

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR DESIGN, SUPPLY, AND INSTALLATION OF LOW AND MEDIUM VOLTAGE LINES, DISTRIBUTION OF TRANSFORMERS FOR DISTRIBUTION NETWORK STRENGTHENING AND UPGRADING THE SINGLE-PHASE LINES TO THREE PHASES IN THE NORTHERN PROVINCE OF RWANDA**



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## EXECUTIVE SUMMARY

Rwanda is experiencing significant socio-economic development, and it is crucial to have facilities that can support the country's ambitions. In this context, the Government is making efforts to improve infrastructure facilities, including ensuring a sustainable supply of electricity in both urban and rural areas to achieve 100% access to electricity nationwide by the year 2024. Under the First National Strategy for Transformation (NST1) for 2017–2024, access to electricity also surged from 34.4% to 78.9 % (MINICOFIN, 2024). Under NST2 (2024-2029), the country intends to scale up of access to electricity and will focus on connecting productive users (such as industries, commercial facilities, schools, health facilities, agro-processing plants, and other facilities) that contribute to socioeconomic development. The ongoing initiatives to provide households with electricity will continue, with the goal of scaling up access from the current level of 78.9% by ensuring that electricity is accessible in all cells and villages of the country.

The Government of Rwanda (GoR) has also shown its ability to carry out large-scale investment programs by pooling funds from various development partners using a 'Sector Wide Approach', particularly in the energy sector. As part of this effort, the Government of Rwanda, in collaboration with multiple development partners (MDPs), initiated Accelerating Sustainable and Clean Energy Access Transformation (ASCENT), under the Rwanda Universal Energy Access Program (RUEAP). The Program Development Objective aims to enhance access to energy and improve the efficiency of energy service delivery to households, businesses, and public institutions in Rwanda. Though proposed activities under ASCENT aims at improving community livelihoods and contribute to economic development, it is anticipated that proposed activities may have negative environmental and social impacts if mitigation measures are not proposed and implemented.

In this regard, Rwanda Energy Group (REG) through its subsidiary Energy Development Corporation Limited (EDCL) has appointed the Bureau for Engineering and Environmental Studies (BESST Ltd) to conduct an Environmental and Social Impact Assessment study related to the project design, supply and installation of new MV and LV lines; design, supply and installation of distribution transformer for distribution network reinforcement; and upgrading the single lines to three phases lines in the Northern Province.

### **Purpose of the ESIA study**

The purpose of this ESIA is to provide the necessary information on potential E&S risks and impacts of the proposed project activities to guide decisions for the relevant institutions. The ESMP also provides guidelines for the proposed project to be implemented in an environmentally sound manner, consistent with established environmental regulations. This report proposes mitigation measures to potential impacts that have been identified, which are required to be implemented during implementation of the present project.

### **Project location and description**

The ASCENT will be implemented in 27 districts across the country and the city of Kigali with the aim to improve the rate of access to electricity supply countrywide. This ESIA is for the Northern Province covering all 5 Districts of the Northern province namely Musanze, Burera, Gakenke, Rulindo and Gicumbi. The project is designed as Engineering, Procurement, and Construction (EPC), thus the design is not yet done to provide detailed information that shall be contained in this ESIA. However, the feasibility study indicate that project activities will consist at three complementary scopes: Design, supply and installation of new MV and LV lines; design, supply, installation and distribution of transformers for distribution network reinforcement; and upgrading the single lines to three phases lines. Specific activities of the project are as follow:

- Construction of MV and LV electrical lines
- Erection of distribution transformers for network reinforcement
- Distribution and installation of transformers
- Upgrading of identified single phases lines to three phases lines;
- Clearing of the line's right-of-way;
- Excavation works and other earthmoving and poles erection;
- Transportation of project materials
- Cable stringing;
- Lines energizing;
- Lines commissioning;
- Maintenance including the clearing of the right of way during the operation phase.

## **Project alternatives**

As the project design is not yet completed and the specific location of project implementation sites are not yet known the identification of project alternatives includes the consideration of the project developer's implementing entity 'preferred option', as detailed in the preliminary route design and drawings the environmental and social considerations to ensure anticipated impacts are avoided and eliminated, easy access to facilitate the transportation of project materials etc. Other project alternatives identified included:

- 1) Route alignment and/or location of project activities;
- 2) Designs of electrical infrastructure and what technology is proposed;
- 3) Use of alternative technology; and
- 4) Various implementation methods and techniques.

The above aspects are considered, and the alternatives identified for the project are:

- No project option
- Overhead power lines consideration
- Underground power lines consideration
- Alternatives sources of energy generation and
- Construction methods and technology
- Offsetting or Compensation of the losses generated by the sub-project

The preferred option is "Overhead Power Lines." This option remains cost effective and is a well-established method of distributing electricity in rural areas in Rwanda. It is proposed that the specific routes to be used are mostly in the roads reserve, thus significantly reducing the environmental impacts, as well as those resulting from maintaining the RoW where necessary.

## **Legal, regulatory and institution framework**

The project implementation is intended to be implemented in full compliance with both national and international regulations related to environmental and social standards. At the national level, environmental regulations start with the Constitution of the Republic of Rwanda which articulates the rights and responsibilities of all citizens and the role of the state in environmental protection. The constitution also recognizes ownership of property and in case the right is taking procedure of public interest, procedures are determined by the law and subject to prior and fair compensation.

Other key national policies, laws, orders and strategies relevant to the project include those related to environmental management and protection, land use and management only to mention some. The international treaties and conventions as signed and rectified by the GoR applicable to the project were also consulted as detailed in this report. The environmental and social assessment considered also international policies and standards applied to ASCENT including WB Environmental and Social Standards (ESS) Asian Infrastructure Investment Bank (AIIB) and other Development Partners (DP). The WB ESS applied to the project are:

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2: Labor and Working Conditions;
- ESS3: Resource Efficiency and Pollution Prevention and Management;
- ESS4: Community Health and Safety;
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ESS8: Cultural Heritage;
- ESS10: Stakeholder Engagement and Information Disclosure.

## **Stakeholders Engagement**

Information collected from the preliminary desk review was completed by information obtained through interviews with key stakeholders. The methodology used for stakeholder consultation consisted of interviews and meetings that were organized at different locations of the project sites. At each site, the consultant used a guiding questionnaire with a topic for discussion to provide information about the project. Discussions allowed participants to provide their opinions, and concerns to the project as well as provide some guidance and recommendations. Telephone calls were also used to gather information and data, especially from REG branches operating in the project areas the attendance list and photo log of the consulted people is available on annex 11 of this Report.

### **Positive impacts**

Regarding the social impacts, the study identified that positive social impacts would result from the new (or improved) electricity supply, which allows economic development and improvements in living conditions. The positive social and environmental impacts during the planning phase are:

- Temporary job opportunities for those who will be working for the project including line surveyors
- Income generation
- Knowledge transfer among those who will be recruited to work with experts.

The positive social and environmental impacts of during the construction phase are:

- Temporally job opportunities for project workers
- Income generation
- the creation of financial income because of the temporary jobs that will be created for local workers;
- the creation of financial income for local traders selling food items along the construction sites
- knowledge transfer

The positive social and environmental impacts of during the operation phase are:

- Value addition to the agricultural products and More reliable services and facilities. This is observed through the availability of grinding mills and other machinery which can process agricultural products that will be set up, or operate at a cheaper cost due to the availability of electricity in the project areas. This will provide value addition to the agricultural products produced by the local farmers there by boosting the economy and the farmer's income.
- More reliable services and facilities will be available at the Health Centres, Schools, Trading Centres and other related services along the project area.
- The standard of living within the project area will generally improve. Positive impacts will be observed in health, the water sector, education, security, communication, and economic activities. Enhanced services will provide significant benefits to the population, gradually improving their quality of life due to the availability of electricity.
- Support to Telecommunications infrastructure operations such community radios, internet cafes as well as phone charging will be observed and reliable. With steady electrical power supply from the national grid, the costs of operations of telecommunication companies will significantly reduce, as well as availability of mobile communication will increase. This as well impacts on businesses and social services positively.
- Improvement and extension of the electricity will lead to improved security through better street lighting in the suburban areas and their environs which will contribute to security of residents and investments.
- Setting up of small-scale industries such as welding workshops, maize mills, carpentry workshops and other cottage activities will increase leading to further employment after completion of the project. On a short-term, the project will bring about creation of jobs during the construction phase. people in the project areas are likely provide labour force etc for skilled, semi-skilled and unskilled labor etc.

The positive social and environmental impacts during the decommissioning phase are:

- Job opportunities and income generation

### **Negative impacts during planning and construction**

The predicted negative impacts for the implementation of the present project were assessed by considering different planned activities and are presented in three main project phases: design and planning phase, construction phase and operation phase. For each negative impact identified, mitigation measures were proposed. for instance, there will be a few activities that include but not limited to excavations, soil disturbance, increased traffic around project sites due to delivery of various project construction materials etc. All these are likely to pollute and degrade the local environment, through mudslides, noise, and dust and air pollution. Potential adverse impacts emanating from the project include:

- Lack of qualified environmental and social risks management personnel and Instruments: This ESIA is prepared when the detail design is not yet conducted and there might be changes and addition information once the design is completed. Thus, it is important that resources are allocated for assessment site specific impacts, prepare and implement contractor management Plans. This requires recruitment of qualified personnel at contractor and supervising consultant to ensure that proposed mitigation measures are implemented and monitored.

- Loss of crops and trees along the Right of Way and pole's foundations: The alignment of the distribution lines will to the most extent be restricted to the road reserve, pathways and agriculture lands. However, to some extent, during line route survey and electrical lines construction, there will be destruction and removal of natural vegetation, crops and trees. The community in project areas is mostly involved in crop cultivation and animal rearing at subsistence level. Dominant crops in the project areas include maize, cassava, soya beans, sunflower, sweet potatoes, and fruit trees like oranges among others. The removal of tree species and crops will affect local community and food supply chain and income.
- Labor influx and labour issues, risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA): in the project area: A number of workers will be engaged by the contractor to ensure completion of works as per schedule. The workers could come from the project sites or from the neighbouring areas. Some personnel will be involved in erection of pole with others in conductor stringing and installation activities. Working conditions including wages, working hours, use of child labor, sexual harassment among workers and to the community, and workers' grievances may arise. Further, cases of drunkenness, robbery and insecurity, sexual exploitation, and gender-based violence and as well as pressure on existing social infrastructure may also be observed.
- Injuries or fatalities from improper manual handling: The most common injuries or illnesses connect to similar projects because of manual handling are musculoskeletal disorders in various parts of the body (back, neck, shoulders, or other) and include from sprains and strains to damage to muscles, joints, and vessels. Other injuries that may arise include cuts, bruises, lacerations, and fractures due to unexpected events such as accidents caused by manual handling.
- Possible increases of HIV/AIDS and other communicable diseases: Risk of increase of HIV/AIDS and other Sexually Transmitted Diseases (STD) due to the increase of people from outside of the project zone may arise among workers. Though there is no workers camp site planned for this project communicable diseases contamination may be anticipated among workers.
- Health and Safety issues: Accidents including cuts, pricks and bruises; electrocution from naked electrical cables; falling in uncovered manholes and trenches, from raised places and on slippery could occur. accidents may also occur and resulting from lack of supervision and job training, improper handling of machinery and hand tools and inappropriate carrying out of tasks.
- Increased traffic in the project area: This project will be implemented in remote and rural areas where traffic is not intensive. In different areas only observed traffics (during the visits of the project sites) are those temporarily available from outside the project area transporting harvest, and other materials. However, during project implementation period, they will be increased of traffic due to moving vehicles transporting project materials and personnel. Therefore, young people may strike or run over by moving vehicles causing minor to major injuries (fractures, wounds) or, falling from vehicles, causing injuries and to some extent vehicles may hit people especially children playing in roads.
- Impacts on soil and water: The project works will involve excavations of pole sites and later back filling. Excavation may cause loss of soil and erosion leading to siltation of natural drainage systems and water courses. For this reason, impacts will only be limited to the top soils, without significant intrusion to underlying groundwater, bedrock or any geological features. Soils, surface waters and groundwater will be susceptible to contamination from various sources during the poles installation process. Soil erosion could occur as a result of the removal of vegetation and the disturbance of soils by vehicles or equipment in areas where the distribution lines will transverse, particularly the pole sites. Siting of poles also has to take into consideration local drainage patterns and climate variability, particularly changes in rainfall intensity in the targeted areas.
- Generation of Solid waste: During construction, different types of wastes will be generated. These may include the remains of conductors, conductor drums, left over insulators and other remains of the materials used in construction. Cardboards and other packaging are also expected. Solid and hazardous waste can cause a number of impacts on the surrounding environment. Except for the hazardous fraction of construction waste, the remaining material is likely to be mainly inert and does not pose a threat to human health or the environment. other human waste will also be generated by workers of the project.
- Noise and Vibration pollution: Noise and vibrations will result from construction works, including excavations, concrete mixing and compaction at pole spots, and from vehicles transporting materials, equipment and workers. The receptors of the noise and vibrations include project site workers, project nearby users and residential nearby areas in the vicinity of the proposed power distribution line routes.
- Impact on ambient air quality: During construction, the ambient air quality at local receptors may potentially be affected by increased dust, particularly during construction material haulage, vehicle movements on unpaved roads, dust from uncovered stockpiled powdery materials or truckloads, emission and particulates from vehicles,
- Human waste disposal issues: Sanitary waste will be an issue of concern since most of the workers will be carrying out various activities at the site throughout the day. The sensitive receptors are the water sources from which the

local community access water e.g. boreholes, unprotected springs, swamps, Lakes, Rivers and streams. Poor human waste disposal will affect the water sources and soil in the project area.

### **Negative impacts during operational phase and maintenance**

- Theft of equipment and Vandalism of power distribution infrastructure: during the operation phase vandalism might lead to electrocution but the magnitude of the impact will be minor if the local community are sensitized on the negative effects of stealing and vandalizing electrical installations. Vandalism will also deny the local community the benefits of constant power supply due to the resulting disruptions.
- Soil and water pollution from transformer oil spillages: There is potential for accidental spillages from transformer oil at any stage of the project cycle that can be a source of concern i.e. during the preparation, construction stage at the equipment storage yard and during the operation phase when maintaining the transformers. This leakage can pollute soils and water sources. Accidental spills can also be experienced when transporting oil to the sites for purposes of filling transformers that may have leaked their oil during transportation, storage, or installation.
- Fire risk: The risk of fire outbreaks during bad weather e.g. storms, winds etc. cannot be overruled especially if electrical faults occur in the “mini” substations. Also failure to maintain the ROW could cause the overgrowth of nearby trees that could end up crashing on the lines during poor weather and hence cause fire outbreaks of black outs.
- Air pollution: Decommissioning impacts on air quality will be similar to construction impacts due to the presence of construction vehicles and trucks. This is considered to be a moderate negative impact as a result of localized dust.

### **Mitigation measures**

Mitigation measures for each of the adverse impacts anticipated were proposed to an extent that they can be avoided, reduced, limited or eliminated, and manageable. Furthermore, an Environmental and Social Management Plan and an Environmental Monitoring Plan indicating the mitigation measures, the procedure to be followed, monitoring indicators, the responsible institutions and likely cost of implementing each of these mitigation measures have all been detailed in this report.

Land use restriction is expected within the RoW and will be carried out in accordance with the prevalent laws of Rwanda, The WB ESS guidelines on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS5), which require identification and quantification of any impacts on land-based livelihood, and adequate compensation to landowners and people relying on the land for their livelihood. For this specific project, no land acquisition is planned. The location of transformers will be road reserves and public spaces. For line routes, land owners shall be able to continue to use the land with some restrictions on land use like construction of the houses under electrical lines, planting trees beyond 3 meters, etc as per RURA Guidelines. Fair compensation will be ensured for crops and trees to be affected by the project activities. Where applicable, compensation would be paid before the start of works. Another method to mitigate the impact of land restriction by the project is to allow the continuation of agriculture within the ROW on conditional terms and in compliance with strict vegetation management guidelines. As part of the livelihood restoration, PAPs will be guaranteed jobs during the project implementation.

### **Environmental and Social Management Plan (ESMP)**

Mitigation measures have been identified by considering each impact, especially what can be done about the high and medium negative impacts. The mitigations are synthesized and presented as a final set of mitigation measures in the Environmental and Social Management Plan (ESMP).

### **Implementation and Monitoring arrangement**

REG/EDCL is the lead agency in the implementation of the developed ESMP and the overall project monitoring. Its main role will be to implement the recommended mitigation measures for each impact identified. Contractors of the project will also work hand in hand with the districts to implement the provided impact mitigation measures. An E&S risks management team under EDCL is assigned to formally address environmental and social issues on a routine basis and will have oversight of environmental and social aspects of the construction contracts, including the enforcement of all monitoring provisions, the location of temporary storage sites for poles and other materials, the resolution of any complaint arising from PAPs, etc.

### **Conclusion**

Given the nature, location, and planned project works, the consultant has identified impacts pertaining to the project and has recommended mitigation measures with a detailed Environmental and Social Management Plan (ESMP) that provides

a way forward for their implementation. Project benefits are found to be far outweighed the negative impacts and for which a mitigation plan has been prepared. To this extent, the consultant is of the view that the project be implemented with careful implementation of proposed measures. Taking into consideration that detailed design is not yet available to assess site specific impacts, it is recommended that the contractor's contracts include the provisions to prepare and implement a detailed contractor's Environmental and Social Management Plan (C-ESMPs) once the detailed design is finalized. Further, it is recommended to prepare a Resettlement Plan for crops and trees to be affected in the right of way and where poles will be installed. The estimated amount for the implementation of proposed mitigation measures is estimated at **966,400 US\$** including compensation funds estimated at **790,800 US\$** and will be updated based on the final detailed design and C-ESMPs.

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## ACRONYMS

|                 |                                                                   |
|-----------------|-------------------------------------------------------------------|
| 7YGP            | : 7-Year Government Program                                       |
| AIIB            | : Asian Infrastructure Investment Bank                            |
| ASCENT          | : Accelerating Sustainable and Clean Energy Access Transformation |
| BESST           | : Bureau for Engineering and Environmental Studies                |
| CO <sub>2</sub> | : Carbon Dioxide                                                  |
| EAC             | : East Africa Community                                           |
| EDCL            | : Energy Development Corporation Limited                          |
| EIA             | : Environmental Impact Assessment                                 |
| ESIA            | : Environmental and Social Impact Assessment                      |
| ESMF            | : Environmental and Social Management Framework                   |
| ESMP            | : Environmental and Social Management Plan                        |
| ESS             | : Environmental and Social Standards                              |
| ESSP            | : Energy Sector Strategic Plan                                    |
| EUCL            | : Energy Utility Corporation Limited                              |
| GOR             | : Government of Rwanda                                            |
| ICT             | : Information & Communication Technology                          |
| LMP             | : Labour Management Procedures                                    |
| LV              | : Low Voltage                                                     |
| MINECOFIN       | : Ministry of Finance                                             |
| MININFRA        | : Ministry of Infrastructure                                      |
| MoE             | : Ministry of Environment                                         |
| MV              | : Medium Voltage                                                  |
| MW              | : Mega Watts                                                      |
| NGOs            | : Non-Governmental Organizations                                  |
| NST2            | : National Transformation Strategy – Phase 2                      |
| OS              | : Operational Standards                                           |
| RDB             | : Rwanda Development Board                                        |
| REG             | : Rwanda Energy Group                                             |
| REMA            | : Rwanda Environment Management Authority                         |
| RoW             | : Right-of-Way                                                    |
| RPF             | : Resettlement Policy Framework,                                  |
| RSSB            | : Rwanda Social Security Board                                    |
| RUEAP           | : Rwanda Universal Energy Access Program                          |
| RURA            | : Rwanda Utility Regulatory Agency                                |
| SDGs            | : Sustainable Development Goals                                   |
| SEP             | : Stakeholder Engagement Plan                                     |
| WB              | : World Bank                                                      |

## 1. INTRODUCTION

Rwanda is undergoing significant socio-economic development, and it is imperative to have facilities that can support the country's ambitions. In this framework, the Government is making effort to increase infrastructure facilities including the sustainable supply of electricity in both urban and rural areas with the target of achieving a 100% access to electricity by the year 2024 countrywide. Under the First National Strategy for Transformation (NST1) for 2017–2024, Access to electricity also surged from 34.4% to 78.9 % (MINICOFIN, 2024). Under NST2(2025-2029), the country intends to scale up of access to electricity and will focus on connecting productive users (such as industries, commercial facilities, schools, health facilities, agro-processing plants, and other facilities) that contribute to socioeconomic development. The ongoing initiatives to provide households with electricity will continue, with the goal of scaling access up from the current level of 78.9% by ensuring that electricity is accessible in all cells of the country.

The NST2 aims to lay the foundation for achieving upper-middle-income country status by 2035 and high-income status by 2050. It is guided by the Sustainable Development Goals (SDGs), the Africa Union Agenda 2063 and its first 10-Year Implementation Plan 2014–2023, and the East African Community (EAC) Vision 2050. The Government of Rwanda (GoR) has also demonstrated its ability to implement large-scale investment programs that pool funds from multiple development partners under a 'Sector Wide Approach', including in the energy sector. To achieve the above objective, the Government of Rwanda in collaboration with multi-Donor partners (MDPs) designed the Rwanda Universal Energy Access Program (RUEAP) which has the main objective of improving access to energy and efficiency of energy service delivery to households, businesses, and public institutions in Rwanda. Under NST2, the country will focus on scaling up access to electricity (on-grid/ off-grid) to productive users (industries, health facilities, schools, agro-processing plans among others) and rolling out access to electricity in all cells of the country to facilitate household connections, Increase energy generation capacity to meet demand projection and maintain the spinning reserve and Increase the share of renewable energy in power generation mix.

### 1.1 ASCENT Project description

The ASCENT is a large energy sector investment financing project to support the Government of Rwanda's energy access objectives to achieve energy sector targets. Project would have a total volume of an estimated US\$ 400 million. The total IDA investment would be US\$300 million and US\$ 100 million investments from AIIB, spread across four components of i) increasing access to grid electricity, ii) enhancing the efficiency of electricity service, iii) increasing access to off-grid electricity and clean cooking solutions, and iv) Institutional Capacity Building, Technical Assistance and Implementation Support for energy access acceleration. The grid-related and technical assistance components will be implemented by the ASCENT Project implementation Unit (PIU). It will use Energy Access and Quality Improvement Project (EAQIP) staff, a project in Energy Development Corporation Limited (EDCL), which is the continuity of Energy Access Roll out Program (EARP) that has demonstrated its effectiveness under the Electricity Access Scale-up and Sector Wide Approach (SWAp) Development Project (EASSDP) project (IDA16). The Component 3 "Increasing Access to Off-Grid Electricity, Clean Cooking Solutions, and Productive Uses of Energy (PUE)" - more specifically sub-components 3a, 3b, 3c and 3d - will be implemented by the Development Bank of Rwanda (BRD) which will administer and disburse the funds to the service providers while EDCL will be the technical counterpart focusing on the implementation of sub-component 3e which is about Increasing access to clean cooking for public Institutions.

The World Bank and AIIB funds will be used to connect about 420,000 households (including 79,000 fill-in connections). The districts to be covered under the project are Gisagara, Huye, Muhanga, Nyamagabe, Nyanza, Nyaruguru, Ruhango, Bugesera, Gatsibo, Kayanza, Kirehe, Ngoma, Nyagatare, and Rwamagana. Other districts can be considered during project implementation. The financing will help these districts to reach 75 percent electrification, as well as support fill-in connections in areas with existing grid connectivity. Fill-in connections will be done in the Musanze, Rubavu, Nyagatare, Rwamagana, Gatsibo, Ruhango, Bugesera, Kamonyi, Muhanga, and Nyanza districts, and potentially other districts identified during implementation. Project implementation will commence in areas with no ongoing electrification projects and will commence in a phase-wise manner in areas with ongoing electrification projects.

This ESIA report focuses on the design, supply and installation of new MV and LV lines; design, supply and installation of distribution transformer for distribution network reinforcement; in all districts of the Northern Province. The map below indicates the administrative District allocation of each development partner whereby the co-financing has the same colour as shown below:

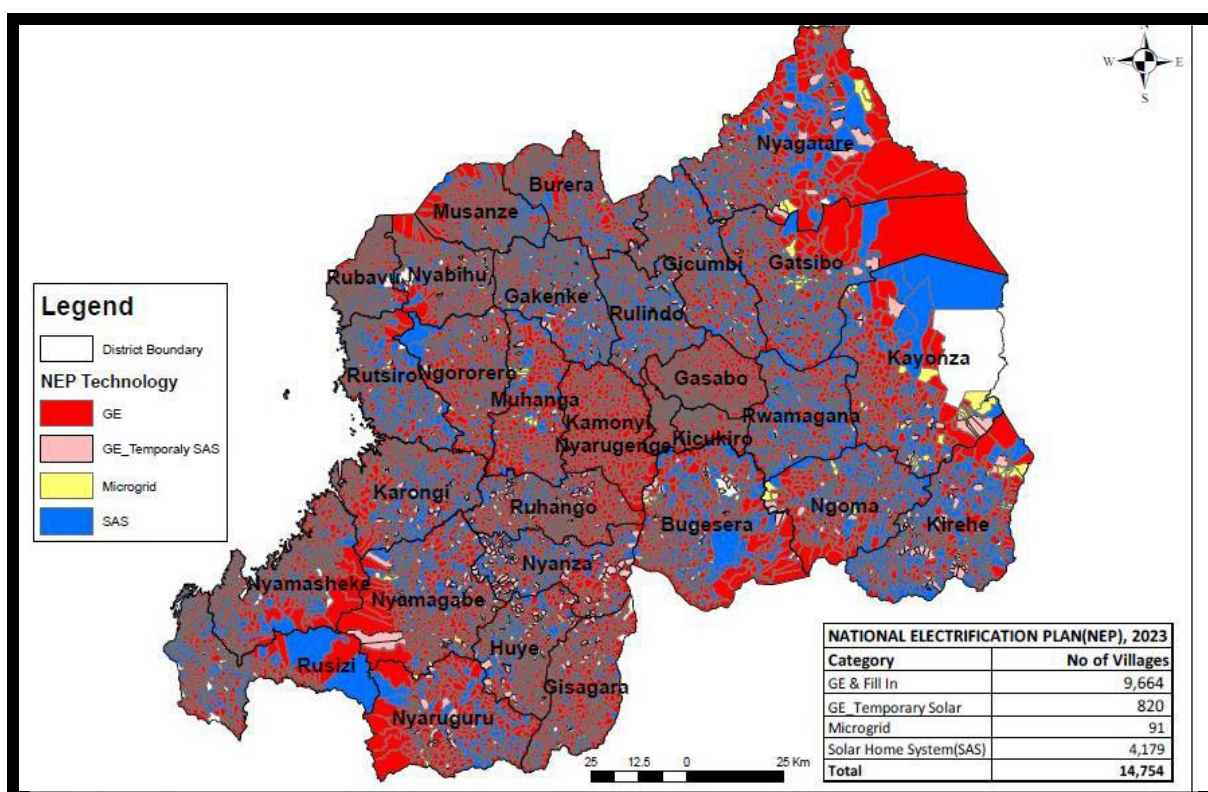


Figure 1: Proposed map indicating the project location and scope

Source: REG-EDCL, 2024

## 1.2 Summary of ASCENT Project Description

Table 1: Summary ASCENT Project components

| Project Components     |                                                                                                                 | Link to MPA Program Pillars                                                                                                                                                      | IDA US\$ (m) | AIIB US\$(m) | Total US\$(m) |
|------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|---------------|
| 1                      | Increasing Access to Grid Electricity                                                                           | <b>Pillar 2:</b> Expanding Grid Electrification through investments in grid network expansion and reinforcement                                                                  | 207.75       | 69.25        | 277           |
| 2                      | Enhancing the Efficiency of Electricity Services                                                                |                                                                                                                                                                                  | 54.75        | 18.25        | 73            |
| 3                      | Increasing Access to Off-Grid Electricity and Clean Cooking                                                     | <b>Pillar 3:</b> Scaling Distributed Renewables and Clean Cooking through financing of off-grid solar and clean cooking solutions, including through private sector mobilization | 22.5         | 7.5          | 30            |
| 4                      | Institutional Capacity Building, Technical Assistance and Implementation Support for Energy Access Acceleration | <b>Pillar 1:</b> Platform to accelerate energy access through development of institutional capacity and mobilization of funding, including scaling up climate funding            | 15           | 5            | 20            |
| <b>Total financing</b> |                                                                                                                 |                                                                                                                                                                                  | <b>300</b>   | <b>100</b>   | <b>400</b>    |

Source: RUEAP, ESMF-ASCENT, 2024.

## 1.3 ESIA consultant

The present ESIA report was prepared by the Bureau for Engineering and Environmental Studies (BESST Ltd). BESST Ltd is a private company registered with the Rwanda Development Board (RDB) and is a certified EA firm of expertise under the Rwanda Association of Environmental Professional Practitioners (RAPEP/EA/071). It has its headquarters in Kigali Rwanda, Gasabo district, KG 182 St, Martin Plaza, second Floor. The company is specialized in Environmental

Studies, Social Studies, Feasibility and Engineering design studies, social assessment, Involuntary Resettlement, Climate Change risk assessment, socio-economic assessment, baseline surveys, waste management, water and sanitation, and advisory services in sectors ranging from Agriculture, energy development, Infrastructure and housing development, transport, and water supply.

#### **1.4 Project implementing entity**

The present project will be implemented by the Rwanda Energy Group (REG). REG has established a Project Implementation Unit (PIU) in its subsidiary, EDCL, to provide the leadership that will run the project in coordination with the departments within EDCL. The PIU is responsible for ESMF development and approval and control over its implementation and advice to EDCL and the Contractor on compliance with WB Environmental and Social Standards, and national laws in the field of environmental and social protection during all project activities. The PIU will carefully analyse the project scope, their availability to the project activities and their capacity for the successful implementation of the project. If need be, they can suggest additional supporting staff for the project and ESMF/ESIA implementation.

The project will utilize the implementation arrangements of the on-going EAQIP (P172594) and Renewable Energy Fund (REF; P160699) and will be jointly implemented by EDCL. As under EAQIP, EDCL will cover all grid-related components (components 1 and 2), the institutional clean cooking program (subcomponent 3e), and the overall program coordination. Using the same implementation arrangements that are efficiently working under EAQIP will eliminate duplication of effort and transaction costs for the GoR, enhance the efficiency of implementation, strengthen the capacity of the Government institutions, and help streamline development partner coordination of the program. The project will utilize the existing PCU that was created for the implementation of the RUEAP program, under which the EAQIP project is being implemented

#### **1.5 Objectives of the ESIA study**

The overall objective of the assignment is to develop an Environmental and Social Impacts Assessment (ESIA) and Environmental and Social Management Plan (ESMP) to ensure that the project is implemented in an environmentally and socially sustainable manner and full compliance with Rwandan and other international environmental and social policies and regulations. These include the World Bank and AIIB Environmental and Social Standards triggered by the project. The ESIA shall also comply with all provisions included in the framework documents including the Environmental and Social Management Framework (ESMF), Resettlement Policy Framework(RPF), Labour Management Procedures(LMP) and Stakeholder Engagement Plan (SEP).

The specific objectives are to:

- Contribute to the environmental and social design of the project;
- Establish a baseline for biophysical, climatic conditions and socio-economic data of the project areas of intervention.
- Identify all potential adverse environmental and social impacts of the project and recommend mitigation measures;
- Develop a comprehensive Environmental and Social Management Plan (ESMP), which will include costs for mitigation; and
- Identify appropriate measures for mitigating the potential negative impacts of the project;
- Facilitate informed decision-making, including setting environmental terms and conditions for implementing the project.
- Prepare an ESIA Report for submission to the Rwanda Development Board (RDB) for project approval and EIA Certificate issuance.

#### **1.6 Scope of the study**

Scoping of the study was conducted to collect relevant information to ensure that the ESIA is prepared in compliance with national and international guidelines and procedures. The study covered the impacts of the projects of design, supply and installation of new MV and LV lines; design, supply and installation of distribution transformer for distribution network reinforcement; and upgrading the single lines to three phases lines in the Northern province. Both environmental and social impacts were covered from the planning phase, construction, and operational phases and considered the site selected and its surroundings mainly this ESIA covers component one under ASCENT project. The scope involved to:

- Identify which legislation, and policies (both local and international) are likely to influence this project and how the project will comply with these regulations. Both national and internal were reviewed
- Develop an overview of the baseline environment of the project intervention area. i.e. study area description, physical, biological, and social- economic-environment etc.
- Develop an overview of likely impacts (both positive and negative) that could be caused by the project in its all phases.
- Propose mitigation measures against the predicted adverse impacts.
- Propose an Environmental and Social Management Plan (ESMP) on how these mitigation measures can be implemented.
- Propose an Environmental and Social Monitoring Plan with measurable indicators and parameters for these mitigation measures to ensure the sustainability of the project.

## **1.7 Approach and methodology**

The methodology used to conduct this environmental and social impact assessment was drawn from the general guidelines for conducting ESIA in Rwanda, the terms of references provided by the client and as approved by the Rwanda Development Board, the consultant's technical proposal, and the best practices drawn from international environmental and social policies to conduct such studies. It involves several stages from scoping to understanding and establishing boundaries of the study, the desk review, field visits, review, consultations with stakeholders and local residents existing data analysis (secondary and primary data), prediction of positive and negative impacts, analysis of alternatives, and proposal of mitigation measures leading to the preparation of an Environmental and Social Management Plan and Monitoring Plan.

Given that the project is an EPC and detailed design is not yet conducted, the environmental and social Impact assessment was based on available information in the preliminary feasibility study, specifications included in tender documents and information collected during field visits in sample location in districts Northern Province of Rwanda namely Musanze, Gicumbi, Gakenke, Rulindo and Burera. And focuses on the design, supply and installation of new MV and LV lines; design, supply and installation of distribution transformer for distribution network reinforcement; and upgrading the single lines to three phases lines in the above-mentioned districts. The stakeholders were consulted during the preparation of this ESIA report and the annex 3 indicates the contacted stakeholders and their concerns or suggestions have been considered as part of this ESIA Report.

### **1.7.1 Documents review**

A desk work was done concentrating on existing institutional legislation, policies, and laws that are likely to influence the project development. Among the key reviewed documents, they include:

- Environmental and Social Management Framework (ESMF) for ASCENT
- Resettlement Policy Framework (RPF) for ASCENT
- Environmental and Social Commitment Plan (ESCP)
- Fifth Population and Housing Census – 2023
- Stakeholder engagement Plan (SEP) for ASCENT,
- World Bank Environmental and Social standards
- District development strategies (DDSs)
- World Bank ESF

### **1.7.2 Socio-Economic baseline data collection**

Socio-economic baseline data used were collected in different project areas of intervention through a survey and interviews with local resident. Primary data were collected during the sites visit which were conducted in this region from the 29th January up to 5<sup>th</sup> February 2024. Data collection used interviews, key informants and focus group discussions. The collected data were completed by data generated from the 5<sup>th</sup> Population and Housing Census conducted by the National Institution of Statistics (NISR) as published in 2023. The presented data covers the Northern province and only indicators related to the project were selected. Used data provided are dependent on the information generated for the thematic report of the census, the details on baseline socio-economic is found in chapter 4 of this ESIA Report.

### **1.7.3 Physical and biological baseline survey**

The physical and biological data were collected from literature review for each district and the information gained was

enriched during the field surveys and included those reported by residents of the project areas that were collected during interviews. Information collected during the field surveys includes those related to the fauna and flora of the project sites. Data were collected using a check list that was developed prior to site survey. Photo using camera was also used to collect enough data that were analysed in return after the survey. For assessing the conservation status of each species, we used the IUCN Red List of Threatened Species, version 2020-2 (IUCN, 2020). In addition, the ministerial order No 007/2008 of 15/08/2008 establishing the list of protected animal and plant species was consulted to identify plant and animal species protected in Rwanda. It is most important to note that there were no endangered or listed species on the IUCN red list or any species protected in Rwanda that were recorded to be affected by the project activities. This is mostly due the fact that in the project areas as most of the line routes will be passing along the existing buffer zones of the roads of the project areas whereby vegetation is almost cleared and only bushes and shrubs are noted.

#### **1.7.4 Stakeholders' consultations**

Information collected from the preliminary desk review was completed by information obtained through interviews with key different stakeholders. The methodology used for stakeholder consultation consisted of interviews and meetings that were organized at different locations of the project sites. At each site, the consultant used a guiding questionnaire with a topic for discussion to provide information about the project. Discussions allowed participants to provide their opinions, and concerns to the project as well as provide some guidance and recommendations. Telephone calls were also used to gather information and data, especially from REG branches operating in the project areas. the attendance list and photolog of the consulted people is available on annex 3 of this Report.

## 2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The project's Environmental and Social Impact assessment is conducted to ensure that the proposed project is aligned with and contributes to national and international sustainable development. Thus, the process includes the identification and description of relevant laws, regulations, and standards governing environmental quality, safety and health, protection of sensitive areas, protection of endangered species, etc.

In Rwanda, the national development objectives and environmental management targets are well established in both long-term and short-term strategic plans. This is noted in the Vision 2050 aspirations that provide national targets by 2050 in terms of developments and environmental sustainability as well as the National Transformation Strategy (NST1, 2018-2024) that breaks down the long-term targets into medium-term targets. To this extent, policies, laws, regulations, and institutional framework that will oversee the implementation of the present project and the implementation of proposed mitigation measures are provided in this chapter.

### 2.1 National Legal and Regulatory Framework

#### 2.1.1 National Policies relevant to sub-project implementation in Northern Province

##### ✓ Constitution of the Republic of Rwanda, 2023

In consideration of the constitution of the Republic of Rwanda of 2023, article 53 on Protection of the environment, states that everyone must protect, safeguard, and promote the environment. The State ensures the protection of the environment. A law determines modalities for protecting, conserving, and promoting the environment.

##### ✓ Energy Policy (2015)

The national policy objective for the development of the energy sector is to provide input in the development process by establishing efficient energy production, procurement, transportation, distribution, and end-user systems in an environmentally sound manner.

Specifically, the energy policy takes into consideration the need to:

- a) Have affordable and reliable energy supplies countrywide;
- b) Reform the market for energy services and establish an adequate institutional framework, that facilitates investment, expansion of services, efficient pricing mechanisms, and other financial incentives;
- c) Enhance the development and utilization of indigenous and renewable energy sources and technologies,
- d) Adequately consider environmental considerations for all energy activities,
- e) Increase energy efficiency and conservation in all sectors; and
- f) Increase energy education and build gender-balanced capacity in energy planning, implementation, and monitoring.

##### ✓ National Land Policy (2019)

Currently, the land tenure system in Rwanda operates in a dual legal system: On one hand, there is customary law, which governs almost all the rural land and promotes the excessive parcelling out of plots through the successive father-to-son inheritance system. On the other, there is the written law, which mostly governs land in urban districts and some rural lands managed by churches and other natural and legal persons. This law confers several land tenure rights to individuals such as land tenancy, long-term lease, and title deeds (particularly in towns).

##### ✓ National Strategy for Transformation (NST2)

Building on the solid foundations laid by NST1, the five-year strategy seeks to transform Rwanda into a prosperous, inclusive and resilient nation based on five key priorities: creating decent and productive jobs, boosting exports, improving education quality, reducing stunting and malnutrition, and enhancing public service delivery.

Among 14 key objectives on the NST2 include Universal Access to Clean Water and Electricity: By 2029, NST2 aims to ensure that every household, school, and health facility in Rwanda has access to clean water, sanitation, hygiene services, and reliable electricity. This commitment to universal access to electricity will transform lives, improve health, and empower communities across the nation. Under the NST1. Access to electricity also surged from 34.4% to 78.9 % (MINICOFIN, 2024) and under NST2(2024-2029), the country intends to scale up of access to electricity and will focus on connecting productive users (such as industries, commercial facilities, schools, health facilities, agro-processing plants, and other facilities) that contribute to socioeconomic development. The ongoing initiatives to provide households with electricity will continue, with the goal of scaling access up from the current level of 78.9% by ensuring

that electricity is accessible in all cells of the country.

✓ **National Environment and Climate Change Policy (2019)**

The Environment and Climate Change Policy reaffirms the government's commitment to address climate change and its resolve to lessen the potential hardships that climate change may pose to the sustainable development of the country. The policy seeks to provide strategic direction on environment and climate change in Rwanda, bearing in mind its linkages with the country's socio-economic development. The National Environment and Climate Change Policy provides strategic direction and responses to emerging issues and critical challenges in environmental management and climate change adaptation and mitigation. The key issues and challenges identified include high population density, water, air, and soil pollution, land degradation, fossil-fuel dependency, high-carbon transport systems, irrational exploitation of natural ecosystems, lack of low-carbon materials for housing and green infrastructure development, inadequate waste treatment for both solid and liquid waste, increase of electronic, hazardous chemicals and materials waste, among others.

It is evident that the energy component, particularly the production and promotion of clean energy and making it accessible to the citizens is central to the policy, especially implicitly implied in strategic objectives (1) Greening economic transformation; and (4) Promoting climate change adaptation, mitigation, and response. The ESIA is a key instrument to ensure environmental sustainability and hence an element toward the realization of the policy's goals and objectives.

✓ **National Strategy for Climate Change and Low Carbon Development (2022)**

Rwanda's Green Growth and Climate Resilience vision and Vision 2050 are for Rwanda to be a developed, climate-resilient, and carbon neutral economy by 2050.

In achieving this vision there are three Strategic Objectives:

- To achieve Energy Security and Low Carbon Energy Supply that supports the development of Green Industry and Services and avoids deforestation.
- To achieve Sustainable Land Use and Water Resource Management that results in Food Security, appropriate Urban Development, and preservation of Biodiversity and Ecosystem Services.
- To ensure Social Protection, Improved Health, and Disaster Risk Reduction that reduces vulnerability to climate change impacts.

Together these refer to the elements upon which Vision 2050 is built, namely the infrastructure and systems that enable low-carbon growth and sustainable resource use, the natural capital and associated spatial development that ensure sustainable development, and the human capital and inclusion that build resilience of the Rwandan people. The purpose of the Strategy is threefold:

- To guide national policy and planning in an integrated way, ensuring alignment with other key documents
- To mainstream climate change into all sectors of the economy, and
- To position Rwanda to access international funding to achieve climate resilience
- and low carbon development

The Strategy calls upon national planners to chart a new development pathway for integrated sector planning that focuses on balancing cross-cutting issues of resource management. The Strategy is the first step in a continuous process, geared to set Rwanda on a course to identify, describe and monitor its current and future vulnerabilities, and take self-determined actions towards building a robust economy. In the next 5 to 10 years the priority is to increase electricity generating capacity and increase connections to the main grid. Small and medium scale hydro-electric plants will be delivered to ensure as electricity generation increases to power households and industries it does so exploiting green technologies as much as possible. The share of households connected to the main grid will progressively increase once the universal access target (of which 52% connected to the grid) is reached in 2024, and a major priority to build on this progress will focus on generating green energy to power productive economic sectors

✓ **Energy Sector Strategic Plan (2018/19 – 2023/24)**

Energy is central to Rwanda's economy and development plans. It supports all other sectors, including housing and urbanization, manufacturing, agro-processing, mining, tourism, and IT services. As such, a well-functioning, efficient energy sector is a prerequisite for achieving the country's national goals. The ESSP will ensure the effective delivery of the targets for the energy sector as set out under the National Strategy for Transformation (NST-1) and guide the implementation of the National Energy Policy (REP). The ESSP thus functions as a plan that serves to translate policy directives and principles into concrete measures necessary to reach medium-term targets, reflecting current resource

constraints and risk and uncertainties. This Strategy takes stock of the previously existing policies, strategies, and laws about Energy sector in Rwanda. The project aims at the realization of this Strategy's objectives.

✓ **Rwanda Rural Electrification Strategy (2016)**

The Government of Rwanda recognizes the vital role that electricity access plays in accelerating economic development through improving health and standards of living. Energy and particularly access to electricity is the Government's key priority. This is why significant investments have been made and progress registered leading to over 24% of households getting access to electricity. More efforts need to be made for the Government to achieve the set targets of 70% by 2017/18 and 100% by 2020. The Government developed this strategy to ensure that Rwanda's households have access to electricity through the most cost-effective means by developing programs that will facilitate both the end users to access less costly technologies and increase private sector participation in the provision of these solutions.

✓ **National Biodiversity Policy (2011) and Strategy (2020)**

The National Biodiversity Policy recognizes that Rwanda's viability is dependent on the conservation of its biological resources as these resources contribute significantly to livelihoods, food sovereignty, health, the environment, cultural diversity, and the economy. Yet despite the high richness of the Rwanda's biological diversity, the latter continues to reduce worryingly due to population pressure and development needs. This Policy's goal is therefore:

To conserve Rwanda's biological diversity, to sustain the integrity, health, and productivity of its ecosystems and ecological processes, whilst providing lasting development benefits to the nation through the ecologically sustainable, socially equitable, and economically efficient use of biological resources. The Purpose of this policy is to: provide an overarching framework for the conservation, sustainable utilization, access to biodiversity resources, and fair and equitable sharing of benefits derived from the resources.

Therefore, this policy provides for the establishment of a System of Protected Areas whose protection and management are guaranteed by law. In this regard, no activity can be undertaken within the limit of these Protected Areas without the specific authorization of the concerned authorities. The ESIA will endeavour to identify which elements of the biodiversity could be affected by the project and establish the relevant mitigation measures.

✓ **National Forest Policy (2018)**

The National Forest Policy is concerned with issues related to forests, but also to the ecological and economic safety of trees, bush research, forestry under any form, and capacity building. The purpose of that policy consists in making forestry one of the pillars of the national economy and ecological viability.

The ESIA will endeavour to assess if forests and individual trees could be affected during project implementation, through clearing for right of way. Adequate compensation will be implemented accordingly. Restoration of affected trees will be done through repletion of the same affected tree species.

✓ **Revised National Gender Policy (2021)**

The 2021 gender policy emphasizes on effective engagement of men and boys and accelerating gender mainstreaming in the private sector – the engine of Rwanda's economy. The vision of this National Gender Policy is for Rwanda to become a nation that enjoys gender equality and equity toward national and sustainable transformation. The policy requires that institutions devise mechanisms and programs to ensure shared responsibility between men and women over domestic work/unpaid work as well as the use of time and energy saving investments by securing alternative energy sources for cooking.

Furthermore, the policy strengthens existing community structures such as Umugoroba w'Imiryango, Inshuti z'Umuryango to prevent and eradicate Gender Violence (GBV) and child abuse. These will include capacity enhancement of these structures, provision of incentives to care for workers, and provision of clear guidelines for the operationalization of these. It also enhances accountability and access to justice for victims of GBV both men and women, boys and girls. In the framework of implementing this policy, the role of every actor is defined in the light of the decentralization policy, where the implementation role is passed on from the central government to local governments. As part of the implementation of this project, through ESMP, the contractor will make sure to promote recruitment procedures and a working environment that considers gender differences and inequalities.

## 2.1.2 National Regulations

### ✓ **Law n°48/2018 of 13/08/2018 on environment**

The law on environment regulates the protection of the environment in Rwanda and sets out the general legal framework for environmental protection. The law requires to preparation and implementation of environmental management instruments and get required permits before any construction. **Article 30** stipulates that the list of projects that must undergo an environmental impact assessment before they obtain authorization for their implementation is established by an Order of the Minister. An Order of the Minister also issues instructions and procedures for conducting environmental impact assessment. **Article 33** of this law stipulates that the environmental impact assessment, environmental audit, and strategic environmental assessment must be approved by the Authority, or another State organ authorized in writing to do so by the Authority. If the approval is made by an authorized organ, such an organ does so on behalf of the Authority which is also responsible for its audit. **Article 46** stipulates that any person who does not carry out environmental impact assessment before launching any project that may have harmful effects on the environment while it is required, is punished by suspension of his/her activities or closure of his/her association and ordered to rehabilitate the damage to environment, persons, and property. He/she also pays an administrative fine of two percent (2%) of the total cost of the project.

The project will comply with the requirements of the law to get the environmental instruments and get required permits before the project starts. The ESIA process responds to obligations under this law and will ensure that the key principles, as well as the relevant provisions of this law, are fully complied with.

### ✓ **Law n° 32/2015 of 11/06/2015 relating to expropriation in the public interest**

The Law determines the procedures relating to expropriation in the public interest. **Article 3** of this law notes that 'No person shall hinder the implementation of the program of expropriation in the public interest on the pretext of self-centred interests. **Article 17** states that after the publication of a decision on expropriation in the public interest, complete with a list of holders of rights registered on land titles and property incorporated on land, landowners shall not develop any long-term activities on the land, otherwise such activities shall not be compensable during expropriation. In terms of valuation, **Article 22** states that land values and prices for property consistent with the prevailing market rates shall be established by the Institute of Real Property Valuers in Rwanda.

According to **Article 26** land titles must be produced as evidence of ownership and evidence of marital status as applicable. Any persons dispossessed of land, unlawfully occupying land, or having developed activities prohibited after the enactment of relevant laws shall receive no compensation. **Article 27** reaffirms that compensation for land must include any improvements on the land and compensation for disruption associated with expropriation. The compensation for disruption caused by expropriation to be paid to the expropriated person shall be equivalent to five percent (5%) of the total value of his/her property expropriated.

**Article 32** refers to a sign-off by the owner once he/she is satisfied with the valuation. **Article 33** allows for any person not satisfied with the valuation to contest in writing within seven days. Any person contesting the assessed value must engage the services of a valuer or a valuation firm recognized by the Institute of Real Property Valuer in Rwanda, at their own expense, to carry out a counter-assessment of the value. Under **Article 34** if unsatisfied the matter may be referred to the courts. However, the compensation will be paid pending the court's decision so as not to delay expropriation. In terms of payment of compensation, **Article 35** notes that, 'fair compensation can be paid in monetary form in the Rwandan currency, or any other form mutually agreed upon by the expropriator and the person to be expropriated'. **Article 36** notes that compensation must be paid within 120 days of approval by the Ministry, or otherwise becomes null and void, unless mutually agreed otherwise.

### ✓ **Law No 27/2021 of 10/06/2021 governing land in Rwanda**

**Article 34** stipulates that the landowner shall enjoy full rights to exploit his/her land by the provisions of this Law and other laws. The State recognizes the right to freely own land and shall protect the landowner from being dispossessed of the land whether totally or partially, except in case of expropriation due to public interest. The project implementation will consider the ownership and use of land, specifically taking note of land tenure and related compensation matters. The ESIA will provide an avenue for compliance with this law, while its provisions are to be addressed through the Compensation schemes.

### ✓ **Law No 52/2018 of 13/08/2018 governing electricity in Rwanda**

This Law governs activities of electric power production, transmission, distribution, and trading within or outside the

national territory of the Republic of Rwanda. Under this law, there is an establishment of a Universal Access Fund whose main purpose is to optimize access to electricity in all areas of the country through cost-effective means and minimized support. A Presidential Order determines the functioning of the Universal Access Fund.

With regards to the Right of Way, Art 47 provides for authorization to operate in a public or a private domain to be granted for electricity transmission or distribution license holder. However, Art 48 provides for an Expropriation of the right of way for the public interest. The right of way is necessary for the operators in the production, transmission, distribution, and supply of electricity. It shall be exercised by the standards set by the regulatory agency. Expropriation shall be conducted by the Law governing expropriation for public interest.

✓ **Law N° 064/2021 of 14/10/2021 Governing biological diversity in Rwanda**

The purpose of this Law is to conserve, manage, protect and promote biological diversity. Under this Law, Art 13 stipulates that Every person has the duty to defend, protect, conserve and promote the biological diversity. The article 15 stipulates that a Ministerial Order establishes the list of invasive species and this list is reviewed every five (5) years and whenever necessary. Art 16 highlights that activities involving species or specimens included on the list of endangered or protected species as annexed to the law are prohibited unless authorized by the Minister.

It is important to note that there was no sensitive and/ or protected biological diversity as established on the list that has been identified of expected to be affected by the project.

✓ **Law N° 66/2018 of 30/08/2018 regulating labor in Rwanda and its amendment of 18/05/2023**

Labor law is fundamental in creating and maintaining employee relations, high productivity, and a conducive work environment. Rwanda repealed the labour law in 2018 to align it with international best practices. The new labour law distinguishes between collective and individual labour disputes. By this law, an employer is responsible for maintaining the health and safety of the workers at the workplace. The employer is required to keep the workplace in a common state of cleanliness and presentation of hygiene & safety necessary for the health and safety of workers.

✓ **Ministerial order No 001/2019 of 15/04/2019 on EIA**

This order determines the list of projects that must undergo environmental impact assessment, instructions, requirements, and procedures to conduct environmental impact assessment. Its article 3, Annex 1 gives the list of works, activities, and projects that have to be subject to a full environmental impact assessment before being granted authorization to commence. Number 12 of this annex puts this project on the list of projects that must undergo the full EIA. It stipulates those projects of construction of hydro-dams, hydropower plants, and electrical lines of high and medium voltage must undergo the full EIA before the commencement of the Works.

✓ **Ministerial Order No. 007/2008 of 15/08/2008**

According to this Ministerial Order, the species of protected animals are classified into: Mammals, birds, and reptiles (Art 1) and are listed in Appendix I of this Ministerial Order. These animals should not be hunted except when there is prior authorization from competent authorities (Art 2). This list comprises:

Annex 1: - Mammals: 18 species

- Birds: 15 species

- Reptiles: 4 species

Annex II: - Plants: 27 species

The ESIA will determine sensitive and protected species to be affected by the project and devise alternative or mitigation measures.

✓ **Environmental Impact Assessment Guidelines 2006**

REMA has developed the EIA regulations which provide a guide and requirements for EIA in Rwanda. According to these regulations, Article 1 makes it mandatory for all the projects listed under Schedule I to be subjected to a full-scale EIA.

The Article further states that no environmental authorization shall be granted by the Authority for any project in Schedule I to these Regulations if no environmental impact assessment has been submitted to the Authority by the provisions of these Regulations. The Article states that any project listed under Impact Level III of Schedule I to these Regulations shall require a full environmental impact assessment by preparation of an environmental impact report, unless the Authority refuses permission.

## 2.2 National Institutional Framework

### 2.2.1. Institutional framework for energy and environmental management

The next table provide key institutions involved in environmental and social risks management as well as energy sector in Rwanda including key roles and responsibilities.

**Table 2: National Institutional Framework**

| Institution                                      | Objective/ Vision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Roles/ Responsibilities                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ministry of Infrastructure (MININFRA)            | The Ministry of Infrastructure (MININFRA) is responsible for four sectors: transport, energy, water and sanitation, urbanization-human settlements, and housing. For the energy sector, MININFRA oversees the formulation, monitoring, and assessment of policies and programs. Its mission is also to ensure the existence of a proper power generation capacity producing cost-effective energy and to initiate programs to increase access to affordable energy and services                                                                                                                                                                                                                                                                                                        | The ministry is not directly involved in activities involved under ASCENT but projects activities are designed and implemented in compliance with policies and strategies established by the ministry.                                                                                                                            |
| Rwanda Energy Group Ltd (REG)                    | REG's vision is "to be the most efficient and customer-centric utility company in the region". It aims to transform the industry, its dynamic and performance, and to reinforce its customer-centred operations in order "to provide sufficient and quality electricity to our customers at affordable and sustainable rates that support the socio-economic development of the country." Since REG Ltd has taken over the energy operations formerly under EWSA, the Group is composed of two subsidiaries, namely Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL).                                                                                                                                                                       | REG works closely with both EUCL and EDCL in the implementation of ASCENT activities.                                                                                                                                                                                                                                             |
| Energy Utility Corporation Limited (EUCL)        | EUCL is the subsidiary utility in charge of the day-to-day operation of generation facilities, transmission and distribution networks, and the sale of electricity. EUCL plans the transmissions and distribution grids. Its current focus is geared toward consumer satisfaction, demand side management, technical and non-technical loss reduction and energy efficiency. As the sole power off-taker in the country, EUCL is also responsible for negotiations and entering into Power Purchase Agreements with Independent Power Producers.                                                                                                                                                                                                                                       | EUCL is responsible for electricity distribution network and work closely with EDCL in the implementation of ASCENT activities                                                                                                                                                                                                    |
| Energy Development Company Limited (EDCL)        | EDCL is the subsidiary in charge of developing new generation, transmission, and energy access development projects. EDCL's mission is to develop new energy resources locally, bolster investment and develop projects in this field. It is also responsible for reviewing the power master plan and defining a least-cost power development plan. EDCL is therefore also in charge of regional power integration with neighbouring countries and power pools. EDCL works closely with MININFRA                                                                                                                                                                                                                                                                                       | EDCL is the direct implementation Entity for ASCENT activities and associated Safeguards instruments.                                                                                                                                                                                                                             |
| Ministry of Environment (MoE)                    | MoE was established to ensure the protection and conservation of the environment and ensure optimal and rational utilization of Water Resources, Lands and Forests for sustainable national development. MoE is responsible for the development of environmental policies and procedures (including impact assessments), protection of natural resources (water, land, flora, and fauna), environmental legislation, biodiversity, and other environmental aspects.                                                                                                                                                                                                                                                                                                                    | The MoE will monitor and ensure that the project is implemented in a sustainable manner and in line with the existing environmental protection and conservation policies, laws and other legal requirements. In the case that EIA certificate is not issued, project developer may make an appeal to the Ministry of Environment. |
| Rwanda Environmental Management Authority (REMA) | REMA was established to implement the environment matters pertinent to the environment and climate change. REMA acts as implementation organ of environment related policies and laws in Rwanda. Key responsibilities of REMA are: <ul style="list-style-type: none"> <li>– Advise the Government on policies, strategies and legislation related to the management of the environment as well as the implementation of environment related international conventions, whenever deemed necessary;</li> <li>– Conduct thorough inspection of environmental management to prepare a report on the status of environment in Rwanda that shall be published every two (2) years;</li> <li>– Put in place measures designed to prevent climate change and cope with its impacts;</li> </ul> | REMA will be responsible for the environmental audits and project implementation environmental compliance.                                                                                                                                                                                                                        |

| Institution                               | Objective/ Vision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Roles/ Responsibilities                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           | <ul style="list-style-type: none"> <li>- Conduct studies, research, investigations, and other relevant activities in the field of environment and publish the findings;</li> <li>- Closely monitor and assess development programs to ensure compliance with the laws on environment during their preparation and implementation;</li> <li>- Participate in the preparation of activities strategies designed to prevent risks and other phenomena which may cause environmental degradation and propose remedial measures;</li> <li>- Provide, where it is necessary, advice and technical support to individuals or entities engaged in natural resources management and environmental conservation;</li> <li>- Prepare, publish and disseminate education materials relating to guidelines and laws relating to environmental management and protection and reduce environmental degradation risks;</li> <li>- Monitor and supervise impact assessment, environmental audit, strategic environmental assessment, and any other environmental study. REMA may authorize in writing, any other person to analyze and approve these studies. The EIA review has been delegated to Rwanda Development Board.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                           |
| Rwanda Utilities Regulatory Agency (RURA) | RURA has the mandate to regulate Telecommunications, information technology, broadcasting, and converging electronic technologies including the internet and any other audio-visual information and communication technology; Postal services; Renewable and non-renewable energy, industrial gases, pipelines and storage facilities; Water; Sanitation; Transport of persons and goods; Radiation Protection; and other public utilities, if deemed necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RURA carries out investigations including inspections at service delivery sites; imposing administrative sanctions in case of a violation of laws and regulations; facilitating settlement of disputes related to regulated services; issuing directives to the regulated service provider as well as regulating tariffs. |
| Rwanda National Land Authority (NLA)      | <p>NLA is responsible for putting in place and operationalizing an efficient system of land administration, use and management that secures land ownership, promotes investment in land for socio-economic development and poverty reduction. Responsibilities of NLA are:</p> <ul style="list-style-type: none"> <li>- Put in place mechanisms which procure security of land tenure for the promotion of investments in land.</li> <li>- Promote proper allocation of land, and proper use of land resources, according to their potential.</li> <li>- Avoid the splitting up of plots and promote their regrouping to bring about optimum production.</li> <li>- Establish mechanisms which facilitate an optimum exploitation of land, targeting the social-economic development of the country.</li> <li>- Orient land management towards a more profitable and sustainable production, by making good choices among methods of land development.</li> <li>- Develop methods that protect land resources from various types of land degradation.</li> <li>- Establish institutional frameworks, which enable land to become more valuable in the economy or at the market.</li> <li>- Promote research as well as the education of the public on all aspects concerning land tenure, management, and transactions.</li> <li>- Establish order and discipline in the allocation of land, as well as in land transactions to control the pressure on land, inappropriate development, speculation and trafficking of land.</li> <li>- Involve and sensitize the public at all levels to ensure protection of the environment and good management of the land.</li> <li>- Ensure the sustainable use of wetlands</li> </ul> | The role of NLA in this project is to guarantee the wise use of the land allocated for the project and will play key roles in land re-adjustment and registration as well as the land transfer process (where necessary). .                                                                                               |
| Rwanda Development Board (RDB)            | RDB was created by Organic Law N° 53/2008 of 02/09/2008 and has mission of improving the well-being of all Rwandans by fast-tracking development, catalysing sustainable economic growth, and creating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RDB in this project is a key partner as it will be responsible for reviewing the ESIA report and                                                                                                                                                                                                                          |

| Institution                                | Objective/ Vision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Roles/ Responsibilities                                                                                                                                                                                                                                   |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            | <p>prosperity for all. This a one stop institution bringing together several government bodies in Rwanda focused at promoting investment in Rwanda. Initially the responsibility for reviewing and approving ESIA reports was entrusted to REMA, this duty has now been transferred to RDB. Key responsibility of ESIA department under One Stop centre in RDB is to:</p> <ul style="list-style-type: none"> <li>- Receive and register ESIA Applications (Project Briefs) submitted by developers;</li> <li>- Identify relevant Lead Agencies to review Project Briefs and provide necessary input during screening,</li> <li>- Review Project Briefs and determine project classification at screening stage,</li> <li>- Transmit Project Briefs to relevant Lead Agencies and concerned Local Governments to provide input on Terms of Reference (ToRs),</li> <li>- Publicize Project Briefs and collect public comments during development of ToRs,</li> <li>- Receive ESIA documents submitted by a developer and verify that they are complete,</li> <li>- Transmit copy of ESIA Reports to relevant Lead Agencies, Local Governments and Communities to review and make comments,</li> <li>- Review ESIA reports and make decision on approval, organize, and conduct public hearings, appoint an officer from Authority to chair public hearings, receive public comments and compile public hearing reports,</li> <li>- Appoint the Technical Committee and its representative to the Technical Committee,</li> <li>- Forward ESIA Documents (ESIA Report, Environment Monitoring Plan and Public Hearing Report) to the Technical Committee,</li> <li>- Chair the Executive Committee which makes final decision on approval of a project,</li> <li>- Communicate decision on whether a proposed project is approved,</li> <li>- Issue developers ESIA Certificate of Authorization if their projects are approved.</li> </ul> | issuing the EIA certificate before project implementation.                                                                                                                                                                                                |
| Districts and their decentralized entities | <p>As per the Article 61 of the law on environmental, Districts and decentralized entities are responsible for the implementation of laws, policies, strategies, objectives, and programs relating to protection, conservation, and promotion of the environment in Rwanda. decentralized entities are particularly responsible for:</p> <ul style="list-style-type: none"> <li>- ensuring activities related to better management of land, especially controlling soil erosion and tap rainwater;</li> <li>- afforestation, protection, and proper management of forests;</li> <li>- efficient management of rivers, lakes, sources of water and underground water;</li> <li>- efficient management and effective use of swamps;</li> <li>- Protection and proper management of reserved areas, historical sites, endangered animal and plant species.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Districts and local decentralized entities especially the sectors and cells of the project area will play key and different roles through all phases of the project implementation. Both districts are also implementing entity of Resettlement Measures. |

### 2.2.2. Institutional framework for child protection, gender based protection and labour management

In addition to institutions dealing with energy, environment and social risks, there also institutions dealing with other areas such as social protection, child protection, and gender-based protection and labour management which will play a role in the project implementation but also in the implementation of project environmental and social impacts. These institutions are presented in the next table.

**Table 3: National institutions for child protection, social and gender-based protection and labour management**

| Institution                                        | Mission                                                              | Role/ Responsibilities                                                                                                                                                                                        |
|----------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ministry of Gender and Family Promotion (MIGEPROF) | To promote gender equality, family stability, and children's rights. | The ministry will ensure gender equality is mainstreamed in all project activities and will Monitor and evaluate that gender-based violence and family welfare programs. And implemented through the project. |
| National Commission for Children (NCC)             | To promote and safeguard children's rights in Rwanda.                | The commission will play roles in ensuring the protection of all children in all form of the project implementation<br>No child employment will be allowed on the project. .                                  |

| Institution                                     | Mission                                                                                                          | Role/ Responsibilities                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rwanda National Police (Child Protection Unit)  | To prevent and combat child abuse and exploitation, ensure the safety and security of children.                  | The unit will play role in handling cases related to child abuse, neglect, and exploitation, investigate cases of child abuse, protect children from abuse and exploitation and collaborate with other institutions for child protection.                                                                                            |
| Ministry of Public Service and Labour (MIFOTRA) | To ensure productive employment, effective labour administration, and social protection in the labour sector.    | The ministry will play roles related to Protect workers' rights and promote decent employment opportunities, ensure social security for workers. Enforce labour laws and standards and ensure the implementation of social protection policies during the project implementation.                                                    |
| Rwanda Social Security Board (RSSB)             | To manage social security benefits for Rwandans, including pensions, health insurance, and occupational hazards. | The board will play roles in Ensure social protection for all project workers, Provide financial support in case of occupational risks. Manage project worker's health insurance, and occupational risk schemes and will Monitor compliance with social security laws during the project implementation.                             |
| Rwanda Investigation Bureau (RIB)               | To investigate and prevent crimes related to child abuse, labour exploitation, and gender-based violence.        | RIB will play roles to Investigate cases of child abuse and gender-based violence. Collaborate with other institutions for crime prevention and fight crimes related to child exploitation, and abuse etc. RIB works with Isange one stop center and GBV task forces to address gender based violence and Sexual exploitation cases. |
| Gender Monitoring Office (GMO)                  | To promote gender equality and fight gender-based violence through monitoring and advocacy.                      | The office will play roles in Ensuring gender equality in all phases of the project implementation, and combat gender-based violence and discrimination                                                                                                                                                                              |
| National Women's Council (NWC)                  | To promote women's participation in the country's socio-economic development and decision-making processes.      | The council will among other advocate for women's right, Support capacity building and leadership development for women and empower women and enhance their socio-economic status                                                                                                                                                    |
| National Commission for Human Rights (NCHR)     | To promote and protect human rights in Rwanda, with a focus on gender equality and social justice.               | The commission will play roles in monitoring and reporting on human rights violations, investigate cases of labor exploitation, child abuse, and gender-based violence and will among other protect vulnerable groups, including children and women during all phases of the project.                                                |

### 2.3. World Bank's Environmental and Social requirements applicable to the project

The present project implementation is funded by the World Bank and Asian Infrastructure Investment Bank (AIIB). As the World Bank is the lead co-financier, both financiers agreed that the project needs to comply with the WB's Environmental and Social Framework and related ES Standards. The next table summarizes standards relevant to the project and borrows requirements.

**Table 4: World Bank's Environmental and Social Standards applicable to the project**

| SN | World Bank ESS                                                                       | Objectives                                                                                                                                                                                                                                                                                                                                                                                                                    | Borrower Requirements                                                                                                                                                                                                                                                                                                               |
|----|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <b>ESS1: Assessment and Management of Environmental and Social Risks and Impacts</b> | Identify, evaluate, and manage the environmental and social risks and impacts of the project in a manner consistent with the ESS1; Adopt a mitigation hierarchy approach to avoid, minimize (reduce), mitigate, and compensate(offset) Utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate. | Use and strengthening of the Borrower's environmental and social framework for the assessment, development, and implementation of World Bank-financed projects as appropriate.                                                                                                                                                      |
| 2  | <b>ESS2: Labor and Working Conditions</b>                                            | Promote safety and health at work; Promote the fair treatment, non-discrimination, and equal opportunity of project workers; Protect project workers, including vulnerable workers such as women, persons with vulnerability, children (of working age, by this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate;                                                   | Prepare and adopt labor management procedures with provisions on the treatment of direct, contracted, community, and primary supply workers, and government civil servants; Terms and conditions of work, non-discrimination and equal opportunity and workers organizations: prevention of Child labor and forced labour, ensuring |

| SN | World Bank ESS                                                                                | Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Borrower Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                                               | Prevent the use of all forms of forced labor and child labor; Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law; Provide project workers with accessible means to raise workplace concerns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | occupational Health and Safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3  | <b>ESS3: Resource Efficiency and Pollution Prevention and Management</b>                      | Promoting sustainable use of resources, including energy, water, and raw materials; Avoiding or minimizing adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; Avoiding or minimizing project-related emissions of short and long-lived climate pollutants; Avoiding or minimizing generation of hazardous and non-hazardous waste                                                                                                                                                                                                                                                                                                                                                                                                   | the borrower should prepare a plan for compliance with ESS3: Resource Efficiency and Pollution Prevention and Management should that includes a structured approach to minimizing resource use, reducing pollution, and ensuring sustainable environmental practices. The plan shall include but not limited to (i) Resource Efficiency Plan; (ii) Pollution Prevention and Management Plan; (iii) Greenhouse Gas (GHG) Emissions Management; (iv) Sustainable Management of Chemicals and Hazardous Materials; (v) Emergency Preparedness and Response Plan; and (vi); Stakeholder Engagement and Community Involvement.                                    |
| 4  | <b>ESS4: Community Health and Safety</b>                                                      | Anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances; Avoid or minimize community exposure to project-related traffic and road safety risks, and hazardous materials; Have in place effective measures to address emergency events; Ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.                                                                                                                                                                                                                                                                                  | Implement requirements for community health and safety regarding infrastructure, and climate change, and apply the concept of universal access, where technically and financially feasible. Prepare and implement disease prevention and risk management plan, implement requirements for traffic and road safety, including road safety assessments and monitoring. Address risks arising from impacts on provisioning and regulating ecosystem services. Measures to avoid or minimize, water-related, communicable, and no communicable diseases identify and manage risks related to labour influx on communities (SEA/SH, noise and air pollution ...). |
| 5  | <b>ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement</b>          | Avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives.; Avoid forced eviction; Mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use; Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure; Conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant. Ensure that resettlement activities are planned and implemented with appropriate disclosure. | Ensure that the acquisition on land and crops and tress happens only after payment of compensation and resettlement has occurred and implement livelihood restoration plans for PAPs. Implement community engagement and consultation, disclosure of information, and put in place a grievance mechanism.                                                                                                                                                                                                                                                                                                                                                    |
| 6  | <b>ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</b> | Protect and conserve biodiversity and habitats; Apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity; Promote the sustainable management of living natural resources; Support livelihoods of local communities, through the adoption of practices that integrate                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implement requirements relating to primary suppliers, where a project is purchasing natural resource commodities, including food, timber, and stones, water etc..                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| SN | World Bank ESS                                                  | Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Borrower Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |                                                                 | conservation needs and development priorities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7  | <b>ESS8: Cultural Heritage</b>                                  | Protect cultural heritage from the adverse impacts of project activities and support its preservation; Address cultural heritage as an integral aspect of sustainable development; Promote meaningful consultation with stakeholders regarding cultural heritage; Promote the equitable sharing of benefits from the use of cultural heritage.                                                                                                                                                                                                                                                                                                                                                                                                                           | Put in place a chance-finds procedure. Ensure people's continued access to culturally important sites, as well as the need for confidentiality when revealing information about cultural heritage that would compromise or jeopardize their safety or integrity. Put in place a mechanism for fair and equitable sharing of benefits from commercial use of cultural resources. Establish provisions for archaeological sites and materials, built heritage, natural features with cultural significance, and moveable cultural heritage.                                        |
| 8  | <b>ESS10: Stakeholder Engagement and Information Disclosure</b> | Establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, particular project-affected parties; Assess the level of stakeholder interest and support for the project and enable stakeholders' views to be taken into account in project design and environmental and social performance; Ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format; Provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond to and manage such grievances. | Preparation and implementation of a Stakeholder Engagement Plan (SEP). The SEP involves early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement is to be conducted in a manner proportionate to the nature, scale, risks, and impacts of the project, and appropriate to stakeholders' interests. Specifies what is required for information disclosure and to achieve meaningful consultation and GRM establishment and operationalization as well. |

## 2.4. World Bank's Environmental, Health, and Safety (EHS) Guidelines for Electric Power Transmission and Distribution

The World Bank's Environmental, Health, and Safety (EHS) Guidelines for Electric Power Transmission and Distribution provide comprehensive recommendations to mitigate environmental and health risks associated with the construction and operation of electrical lines. Below is a summarized table highlighting key guidelines and their relevance to electrical line construction that would be applied during the implementation of the present project.

**Table 5: World Bank's EHS)Guidelines for Electric Power Transmission and Distribution**

| Guideline                                 | Summary                                                                                                                                                                                                                           | Relevance to the project                                                                                             |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Terrestrial Habitat Alteration</b>     | Avoid critical habitats by utilizing existing corridors and roads; install lines above existing vegetation to minimize clearing; schedule construction to avoid breeding seasons; revegetate disturbed areas with native species. | Minimizes ecological disruption and maintains biodiversity during construction activities.                           |
| <b>Right-of-Way Maintenance</b>           | Implement integrated vegetation management; selectively remove tall-growing species; encourage low-growing vegetation; remove invasive species; schedule maintenance to avoid sensitive periods for wildlife.                     | Ensures safe operation of transmission lines while preserving local ecosystems and preventing habitat fragmentation. |
| <b>Aquatic Habitat Protection</b>         | Avoid clearing in riparian zones; minimize machinery use near watercourses; implement erosion and sediment control measures; maintain buffer zones of natural vegetation along water bodies.                                      | Protects water quality and aquatic ecosystems from sedimentation and pollution during construction.                  |
| <b>Electric and Magnetic Fields (EMF)</b> | Design transmission lines to meet international EMF exposure guidelines; maintain appropriate distances from residential areas; conduct public consultations to address EMF concerns.                                             | Reduces potential health risks to nearby communities and addresses public concerns regarding EMF exposure.           |
| <b>Hazardous Materials Management</b>     | Develop procedures for handling and storing hazardous materials; train workers in spill prevention and response; dispose of waste materials according to regulatory requirements.                                                 | Prevents environmental contamination and ensures worker safety during the handling of hazardous substances.          |

|                                       |                                                                                                                                                                             |                                                                                                        |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Occupational Health and Safety</b> | Provide workers with personal protective equipment (PPE); implement fall protection measures; establish emergency response plans; conduct regular safety training sessions. | Enhances worker safety and reduces the risk of accidents and injuries during construction activities.  |
| <b>Community Health and Safety</b>    | Inform communities about construction schedules and potential hazards; implement traffic safety measures; establish grievance mechanisms for community concerns.            | Minimizes disruptions and health risks to local communities, fostering good relations and cooperation. |

Adhering to these guidelines ensures that the construction of electrical lines is conducted in an environmentally responsible manner, safeguarding both ecosystems and human health.

## 2.5. Other World Bank's Environmental, Health, and Safety Guidelines applied to the project

The implementation of the present project should adhere to several of the World Bank's Environmental, Health, and Safety (EHS) Guidelines specifically the General EHSs and the EHSs for Power Transmission and Distribution in order to ensure sustainable and safe implementation. Below is a table summarizing the relevant guidelines, their summaries, and their relevance to the project.

**Table 6: World Bank's Environmental Health and Safety Guidelines applied to the project**

| <b>EHS Guideline</b>                       | <b>Summary</b>                                                                                                       | <b>Relevance</b>                                                                                           |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Occupational Health and Safety</b>      | Addresses worker safety, PPE usage, fall protection, electrical hazards, and training requirements.                  | Ensures safe working conditions during pole erection, line stringing, and equipment installation.          |
| <b>Community Health and Safety</b>         | Involves preventing risks to communities such as electrocution, traffic accidents, and unauthorized access to sites. | Helps reduce risks to people living near construction sites or power lines in rural areas.                 |
| <b>Waste Management</b>                    | Encourages proper management of construction waste such as packaging, used materials, and oily waste.                | Ensures proper disposal of poles, conductors, insulators, and associated waste to protect the environment. |
| <b>Noise and Vibration</b>                 | Recommends limiting construction noise through timing, equipment maintenance, and community notification.            | Helps prevent noise disturbance in quiet rural environments during construction activities.                |
| <b>Air Emissions and Dust Control</b>      | Suggests minimizing dust and vehicle emissions via watering, covering loads, and equipment maintenance.              | Relevant for rural roads and dry areas where dust levels can become a nuisance or health issue.            |
| <b>Soil Erosion and Sediment Control</b>   | Provides methods to control soil disturbance and runoff during excavation or pole setting.                           | Protects farmland and sensitive habitats from degradation during line construction.                        |
| <b>Biodiversity Conservation</b>           | Aims to prevent disturbance to natural habitats and endangered species.                                              | Important when lines pass through or near forests, wetlands, or protected areas in Rwanda.                 |
| <b>Use of Pesticides and PCBs</b>          | Avoids use of hazardous substances like PCBs in transformers and recommends proper disposal.                         | Ensures new installations avoid legacy pollution and hazardous materials.                                  |
| <b>Electric and Magnetic Fields (EMF)</b>  | Suggests design practices to limit exposure to EMF and comply with international exposure limits.                    | Important for long-term health of residents and workers near transmission lines.                           |
| <b>Emergency Preparedness and Response</b> | Requires planning for fire, electrical incidents, and natural hazards with trained response teams.                   | Critical for managing accidents or natural events like lightning strikes or storms during operations.      |
| <b>Visual Impacts and Land Use</b>         | Recommends minimizing visual disruption and negotiating land access with communities.                                | Helps maintain aesthetics of rural landscapes and avoids conflict over land acquisition.                   |
| <b>Worker Accommodation and Welfare</b>    | Sets standards for worker housing, hygiene, and medical care on remote construction sites.                           | Important if camps are set up in isolated rural locations during construction.                             |
| <b>Traffic Management</b>                  | Provides guidance for vehicle movement and road safety near construction zones.                                      | Reduces risk of accidents on narrow or unpaved rural roads.                                                |

## 2.6. International Conventions

Rwanda has signed and ratified different environmental international conventions which are to some extent in line with this project. The following are conventions connected to the project implementation:

- The International Convention on Biological Diversity and its Habitat was signed in Rio de Janeiro in Brazil on 5 June 1992, as approved by Presidential Order No 017/01 of 18 March 1995;
- The CARTAGENA protocol on biodiversity to the Convention on Biological Biodiversity signed in NAIROBI from May 15, to 26, 2000, and in NEW YORK from June 5, 2000, to June 4, 2001, as authorized to be ratified by Law No 38/2003 of 29 December 2003;
- The United Nations Framework Convention on Climate Change, signed in Rio de Janeiro in Brazil on 5 June 1992, as approved by Presidential Order No 021/01 of 30 May 1995;
- The Kyoto Protocol to the framework on climate change adopted at Kyoto on March 6, 1998, as authorized to be ratified by Law No 36/2003 of December 2003;
- The RAMSAR International Convention of February 2, 1971, on Wetlands of International importance, especially as water flows habitats as authorized to be ratified by Law No 37/2003 of 29 December 2003;
- The STOCKHOLM Convention on Persistent Organic Pollutants, signed in STOCKHOLM on 22 May 2001, as approved by Presidential Order No 78/01 of 8 July 2002;
- The ROTTERDAM International Convention on the establishment of the international procedures agreed by states on commercial transactions of agricultural pesticides and other poisonous products, signed in ROTTERDAM on 11 September 1998 and in New York from 12 November 1998 to 10 September 1999 as approved by Presidential Order No 28/01 of August 2003 approving the membership of Rwanda;
- The Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their disposal as adopted at Basel on 22 March 1989, and approved by Presidential Order No 29/01 of 24 August 2003 approving the membership of Rwanda;
- The Montreal International Conventional on Substances that Deplete the Ozone Layer, signed in London (1990), Copenhagen (1992), Montreal (1997), and BEIJING (1999), especially in its article 2 of London amendments and Article 3 of Copenhagen, Montreal, and Beijing amendments as approved by Presidential Order no 30/01 of 24 August 2003 related to the membership of Rwanda;
- The Bonn Convention opened for signature on June 23, 1979, on conservation of migratory species of wild animals as authorized to be ratified by Law No 35/2003 of 29 December 2003;
- The Washington agreement of March 3, 1973, on international trade in endangered species of Wild Flora and Fauna as authorized to be ratified by presidential Order No 211 of 25 June 1980.

## 2.7. International agreements

The following table indicates different agreements connected to environmental protection which Rwanda is a signatory:

**Table 7: Environmental assessment-related agreements**

| No | Agreement                                                                                             | Date signature of | Date ratification of |
|----|-------------------------------------------------------------------------------------------------------|-------------------|----------------------|
| 1  | Agreement on the Biological Diversity                                                                 | 10/06/1992        | 18/03/1995           |
| 2  | Agreement Context of the United Nations on climate changes                                            | 10/06/1992        | 18/08/1998           |
| 3  | Agreement related to the fight against Desertification                                                | 10/06/1992        | 22/10/1998           |
| 4  | The agreement in Vienna on the protection of the ozone layer                                          | 22/03/1985        | 6/12/2002            |
| 5  | Agreement of Ramsar related to humid zones of international importance, particularly the wild housing | 02/02/1971        | 6/6/2003             |
| 6  | International Agreement for the trade of the species in the process of disappearance (IATSPD)         | 20/10/1980        | 18/01/1981           |
| 7  | Conservation Agreement of the animals of the migrating wild species (CMS)                             | 23/06/1979        | 06/06/2003           |
| 8  | African Agreement on nature conservation and natural resources                                        | 15/09/1968        | 20/05/1975           |

These treaties and international agreements are relevant for the protection and conservation of the environment and biodiversity in Rwanda and shall guide the implementation of the present project.

## 2.8. Gap Analysis between Rwandan regulations and World Bank Environmental and Social Standards

Rwanda has developed and enacted different regulations governing environmental management and protection as well as regulations related to land acquisition and expropriation. Despite the effort made to improve the national regulations and align them with international standards, there is a number of gaps identified between the World Bank Environmental and Social Standards (ESSs) and national regulations, especially in terms on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS5). The table below summarizes similarities and gaps between Rwanda regulations on environmental and social considerations and the World Bank Environmental and Social Standards.

**Table 8: Differences between Rwanda regulations and World Bank Environmental and Social Framework/Standards/ESF/ESSs**

| ESF requirements                                                                                                                                                                                                                               | National Legal requirements                                                                                                                                                                                                          | Gaps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Recommended Actions                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Standard 1: Assessment and Management of Environmental and Social Risks and Impacts</b>                                                                                                                                                     |                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                         |
| (i) To identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs.                                                                                                         | The Law 48/2018 of 13/08/2018 suggests a systematic process of identifying environmental, social and economic impacts of a project before a decision of its acceptance is made;                                                      | The difference lies between the Project Classification according to levels of impacts while WB classifies into 4 categories (High, Substantial, Moderate and Low Risk), While the ministerial order No 001/2019 OF 15/04/2019 classifies projects in three categories after screening. (Project that must undergo full EIA, Partial EIA and no EIA for the project not listed in the Annex 1 and 2. Further, ESF classification is risk based while national classification is mainly size based. | All sub-projects would be screened as there might be some projects forgotten, but which have adverse environmental impacts                              |
| (ii) To adopt a mitigation hierarchy approach                                                                                                                                                                                                  | The Rwandan Regulation does not specify the use of hierarchy, but it suggests that the mitigation measures should aim at preventing, eliminating or reducing the adverse effects on human health, natural resources and environment. | Although current national legislative framework seeks to avoid and mitigate social risks, there is no explicit directive to minimize impacts or to promote the adoption of a clearly defined mitigation hierarchy approach to managing social risks. In addition, the current system emphasizes cash compensation as a mitigation measure and hence does not address other losses.                                                                                                                | The ESS of the World Bank will be adopted during project implementation.                                                                                |
| (iii) To adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities resulting from the project. | The Constitution of Rwanda approves that the State has also the duty, within the limits of its means, to undertake special actions aimed at the welfare of the indigent, the elderly and other vulnerable groups.                    | The National Social Protection Policy defines a <b>vulnerable</b> individual or household who, for whatever reason, is less able to withstand socio-economic shocks and is therefore at an elevated risk of experience declines in welfare and or other forms of social                                                                                                                                                                                                                           | The vulnerability will be assessed based on country context and best practices and special attention will be provided to those identified as vulnerable |

| ESF requirements                                                                                                                                                                               | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Gaps                                                                                                                                                                                                                               | Recommended Actions                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | deprivation. In the context of this strategy key vulnerable groups in Rwanda include low income and/or labour-constrained individuals or households such as older people, people with vulnerability, female-headed households etc. |                                                                             |
| (iv) To utilize national environmental and social Institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate. | There are various institutions systems, laws and regulations for the Environmental and Social management in the country                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The mandated institutions have limited resources for the effective environmental and social implementation and with some exceptions, monitoring and compliance assessment is inadequate or absent.                                 | The ESS1 will be applied during project implementation to address this gap. |
| (v) To promote improved environmental and social performance, in ways which recognize and enhance Borrower capacity                                                                            | The Law suggests training and improving the capacity of the workforce while ensuring the protection of workers' rights in accordance with laws and international conventions ratified by Rwanda;                                                                                                                                                                                                                                                                                                                                                                                                         | The law does not clearly define how they should be trained.                                                                                                                                                                        | The ESS1 will be applied during project implementation to address this gap. |
| <b>Standard 2: Labour and Working Conditions</b>                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                    |                                                                             |
| (i) To promote safety and health at work.                                                                                                                                                      | Ministerial order N°2 of 17/05/2012 determining conditions for occupational and health safety aims to improve health, safety, and general wellbeing of workers and workplaces by promoting occupational health and safe practices in order to eliminate occupational accidents and diseases, hence achieve better productivity in the workplaces.                                                                                                                                                                                                                                                        | The similarity is evident.                                                                                                                                                                                                         | The ESS shall be given priority during project implementation               |
| (ii) To promote the fair treatment, non-discrimination and equal opportunity of project workers.                                                                                               | The working conditions in Rwanda are governed by the Law N° 66/2018 of 30/08/2018 regulating Labour and its implementing orders. This Law applies all aspect of labour be it formal and informal sectors and provides guidelines related to relationship between an employee and his/her employer in regard to: contract, wages and others benefits, working environment, working hours and different types of allowed leaves which the employee is entitled to. This law also sets standards in terms of employment age and prohibits all form of forced labour, discrimination, and sexual harassment. | The similarity is evident.                                                                                                                                                                                                         | The implementation of the project will apply the ESS2                       |
| (iii) To protect project workers, including vulnerable workers.                                                                                                                                | The law requires the protection of workers during employment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The enforcement is lacking, in part due to lack                                                                                                                                                                                    | With the budgeting allocated for this                                       |

| ESF requirements                                                                                                                               | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Gaps                                                                                                                                                     | Recommended Actions                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | of budgeting and staffing, as well as the high unemployment in the country, which facilitates the exploitation of workers.                               | project, harmony will be sought for both the ESS and the national requirements                                    |
| (iv) To prevent the use of all forms of forced labour and child labour.                                                                        | As (ii) in this section 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | As (ii) in this section 2                                                                                                                                | The ESS shall be given priority during project implementation                                                     |
| (v) To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. | Article 39 of Rwandan Constitution as revised in 2015 suggests that the right to freedom of association is guaranteed and does not require prior authorization. This right is exercised under conditions determined by law.                                                                                                                                                                                                                                                                                                                                                      | The casual nature of employment affects unionization, as employees paid per day are unable to make the monthly check off in support of union activities. | The World Bank ESS2 that is stronger in terms of supporting the freedom of association will be adopted            |
| <b>Standard 3: Resource Efficiency and Pollution Prevention and Management</b>                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                          |                                                                                                                   |
| (i) To promote the sustainable use of resources, including energy, water and raw materials.                                                    | The Law on the environment promote the sustainable use of the resources where in its Article 4 of Principle of environmental sustainability emphasizes that present and future generations enjoy equal opportunities. The right to development must be achieved in consideration of the needs of present and future generations.                                                                                                                                                                                                                                                 | The similarities are evident.                                                                                                                            | National regulations will be employed and any gaps with ESS3 will be filled with appropriate mitigation measures. |
| (ii) To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.     | The Law on Environment in its Article 15 of Protection and conservation of the atmosphere suggests that any installation likely to create risks or cause pollution, vehicles and engine driven machines, commercial, craft or agricultural activities must be conducted in accordance with technical principles established by competent authorities in order to protect and preserve the atmosphere.                                                                                                                                                                            | The National requirements are reinforced by the labour Law                                                                                               | The World Bank ESS3 will be employed as with most Bank funded projects for effectiveness of ESS 3.                |
| (iii) To avoid or minimize project-related emissions of short and long-lived climate pollutants.                                               | The article 26 of the Law on Environment orders to take necessary measures to protect and respect the obligations stipulated in international agreements which it signed; to prohibit any activity carried out on its behalf or in its capacity that may degrade the environment in another country or in regions beyond its national jurisdiction; to co-operate with other states in taking decisions to fight trans-boundary pollution; to protect, conserve and manage properly the environment using appropriate measures; while in its Article 50 establishes punishments. | The National requirements are reinforced by the Law                                                                                                      | National regulations will be employed and any gaps with ESS3 will be filled with appropriate mitigation measures. |

| ESF requirements                                                                                                                                                                                                                                                                                                                                               | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gaps                                                                                                                                                                                                                                   | Recommended Actions                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (iv) To avoid or minimize generation of hazardous and non-hazardous waste.                                                                                                                                                                                                                                                                                     | Article 19: Management of hazardous and toxic waste<br>Any waste, especially from hospitals, health centres and clinics, research centres equipped with laboratories, industries and any other hazardous or toxic waste must be collected, treated and changed in a manner that does not degrade the environment in order to prevent, eliminate or reduce their adverse effects on human health, natural resources and environment. Management, disposal and trans-boundary movements of hazardous or toxic waste are governed by an order of the Minister. | The Law is enforced and the management to oversee that all kind of waste are well managed falls under RURA's responsibility while the management to restrict their entry fraudulently is taken care of by RSB (Rwanda Standards Board) | National regulations will be employed and any gaps with ESS3 will be filled with appropriate mitigation measures.                                                                                                                                                     |
| <b>Standard 4: Community Health and Safety</b>                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                       |
| (i) To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances.                                                                                                                                                                            | In Rwanda there is no specific law on community health and safety. Some provisions are included in environment law(2018) and Expropriation law(2015)                                                                                                                                                                                                                                                                                                                                                                                                        | Project impacts on hosting community is not well articulated in national regulations. Only impacts on properties is granted.                                                                                                           | The ESS4 that is more comprehensive standard will be applied regarding the anticipation and avoidance of adverse impacts on the health and safety of project-affected communities                                                                                     |
| <b>Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement</b>                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                       |
| Compensation should be provided to all Affected persons who:<br>a) Have formal legal rights to land or assets;<br>b) Do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law; or<br>c) Have no recognizable legal right or claim to the land or assets they occupy or use. | National regulations recognize Affected people who have land titles and documentary evidence that he/she is the owner of property incorporated on land. A person dispossessed of land or unlawfully occupying land or having developed activities on land on which such activities are prohibited after the enactment of relevant laws shall receive no compensation.                                                                                                                                                                                       | The Bank diverges with the Rwanda Law whereas the law in Rwanda refuses to recognize illegal landowners and does not provide any Compensation                                                                                          | ESS5 will apply and the compensation and resettlement measures should be provided to all affected person including those with no land title and tenants. Those who don't have legal right on the land will be compensated for trees and crops established on the land |
| The ESS5 requires the borrower to consider feasible alternative project designs to avoid or minimize land acquisition or restrictions on land use,                                                                                                                                                                                                             | The national law on environment and ESIA procedures requires the developer to explore project alternatives but is silent about avoiding or minimizing involuntary resettlement.                                                                                                                                                                                                                                                                                                                                                                             | While ESS5 requires the borrower to explore alternatives that avoid or minimize resettlement impacts, the national regulations only requires the provision of compensation                                                             | ESS5 will apply                                                                                                                                                                                                                                                       |
| When land acquisition or restrictions on land use (whether permanent or temporary) cannot be avoided, the ESS5 requires Borrower to offer affected persons compensation at replacement cost, and other assistance as may be necessary to help them improve or at least restore                                                                                 | The national Regulations (expropriation law, art 27) defines properties subject to valuation for the payment of fair compensation due to expropriation in the public interest are land, activities carried out on land for its efficient management or rational use and compensations for disruption                                                                                                                                                                                                                                                        | Loss of income is not covered under national regulations and regulations are silent on livelihood measures or assistance to vulnerable people                                                                                          | ESS5 will apply                                                                                                                                                                                                                                                       |

| ESF requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Gaps                                                                                                                                                                                                                          | Recommended Actions                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| their standards of living or livelihoods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | caused by expropriation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                               |                                                                                                                                           |
| ESS5 requires that the Borrower takes possession of acquired land and related assets only after compensation in accordance with this ESS has been made available and, where applicable, displaced people have been resettled and moving allowances have been provided to the displaced persons in addition to compensation. In addition, livelihood restoration and improvement programs will commence in a timely fashion to ensure that affected persons are sufficiently prepared to take advantage of alternative livelihood opportunities as the need to do so arises. | Article 36 of the Expropriation law (2015) state that approved fair compensation shall be paid within a period not exceeding one hundred and twenty (120) days from the day of its approval. Subsequent to receiving fair compensation, the expropriated person shall have a period not exceeding one hundred and twenty (120) days to relocate.                                                                                                                                                                                                                                                  | The ESS5 requires providing compensation measures before land take while the national Regulations allows the project developer to take the land even before the compensation as long as the compensation is made in 120 days. | Compensation and provision of resettlement measures will be given prior land take and any construction works.                             |
| ESS5 requires the Borrower to engage with affected communities, including host communities, through the process of stakeholder engagement described in ESS10. Decision-making processes related to resettlement and livelihood restoration will include options and alternatives from which affected persons may choose.                                                                                                                                                                                                                                                    | Article 24 of expropriation law requires the District or City of Kigali administration or the relevant Ministry to inform the persons to be expropriated in the public interest of the expected start date of measurement of land and inventory of property incorporated thereon.                                                                                                                                                                                                                                                                                                                 | While the ESS5 requires consultation with affected communities and other stakeholders, the national regulations require only communication to the affected people.                                                            | ESS5 will apply and the RPF and RAP, if needed, will include requirements for stakeholder consultation and engagement                     |
| ESS5 requires borrowers to ensure that a grievance mechanism for the project is in place, in accordance with ESS10 as early as possible in project development to address specific concerns about compensation, relocation or livelihood restoration measures raised by displaced persons (or others) in a timely fashion.                                                                                                                                                                                                                                                  | Article 33 of expropriation law state that within seven (7) days after the approval of the valuation report by the expropriator, any person to be expropriated who is not satisfied with the assessed value of his/her land and property incorporated thereon shall indicate in writing grounds for his/her dissatisfaction with the valuation report. Any person contesting the assessed value shall, at his/her own expense, engage the services of a valuer or a valuation firm recognized by the Institute of Real Property Valuers in Rwanda to carry out a counter-assessment of the value. | While ESS5 requires the establishment of Grievance Redress mechanism for the proposed project, National regulations provide only steps and timeframe for contesting valuation report                                          | Grievance redress mechanism will be established at project level, district level and site level                                           |
| Where land acquisition or restrictions on land use are unavoidable, the Borrower will, as part of the environmental and social assessment, conduct a census to identify the persons who will be affected by the project, to establish an inventory of land and assets to be affected, to determine who will be eligible for compensation and assistance, and to discourage ineligible persons, such as                                                                                                                                                                      | Article 10 of expropriation law requires the project developer to only prepare application that shall indicate:<br>1° the nature of the project;<br>2° the indication that the project aims at the public interest;<br>3° the master plan of land where the project will be carried out;<br>4° the document indicating that the project has no detrimental effect on the environment;                                                                                                                                                                                                             | The measure gap in terms of planning and implementation is the absence of socio-economic assessment of project affected people and inventory of affected assets in the application report.                                    | The socio-economic assessment of project affected people and inventory of affected crops and trees will be part of the Resettlement Plan. |

| ESF requirements                                                                                                                                                                                                                                                                                                         | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Gaps                                                                                                                                                                             | Recommended Actions                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| opportunistic settlers, from claiming benefits.                                                                                                                                                                                                                                                                          | 5° the document confirming the availability of funds for fair compensation;<br>6° the explanatory note detailing that such land or place suits the project;<br>7° the minutes indicating that the concerned population was sensitized about the project and its importance;                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                  |                                                                                                                                                                                       |
| The social assessment will also address the claims of communities or groups who, for valid reasons, may not be present in the project area during the time of the census, such as seasonal resource users.                                                                                                               | The social assessment is part of Environmental Impact assessment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Regulations on land acquisition does not require social assessment.                                                                                                              | Social assessment will be part of Resettlement Plan.                                                                                                                                  |
| The Borrower will establish a cut-off date for eligibility.                                                                                                                                                                                                                                                              | The District or City of Kigali administration or the relevant Ministry must inform the persons to be expropriated in the public interest of the expected start date of measurement of land and inventory of property incorporated thereon.                                                                                                                                                                                                                                                                                                                                                    | The only gap identified is that the national regulations does not include warnings to the persons settling in the project area after the cut-off date may be subject to removal. | The cut-off date will be established and communicated to all affected people.                                                                                                         |
| In the case of projects affecting livelihoods or income generation, the Borrower's plan will include measures to allow affected persons to improve, or at least restore, their incomes or livelihoods.                                                                                                                   | National Regulation are silent about economic displacement and does not provide any livelihood restoration program                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Livelihood restoration and economic displacement are not considered under national regulations                                                                                   | Both physical and economic displacement will be considered and livelihood plan prepared as appropriate.                                                                               |
| The Borrower will establish means of collaboration between the agency or entity responsible for project implementation and any other governmental agencies, subnational jurisdictions or entities that are responsible for any aspects of land acquisition, resettlement planning, or provision of necessary assistance. | Section one of the expropriation law provides the implementation arrangements for land acquisition from approving, implementation and implementation of decisions. Further, the land law of 2013 defines roles and responsibility of various stakeholders involved in land administration and expropriation.                                                                                                                                                                                                                                                                                  | No major gap identified apart from technical capacity of local entities that needs to be enhanced                                                                                | ESIA and RAP to be prepared will provide implementation arrangement from national level to local level and the Resettlement plan will include a section on implementation arrangement |
| <b>Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</b>                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                  |                                                                                                                                                                                       |
| (i) To protect and conserve biodiversity and habitats.                                                                                                                                                                                                                                                                   | The article 28 on the Biodiversity conservation of the Law 48/2018 of 13/8/2018 on Environment emphasizes that the state has the responsibility to establish the list of species of animals and plants that must be protected depending on their role in ecosystems, their scarcity, their aesthetic value, their threat to extinction and their economic, cultural and scientific role; and to identify areas to be protected for conservation or rehabilitation of ecosystems, forests, woodlands, species of biodiversity and protected zones, monuments, historical sites and landscapes. | No major gap                                                                                                                                                                     | National regulations will be employed and any gaps with ESS6 will be filled with appropriate mitigation measures.                                                                     |

| ESF requirements                                                                                                                                                                                                   | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Gaps                                                                                                                                                                                                                                                                                                               | Recommended Actions                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| (ii) Where biodiversity impacts are likely, apply mitigation hierarchy and precautionary approach in project design & implementation                                                                               | The National Regulations do not emphasize the hierarchy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Though the laws do not emphasize on the hierarchy, they agree on the principle of preventing any harm to biodiversity.                                                                                                                                                                                             | The ESS6 will be adopted to assess and manage Risks and Impacts on biodiversity under this project |
| (iii) To promote the sustainable management of living natural resources.                                                                                                                                           | The chapter III regarding the conservation and protection of the environment of the Law on the environment above emphasizes that all natural resources should be protected from all kinds of degradation, and they must be used in a sustainable manner in accordance with relevant laws.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The implementation is highly variable as some implementers do not involve a multidisciplinary team to assess and adequately manage impacts.                                                                                                                                                                        | National Regulations will be complemented by ESS6 will be adopted                                  |
| (iv) To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities | National Regulation are silent about economic displacement and does not provide any livelihood restoration program                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Livelihood restoration and economic displacement are not considered under national regulations                                                                                                                                                                                                                     | The ESS6 will be applied                                                                           |
| <b>Standard 8: Cultural Heritage</b>                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                    |                                                                                                    |
| (i) To protect cultural heritage from the adverse impacts of project activities and support its preservation.                                                                                                      | The protection and preservation of culture heritage is governed by the Law N° 28/2016 of 22/7/2016 on The Preservation of Cultural Heritage and Traditional Knowledge<br>The Article 15 of this law on Restrictions on classified heritage requires that, apart from routine tasks of maintaining cultural heritage, no person shall destroy, move, repair or modify in any way classified cultural heritage without prior written approval of the Minister within sixty (60) days from the date of receipt of the complete file. In case the Minister fails to reply within the prescribed period, the application is deemed accepted. No person shall affix texts, images or install advertising signs on a historical monument or in its neighbouring area. | Chance finds procedures are not included in national regulations                                                                                                                                                                                                                                                   | ESS8 will apply and chance finds procedure.                                                        |
| <b>Standard 10: Stakeholder Engagement and Information Disclosure Consultants</b>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                    |                                                                                                    |
| To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.  | The Law 48/2018 of 13/08/2018 on environment requires public hearings and consultation during Environmental studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The lack of legislation to guide the consultation of people on matters that affect them remains a big loophole in ensuring planning and budgeting of meaningful consultations. The Consultations required would be insufficient for the effective management of social risks on a project with significant impacts | The ESS10 will be employed during project implementation.                                          |

| ESF requirements                                                                                                                                                                                          | National Legal requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Gaps                                                                                                                                                                                                                                                                                                                                           | Recommended Actions                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | since it considers mainly environmental risks.                                                                                                                                                                                                                                                                                                 |                                                                                                                    |
| To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.            | MO 001 of 15/04/2019 in its article 10 on public participation to express views on the environmental impact assessment report requires that the stakeholders may comment on the environmental impact assessment report and express views on the impacts of the proposed project. The authorized organ covers all costs of the public hearing process. The stakeholders' views are considered when selecting the best alternative of the project to be implemented.                                                                                                                                                                           | The similarities are evident though the ESS10 provide more clarity.                                                                                                                                                                                                                                                                            | National regulations will be employed and any gaps with ESS10 will be filled with appropriate mitigation measures. |
| (iii) To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.                   | The Expropriation law in public interest of 2015 in its article 6 requires that the initiator of an act aimed at the implementation of land use and development master plans shall first negotiate with owners of assets that are affected by the project. In case negotiations fail, formalities related to expropriation in the public interest shall be followed upon request of the expropriator and the initiator of the project, considering the interests of the person to be expropriated. The price or value of assets affected by the project shall be paid by the initiator of the project before any commencement of activities. | During the project implementation Project affected People are engaged and the Grievance Redress Mechanism is established together with the committees at cell, sector, and district level. However, the implementation is hampered by the poor training and lack of means to help the committees to carry out the regular meetings and visits. | The ESS10 will be applied to promote effective inclusion of project affected parties in the implementation         |
| (iv) To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format. | Though the studies are disclosed, the law is silent about the disclosure of the Safeguards document.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No clear process for information disclosure in national environmental and social regulations                                                                                                                                                                                                                                                   | ESS10 will apply and public disclosure of all safeguard's instruments will be disclosed                            |

Source: Consultant assessment based on WB ESF/ESS and national regulations

### **3. PROJECT JUSTIFICATION AND DESCRIPTION**

Energy is increasingly proving to be a basic essential without which true development is not possible. Access to energy is an essential driver for development due to its effect on poverty and hunger, health, education, improving living conditions, and reducing the exodus from the countryside and on the environment. Making electricity available in homes reduces the use of batteries and the often, excessive use of biomass. The use of electricity of hydroelectric origin also makes it possible to prevent the production of greenhouse gases such as CO<sub>2</sub> caused by the burning of wood cooking and lighting.

#### **3.1 Project location**

The present project of design, supply and installation of new MV and LV lines; design, supply and installation of distribution transformer for distribution network reinforcement; and upgrading the single lines to three phases lines will be implemented in different sectors making the district of the Northern Province of Rwanda. The districts of intervention are respectively Rulindo, Gakenke, Musanze, Burera and Gicumbi. Maps showing the sectors of the project area of intervention are provided in annexure 2 of this report and the sectors of the project intervention are detailed in the chapter of the baseline data. The electrical lines will mostly be passing along the existing earth roads connecting different centres of the sectors of areas of intervention. The buffer zones of the existing roads connecting different area will be used as line routes and to facilitate easy transportation of project materials, allow easy connection of houses, reduce vegetation clearance in the RoW, facilitate easy maintenance, and reduce maintenance costs related to vegetation control in the ROW. However, where not possible to follow the existing roads, in some areas the lines will pass in agricultural land to reduce the length of the lines. The land acquisition will be limited to poles and transformer locations. (Maps of the project location are provided in annex 6 of the report).

#### **3.2 Project justification**

The government of Rwanda recognizes the vital role that electricity access plays in accelerating economic development through improving health and standards of living. Energy and particularly access to electricity is the Government's key priority. This is why significant investments have been made and why the government has set the target of Universal Electrification (100% access) for the year 2029. The installed energy capacity is envisaged to grow at a 15% rate per annum to reach an installed energy capacity of 554MW by 2024. In the end of 2023, 51% of Rwandan households had access to electricity, connected to the national grid (37%) or through off-grid systems (14%). As the target is 100% access to electricity, a national electrification plan has been elaborated to ensure that this target is reached in 7 years (by 2029).

As the Government of Rwanda is promoting alternative sources of electricity such as solar home systems, a parallel policy has been approved to encourage people to make productive use of the power on the national grid, to bridge the demand-supply imbalance, while making economic sense of future energy investments. The construction of the transmission lines in the Northern province of Rwanda will therefore be a driving force for the economic and social development of the country, by improving and increasing electric energy availability. The planned project will help to improve the quality of electricity supply and strengthen the backbone of the transmission network, thus providing additional capacity to cope with the growth of demand, under conditions of safety and quality in line with the requirements of the public electricity service.

#### **3.3 Benefits of access to electric power**

Power being today a major drive of development, the increase in the rate of access to electric power will certainly contribute to the achievement of the NST1 and other Development Plans of Rwanda as well as the Sustainable Development Goals (SDGs) as defined by the UN, particularly the SDG 7 aiming at ensuring access to affordable, reliable, sustainable, and modern energy for all. Indeed, power appears more and more to be a basic good without which true development is not possible. Thus, access to energy, and particularly electricity, is a major lever of development. Among key benefits that the project will provide in project areas include only to mention some.

##### **a. Reduced poverty and hunger**

Access to electric power allows for a longer working day, access to light, and time and money saved (easier access to energy and water). Moreover, the use of electric equipment makes possible to increase handicraft and agricultural productivity. The availability of energy is also an economic development factor because it allows the development of

small and medium enterprises as well as the automation of processing activities for agricultural products and their conservation (refrigeration).

#### **b. Health benefits**

The availability of electricity in health centres allows the storage of medicines (refrigeration) and increased safety at night during delivery. In addition, access to communication means (TV, radio, Internet) facilitates the transfer of knowledge on basic topics such as protection against HIV- AIDS and malaria as well as telemedicine. Access to electric light also decreases indoor pollution due to the use of wood, candles, and kerosene lamps for lighting, which reduces the risks of respiratory problems. At last, access to electricity in health centres in rural areas by improving the living and working conditions of nurses and doctors will incite them to remain in villages.

#### **c. Benefits to education**

Energy and access to electric lighting make easier for pupils to study at night in good conditions. Availability of electricity allows for access to the Internet and tele-education, which thus increases access to knowledge. The availability of electricity also prompts teachers to remain in rural areas and not migrate to towns. Furthermore, access to electricity and water helps improve teaching conditions and the organization of night classes for adults.

#### **d. Benefits on the improvement of living conditions, particularly for women**

Within the household, women often perform most of the domestic tasks. Access to electricity and the elongation of the duration of a working day help women organize in a more flexible way their day and above all practice an income-generating activity. Thus, they have enough personal income that ensure that they are more and more autonomous and have a better quality of life. In addition, access to media (TV, radio, Internet) helps to make progress in the image of women in traditional societies.

#### **e. Decrease of rural exodus**

The improvement of living conditions of rural households and local job creation increases economic development and helps reduce the need for rural exodus.

#### **f. Benefits to the general environment**

Access to electricity reduces the need for batteries, but also biomass that is often overexploited. The use of hydropower energy also helps avoid the production of greenhouse gases such as CO<sub>2</sub> coming from the combustion of wood and charcoal for heating and cooking.

### **3.4 Project Components**

The main component of the present project is the construction of electrical distribution networks in different sectors of the districts of the Northern province. The focus is to connect households and public institutions (schools, administration offices, health centres, etc) and productive users (small industries where applicable).

Key main components of the project in Northern Province are summarized in the table below:

**Table 9: Project key main components**

| S/N | Item                                                                         | Data                                                                                                                                                                       |
|-----|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Capacity of the MV                                                           | <ul style="list-style-type: none"> <li>30kV</li> </ul>                                                                                                                     |
| 2   | Capacity of the LV lines                                                     | <ul style="list-style-type: none"> <li>0.4 kV</li> </ul>                                                                                                                   |
| 3   | The height of the wooden/concrete poles to be used for stringing conductors, | <ul style="list-style-type: none"> <li>Height of LV poles is 9m</li> <li>Height of MV wooden poles is 12m</li> <li>Height of MV concrete and steel poles is 14m</li> </ul> |
| 4   | Land area required for the installation of a single pole                     | <ul style="list-style-type: none"> <li>Required land area for pole installation is 0.5 m<sup>2</sup> for LV lines and 1m<sup>2</sup> for MV lines</li> </ul>               |
| 5   | The distance to be maintained between two poles                              | <ul style="list-style-type: none"> <li>Distance between two poles is 35m for LV lines and 70m for MV lines</li> </ul>                                                      |
| 6   | The vertical and horizontal clearance requirements for MV and LV lines       | <ul style="list-style-type: none"> <li>Horizontal clearance is 12m</li> <li>Vertical clearance is 3m</li> </ul>                                                            |
| 7   | The type of transformers to be installed                                     | <ul style="list-style-type: none"> <li>Only poles mounted transformers will be installed</li> </ul>                                                                        |

Source: REG\_EDCL

The length of the lines to be upgraded from single phase to three phase in the Northern province will be in total 395.4 km of MV lines and 1,189.3 km of LV lines. The length of Medium Voltage (MV) and Low Voltage (LV) lines to be constructed in the Northern province, along with the number of transformers to be installed per district are also provided

in the table below

**Table 10: Length of the MV and LV lines to be constructed and number of transformers to be installed**

| SN           | District        | Planned MV   | Planned LV     | Tranformers | Customers     |
|--------------|-----------------|--------------|----------------|-------------|---------------|
| 1            | Musanze         | 120.4        | 146.3          | 12          | 21,316        |
| 3            | Gakenke- Burera | 134          | 509            | 134         | 20,094        |
| 4            | Gicumbi-Rulindo | 141          | 534            | 141         | 21,098        |
| <b>Total</b> |                 | <b>395.4</b> | <b>1,189.3</b> | <b>287</b>  | <b>62,508</b> |

Source; REG-EDCL

### 3.5 Project activities

During the implementation of the present project, different activities will be done, and these are divided into 4 phases: (i) Design and Planning phase, (ii) Construction Phase, (iii) Commissioning Phase, and (iv) Operation Phase. The main project activities will include but not limited to

- pegging out works and bush clearing and line surveying, excavation, rock-filled backfilling and concrete foundations;
- supply and installation of LV poles both wooden and cencter poles of different length and dimensions;
- LV structure assemblies (excluding poles only) including all bolts, nuts, washers, crimp joints, etc;
- MV structure assemblies (excluding poles only) for 30kv including all brackets, bolts, nuts, washers, crimp joints, etc;
- overhead conductor installation
- Transformers installation
- service connections

#### 3.5.1 Project activities during the design and planning phase

During the design and planning phase, it will be a process of survey and mapping for new transmission and distribution line routes, and site selection of transformers locations to avoid harming sensitive ecosystems. There is no land acquisition for MV and LV lines as these will be passing in land for agriculture forest, pasture and/ or in the buffer zones of the existing roads of the project area. Maximum effort will be made to avoid passing over the residential plots and other sensitive areas. However, there will be some restrictions in the Right of way for medium voltage such establishment residential building or planting height trues under the electrical lines

#### 3.5.2 Project activities during the construction phase

##### a. Clearance of the ROW

During the construction phase, it will be the process of clearing the Right of Way (ROW) as the initial activity that will occur during the construction phase. This is done to create the vertical and horizontal clearance required when constructing power lines. The clearance will be done on 12 meters large (6 m each side from the center line). Only trees and crops that can grow to more than 3 meters in height will be cleared on 12 meters. The valuation of affected trees and crops will be done to 12 meters and will cover all trees and crops on that surface. In any case, a residential house found within the 6 m will be relocated and fair compensation will be done. However, maximum efforts will be made during the line re-route design and construction to avoid houses under the RoW.

##### b. Foundation excavation and poles erection

Foundation excavations and erection of poles will consist of creating the foundations for poles. Concrete and wooden poles are planned to be used by the project. The general outlines of the poles may be varied but the general dimensions, phase spacing, clearances, and the configuration of the conductors and earth wire are those applied to similar projects being implemented countrywide for similar electrical distribution project. The general outlines of the poles may be varied but the general dimensions, phase spacing, clearances, and the configuration of the conductors and earth wire are those applied to similar projects being implemented countrywide. The design study will define the type and size of poles foundation based on standards established by REG as presented in the next table.

**Table 11: Standard Pole Sizes**

| Application          | Pole length | Min Diam. at 1.5m from Butt (mm) | Min Diam. at Pole Top (mm) | Planting Depth | Construct ion | Comment                          |
|----------------------|-------------|----------------------------------|----------------------------|----------------|---------------|----------------------------------|
| LV light use         | 9m          | 200                              | 150                        | 1.5m           | ABC           | Intermediate poles               |
| LV medium            | 9m          | 230                              | 170                        | 1.5m           | ABC           | Angle poles - supported          |
| LV Stout             | 9m          | 285                              | 190                        | 1.5m           | ABC           | Angle pole - unsupported         |
| LV and Street Lights | 10m         | 210                              | 150                        | 1.6m           | ABC           | Road clearance and Street Lights |
| MV light use         | 12m         | 240                              | 180                        | 1.8m           | Vertical      | Rural lines, no LV under         |
| MV medium            | 12m         | 260                              | 195                        | 1.8m           | Vertical      | Angle poles - supported          |
| MV Stout             | 12m         | 320                              | 200                        | 1.8m           | Vertical      | Unsupported angle                |
| Special use          | 14m         | 240                              | 210                        | 2.2m           | Vertical      | Special, long span               |
| H-Pole               | 12m         | 240                              | 195                        | 1.8m           | Horizontal    | Special, Extra-long span         |
| H-Pole               | 14m         | 260                              | 220                        | 2.2m           | Horizontal    | Special, Extra-long span         |

Source: REG, 2020

### c. Installation of distribution transformers.

MV/LV transformers will be installed at different sites along the transmission lines to supply electricity to neighbouring houses and public facilities. These transformers will play the role of stepping down the electricity from MV to LV before distribution to consumers. According to REG standards the distribution transformers:

- Are mounted on a two-pole structure made of steel or concrete poles. However, transformers up to 15 kVA can be mounted on a single pole structure if the limit state design has proven it is possible.
- Transformer voltage ratings (No-load): 30kV/400/230V and 15kV/400/230V
- The standard vector group: Dyn11 and
- Off load 5 position tap changer: 95%-97.5%-100%-102.5%-105%. Up to 25 kVA transformers, 3 positions tap changer may be used.

### 3.5.3 Activities of the project during the operation phase

During the operation phase, project activities will be mainly the operation and maintenance of the transformers and the electrical lines that will have been installed during the construction phase. It is important to note that both EDCL EUCL are no longer use transformers containing PCBs (as commonly used in old equipment) which are harmful to the environment and humans.

#### a. Maintenance of the RoW

The transmission line requires clearing a permanent ROW. Its width generally is 12 m wide. Trees along the ROW must also be cleared for the safety of the lines. The regular maintenance of the ROW will be done to maintain clearance, among poles, conductors, and all the vegetation. Those maintenance operations will normally take place twice a year but may vary according to the local conditions of the project areas.

#### b. Maintenance of the transformers

As for the line, maintenance for the transformers is required. It must provide for the regular replacement of coolants and lubricants for transformers. However, this is not frequently done unless where it is required to be.

### 3.5.4 Decommissioning phase

During the decommissioning phase, project activities will be dismantling and removing all the structures from project construction sites, dismantling the supporting infrastructures and all those structures that were associated with the project implementation. The project also will rehabilitate the damaged sites to their former status or near what they were before the project was commissioned. This will include but not limited to the stores demolition, returning the remainder materials to EDCL Stores, revegetation of the soil where the poles and other materials were stored etc

## 4. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE STATUS

The description of the current baseline state provides the context from which to consider the environmental and social impacts of the proposed project sites. The detailed baseline characteristics described include both physical, biological, and socio-economic indicators as presented in this chapter.

### 4.1 General overview

Rwanda's administrative structure comprises 4 Provinces (Eastern, Western, Northern and Southern Provinces) and City of Kigali all subdivided into 30 districts. The topography of Rwanda is ascending western ward from 1000 m to 4507 m where eastern plains are lying on 1,000 m to 1,500 m and the central plateau region extend between 1,500 m and 2,000 m. The Northern Province is a mountainous, ecologically rich region with diverse landscapes, fertile soils, and significant biodiversity. The area is characterized by diverse physical and environmental features, making it one of the most ecologically significant regions in the country. The Province is predominantly mountainous, featuring high altitudes and rugged terrain. It is home to the Volcanoes National Park, which contains five of the eight Virunga volcanoes namely Karisimbi, Bisoke, Sabyinyo, Gahinga, and Muhabura. the altitude in this province varies significantly, with the highest point at Mount Karisimbi (4,507 meters), the tallest volcano in the Virunga range. The hilly and steep slopes define the province's landscape, affecting land use patterns and human settlement.

The province has a moderate equatorial climate, with temperatures ranging from 10°C to 25°C depending on altitude. Several rivers originate from the Northern Province, including Nyabarongo River, one of Rwanda's major rivers, which eventually flows into the Nile Basin. There are numerous lakes and wetlands, with Lake Ruhondo and Lake Burera being the most significant, located near the Virunga mountains. The region's high rainfall and abundant water resources contribute to the rich biodiversity and agricultural potential. The province hosts Volcanoes National Park, which is famous for being home to the mountain gorillas (*Gorilla beringei beringei*). The park also contains golden monkeys (*Cercopithecus kandti*), a unique primate species endemic to the Virunga region. The vegetation is primarily montane and bamboo forest, with higher elevations featuring afro-alpine flora such as giant lobelias and senecio species. The province's lower areas have scattered woodlands, grasslands, and agricultural landscapes.



**Figure 2: Typical topographical and vegetation characteristics of the northern province**

Source: Field survey, 2024

### 4.2 Rulindo district

#### 4.2.1 Physical environment

Rulindo is an administrative entity that make up the Northern Province, others being; Gakenke, Burera, Gicumbi and Musanze. The district has 17 administrative Sectors: Base, Burega, Bushoki, Buyoga, Cyinzuzi, Cyungo, Kinihira, Kisaro, Masoro, Mbogo, Murambi, Ngoma, Ntarabana Rukozo, Rusiga, Shyorongi, Tumba. These sectors are subdivided into 71 Cells and 494 Villages (Imidugudu). The surface area of Rulindo District is 567 km<sup>2</sup>

##### a) Topography

Rulindo District is mostly characterized by hills among which include; Tare, Tumba and the Cyungo hills with their altitude rising to 2,438 m. These hills are interspersed by valleys and swamps that also border rivers such as Nyabarongo, Muyanza and Nyabugogo. The valleys and swamps such as Rugezi feeds lake Burera and in turn supplies the fall of Ntaruka in Burera district which is a source of hydro energy to the country. This interweaving of hills and valleys with rivers provides a beautiful and eye-catching scenery to both citizens and visitors.

#### **b) Climate and Rainfall**

Rulindo District has a tropical climate, characterized by a succession of rainy seasons and droughts. The dry season usually extends from June to August and January to February while the rainy season normally stretches from September to December and March to May. The average annual temperature is 19°C. High temperatures are observed in August where they reach 28 °C in the middle of the day. During the rainy seasons, the district encounters concentrations of mists in the valleys in the morning and on the hilltops in the late morning. Rainfall normally reaches 1,243.3 mm per year on average.

#### **c) Hydrography**

Rulindo District has significant water reservoirs from local sources including rivers that have a steady flow into valleys that enables the district to have water even during the dry seasons. The main rivers that flow into the district are Base, Bahimba, Mulindi, Cyonyonyo, Cyohoha, and Rukeri, Muyanza. None of the schools of intervention has been found to be located in any near water body however, during surveys it was noted that some of the schools may face the challenges associated to soil erosion due to heavy rains on some extent. To this it was recommended that the designs take into consideration the recorded information and be adopted accordingly.

### **4.2.2 Ecological environment**

Rulindo district has diverse ecological characteristics influenced by its topography, climate, and land use patterns. The district features hills, valleys, and wetlands, providing a variety of habitats for different species of plants and animals.

#### **- Flora of Rulindo district**

The vegetation of Rulindo District consists of natural forests, plantations, and agricultural lands. However, due to human activities such as farming and settlement expansion, much of the natural vegetation has been altered.

##### **a) Natural vegetation**

The district hosts remnants of montane forests and gallery forests along riverbanks and wetlands. Some of the indigenous plant species include: *Albizia gummifera* (Peacock Flower Tree), *Markhamia lutea* (Nile Tulip Tree); *Ficus thonningii* (Strangler Fig); *Maesopsis eminii* (Umbrella Tree) and *Polyscias fulva* (Parasol Tree)

##### **b) Reforestation and plantation species**

Due to deforestation, the district has been reforested with exotic tree species, mainly for timber, fuelwood, and soil conservation. These include: *Eucalyptus* spp.; *Pinus patula* (Patula Pine); *Grevillea robusta* (Silky Oak); *Cupressus lusitanica* (Mexican Cypress); *Acacia melanoxylon* (Blackwood Acacia)

##### **c) Agricultural crops and vegetation**

Most of the land in Rulindo District is used for agriculture. Key crops include: Cash Crops such as *Coffea arabica* (Arabica Coffee); *Camellia sinensis* (Tea), Food Crops such as *Zea mays* (Maize), *Phaseolus vulgaris* (Common Beans), *Manihot esculenta* (Cassava), *Dioscorea* spp. (Yams), *Solanum tuberosum* (Potatoes) *Oryza sativa* (Rice, in marshlands) and Fruit Trees such as *Persea americana* (Avocado), *Mangifera indica* (Mango), *Carica papaya* (Papaya), *Psidium guajava* (Guava); *Musa* spp. (Bananas),

##### **d) Wetland and riparian vegetation**

The district has wetlands and riverine ecosystems that support hydrophilic (water-loving) vegetation, including: *Cyperus papyrus* (Papyrus); *Typha domingensis* (Cattail); *Phragmites mauritanus* (Reed Grass) and *Echinochloa pyramidalis* (Antelope Grass)

#### **- Fauna of Rulindo district**

The fauna in Rulindo district is primarily composed of small mammals, birds, amphibians, reptiles, and insects. Larger mammals are less common due to habitat fragmentation and human activities.

##### **a) Mammals**

Some of the mammals that can be found in Rulindo District include: *Cercopithecus mitis* (Blue Monkey) – found in

remaining forested areas, *Papio anubis* (Olive Baboon) – seen in fragmented forests and plantations, *Hystrix cristata* (Crested Porcupine), *Atilax paludinosus* (Marsh Mongoose), *Lepus microtis* (African Savanna Hare) and *Genetta genetta* (Common Genet)

#### b) Bird species

Rulindo District is home to a variety of bird species, some of which are common in forests, wetlands, and farmlands. Notable birds include: *Tauraco rossae* (Ross's Turaco), *Cossypha natalensis* (White-browed Robin-chat), *Cinnyris venustus* (Variable Sunbird), *Halcyon chelicuti* (Striped Kingfisher), *Bostrychia hagedash* (Hadada Ibis), *Milvus migrans* (Black Kite), *Bubulcus ibis* (Cattle Egret) – commonly found in agricultural areas, *Ploceus baglafecht* (Baglafecht Weaver)

#### c) Amphibians and reptiles

The district has several wetland areas that provide a habitat for amphibians and reptiles, including: *Amietophrynus regularis* (African Common Toad), *Hyperolius viridiflavus* (Variable Reed Frog), *Hemius guineensis* (Guinean Burrowing Frog), *Naja melanoleuca* (Forest Cobra), and *Philothamnus semivariegatus* (Green Bush Snake).

#### d) Insects and other invertebrates

Pollinators, decomposers, and aquatic invertebrates play a vital role in Rulindo's ecosystems. Important insect species include: *Apis mellifera* (Honeybee) – critical for pollination, *Danaus chrysippus* (African Monarch Butterfly), *Anopheles* spp. (Mosquitoes) – vectors of malaria, *Macrotermes* spp. (Termites) – contribute to soil fertility, *Gryllidae* spp. (Crickets)

### 4.2.3 Socio-economic environment

#### a) Population

The 5<sup>th</sup> RPHC enumerated 360,144 residents in Rulindo district. The population of Rulindo District is predominantly female: are 188,295 women corresponding to 52.3 % of its total population. Females are predominant in all the sectors of Rulindo District (female represent more than 50% in all sectors). Shyorongi (43,744 residents), Masoro (27,311 residents), Murambi (27,283 residents) and Buyoga (24,721 residents) are the most populated sectors. They represent respectively 12.1%; 7.6% and 6.9% of the total population of Rulindo district. The two less populated sectors are Rusiga (13,452 inhabitants) and Ngoma (12,703 inhabitants). They represent 3.7% and 3.5% of the total resident population of Rulindo District respectively.

**Table 12: Population of Rulindo District by Sector and sex**

| District and Sector      | Frequency         |                  |                  | Percent    |             |             | Share of the population |
|--------------------------|-------------------|------------------|------------------|------------|-------------|-------------|-------------------------|
|                          | Both sexes        | Male             | Female           | Both sexes | Male        | Female      | Both sexes              |
| <b>Rwanda</b>            | <b>13,246,394</b> | <b>6,429,326</b> | <b>6,817,068</b> | <b>100</b> | <b>48.5</b> | <b>51.5</b> | <b>-</b>                |
| <b>Northern Province</b> | <b>2,038,511</b>  | <b>972,960</b>   | <b>1,065,551</b> | <b>100</b> | <b>47.7</b> | <b>52.3</b> | <b>-</b>                |
| Rulindo district         | 360,144           | 171,849          | 188,295          | 100        | 47.7        | 52.3        | 100.0                   |
| Base                     | 20,528            | 9,574            | 10,954           | 100        | 46.6        | 53.4        | 5.7                     |
| Burega                   | 13,893            | 6,571            | 7,322            | 100        | 47.3        | 52.7        | 3.9                     |
| Bushoki                  | 23,570            | 11,102           | 12,468           | 100        | 47.1        | 52.9        | 6.5                     |
| Buyoga                   | 24,721            | 11,743           | 12,978           | 100        | 47.5        | 52.5        | 6.9                     |
| Cyinzuzi                 | 15,768            | 7,543            | 8,225            | 100        | 47.8        | 52.2        | 4.4                     |
| Cyungo                   | 15,350            | 7,212            | 8,138            | 100        | 47.0        | 53.0        | 4.3                     |
| Kinihira                 | 17,145            | 8,082            | 9,063            | 100        | 47.1        | 52.9        | 4.8                     |
| Kisaro                   | 23,113            | 11,054           | 12,059           | 100        | 47.8        | 52.2        | 6.4                     |
| Masoro                   | 27,311            | 13,261           | 14,050           | 100        | 48.6        | 51.4        | 7.6                     |
| Mbogo                    | 19,101            | 9,070            | 10,031           | 100        | 47.5        | 52.5        | 5.3                     |
| Murambi                  | 27,283            | 13,293           | 13,990           | 100        | 48.7        | 51.3        | 7.6                     |
| Ngoma                    | 12,703            | 6,061            | 6,642            | 100        | 47.7        | 52.3        | 3.5                     |
| Ntarabana                | 24,748            | 11,930           | 12,818           | 100        | 48.2        | 51.8        | 6.9                     |
| Rukozo                   | 17,021            | 8,045            | 8,976            | 100        | 47.3        | 52.7        | 4.7                     |
| Rusiga                   | 13,452            | 6,416            | 7,036            | 100        | 47.7        | 52.3        | 3.7                     |
| Shyorongi                | 43,744            | 21,182           | 22,562           | 100        | 48.4        | 51.6        | 12.1                    |
| Tumba                    | 20,693            | 9,710            | 10,983           | 100        | 46.9        | 53.1        | 5.7                     |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Rulindo district population is predominantly in rural area 89.4% while urban represents 10.6%. Most the sectors of

Rulindo district are entirely rural, only 4 sectors out of 17 have a small urban area (Base, Kinihira, Murambi and Shyorongi).

#### b) Number of households and size of household

household size in Rulindo District is 3.9 persons per household. At the Sector level, the highest sizes are found in Cyungo, Murambi and Rukozo (4.0 persons/household each). The smallest household sizes are found in Burega (3.7 persons/household). The results of the 5th RPHC 2022 revealed that 28.9% of private households are headed by women at national level. In Rulindo district, private households headed by females are 27.4%. At sector level, the highest percentages of households headed by women are found in Tumba (30.3%) and Burega (29.8%) while the lowest are found in Murambi (24.1%).

**Table 13: Number of households and their corresponding population, mean size and sex of household head**

| Sectors                  | Total number of private households | Corresponding Population <sup>1</sup> | Household Size | Percentage      |                   |
|--------------------------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|                          |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| <b>Rwanda</b>            | <b>3,312,743</b>                   | <b>13,100,600</b>                     | <b>4.0</b>     | <b>71.1</b>     | <b>28.9</b>       |
| <b>Northern Province</b> | <b>506,064</b>                     | <b>2,024,173</b>                      | <b>4.0</b>     | <b>73.1</b>     | <b>26.9</b>       |
| Rulindo District         | 91,909                             | 359,575                               | 3.9            | 72.6            | 27.4              |
| Base                     | 5,236                              | 20,523                                | 3.9            | 70.5            | 29.5              |
| Burega                   | 3,722                              | 13,880                                | 3.7            | 70.2            | 29.8              |
| Bushoki                  | 5,932                              | 23,368                                | 3.9            | 70.4            | 29.6              |
| Buyoga                   | 6,340                              | 24,702                                | 3.9            | 71.7            | 28.3              |
| Cyinzuzi                 | 3,999                              | 15,757                                | 3.9            | 71.3            | 28.7              |
| Cyungo                   | 3,793                              | 15,338                                | 4.0            | 72.6            | 27.4              |
| Kinihira                 | 4,360                              | 17,120                                | 3.9            | 72.9            | 27.1              |
| Kisaro                   | 5,846                              | 23,091                                | 3.9            | 73.8            | 26.2              |
| Masoro                   | 6,922                              | 27,249                                | 3.9            | 71.9            | 28.1              |
| Mbogo                    | 4,868                              | 19,086                                | 3.9            | 72.6            | 27.4              |
| Murambi                  | 6,831                              | 27,263                                | 4.0            | 75.9            | 24.1              |
| Ngoma                    | 3,246                              | 12,698                                | 3.9            | 70.5            | 29.5              |
| Ntarabana                | 6,366                              | 24,715                                | 3.9            | 72.8            | 27.2              |
| Rukozo                   | 4,268                              | 17,016                                | 4.0            | 74.0            | 26.0              |
| Rusiga                   | 3,460                              | 13,445                                | 3.9            | 72.8            | 27.2              |
| Shyorongi                | 11,445                             | 43,633                                | 3.8            | 75.3            | 24.7              |
| Tumba                    | 5,275                              | 20,691                                | 3.9            | 69.7            | 30.3              |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### c) Housing characteristics

The most common type of habitat in Rulindo district is Umudugudu (Planned rural settlement) (52.8%) followed by Dispersed/ Isolated housing (40.2%). The type of habitat varies across sectors Umudugudu (Planned rural settlement) housing is most prevalent in Cyungo (83.7%) and Rukozo (83.4%). The sectors with the high percentages of dispersed/isolated housing units are Ngoma (78.0%) and Masoro (70.9%).

**Table 14: Distribution (count and %) of households in Rulindo District by type of habitat and Sector**

| Sectors                  | Total Number of Households | Percentage |                                      |                          |                |                            |                |                              |                       |            |
|--------------------------|----------------------------|------------|--------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|                          |                            | Total      | Umudugudu (Planned rural settlement) | Integrated model village | Old settlement | Dispersed/Isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| <b>Rwanda</b>            | <b>3,312,743</b>           | <b>100</b> | <b>65.4</b>                          | <b>0.8</b>               | <b>2.3</b>     | <b>14.9</b>                | <b>6.9</b>     | <b>8.9</b>                   | <b>0.8</b>            | <b>0.0</b> |
| <b>Northern Province</b> | <b>506,064</b>             | <b>100</b> | <b>70.5</b>                          | <b>0.6</b>               | <b>1.7</b>     | <b>22.3</b>                | <b>0.5</b>     | <b>4.1</b>                   | <b>0.3</b>            | <b>0.0</b> |
| <b>Rulindo District</b>  | <b>91,909</b>              | <b>100</b> | <b>52.8</b>                          | <b>0.9</b>               | <b>0.9</b>     | <b>40.2</b>                | <b>0.4</b>     | <b>4.4</b>                   | <b>0.4</b>            | <b>0.0</b> |
| <b>Rulindo Urban</b>     | <b>9,898</b>               | <b>100</b> | <b>46.4</b>                          | <b>0.4</b>               | <b>1.6</b>     | <b>24.9</b>                | <b>2.5</b>     | <b>24.2</b>                  | <b>0.1</b>            | <b>-</b>   |
| <b>Rulindo Rural</b>     | <b>82,011</b>              | <b>100</b> | <b>53.6</b>                          | <b>1.0</b>               | <b>0.8</b>     | <b>42.0</b>                | <b>0.1</b>     | <b>2.0</b>                   | <b>0.5</b>            | <b>0.0</b> |
| Base                     | 5,236                      | 100        | 68.9                                 | 0.2                      | 0.2            | 30.0                       | -              | 0.6                          | 0.2                   | 0.0        |
| Burega                   | 3,722                      | 100        | 46.8                                 | 0.1                      | 2.1            | 50.6                       | -              | 0.3                          | 0.1                   | 0.0        |
| Bushoki                  | 5,932                      | 100        | 68.4                                 | 2.8                      | 0.4            | 26.7                       | 0.0            | 1.5                          | 0.1                   | -          |

| Sectors   | Total Number of Households | Percentage |                                      |                          |                |                            |                |                              |                       |            |
|-----------|----------------------------|------------|--------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|           |                            | Total      | Umudugudu (Planned rural settlement) | Integrated model village | Old settlement | Dispersed/Isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| Buyoga    | 6,340                      | 100        | 61.2                                 | 0.7                      | 0.8            | 34.3                       | -              | 0.9                          | 2.1                   | -          |
| Cyinzuzi  | 3,999                      | 100        | 29.2                                 | 1.4                      | 1.2            | 57.1                       | -              | 10.9                         | 0.3                   | -          |
| Cyungo    | 3,793                      | 100        | 87.1                                 | 0.3                      | 0.0            | 9.9                        | 0.0            | 2.5                          | 0.1                   | -          |
| Kinihira  | 4,360                      | 100        | 65.7                                 | 3.8                      | 0.5            | 24.2                       | 0.0            | 3.7                          | 2.1                   | -          |
| Kisaro    | 5,846                      | 100        | 71.0                                 | 0.2                      | 0.1            | 27.6                       | 0.0            | 0.6                          | 0.3                   | -          |
| Masoro    | 6,922                      | 100        | 17.8                                 | 1.4                      | 2.5            | 70.9                       | 0.0            | 6.2                          | 0.4                   | -          |
| Mbogo     | 4,868                      | 100        | 54.4                                 | 0.1                      | 2.0            | 42.6                       | 0.0            | 0.8                          | 0.2                   | -          |
| Murambi   | 6,831                      | 100        | 44.8                                 | 0.2                      | 0.0            | 54.4                       | 0.0            | 0.3                          | 0.2                   | -          |
| Ngoma     | 3,246                      | 100        | 20.2                                 | 0.0                      | 0.3            | 78.0                       | 0.0            | 1.0                          | 0.4                   | -          |
| Ntarabana | 6,366                      | 100        | 42.0                                 | 0.9                      | 1.8            | 52.7                       | 0.0            | 1.9                          | 0.3                   | -          |
| Rukozo    | 4,268                      | 100        | 83.4                                 | 0.1                      | 0.0            | 16.4                       | 0.0            | 0.0                          | 0.0                   | -          |
| Rusiga    | 3,460                      | 100        | 57.0                                 | 1.1                      | 0.4            | 40.8                       | 0.0            | 0.7                          | 0.0                   | -          |
| Shyorongi | 11,445                     | 100        | 45.4                                 | 1.4                      | 1.6            | 28.2                       | 0.0            | 21.2                         | 0.2                   | -          |
| Tumba     | 5,275                      | 100        | 52.8                                 | 0.0                      | 0.2            | 46.5                       | 0.0            | 0.3                          | 0.1                   | -          |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

According to the area of residence, the predominant types are Umudugudu (Planned rural settlement) housing (46.4%), Dispersed/ Isolated housing (24.9) and Spontaneous/squatter housing (24.2%) in urban areas. In rural areas, the predominant type is Umudugudu (Planned rural settlement) housing (53.6%) followed by Dispersed/ Isolated housing (42.0%).

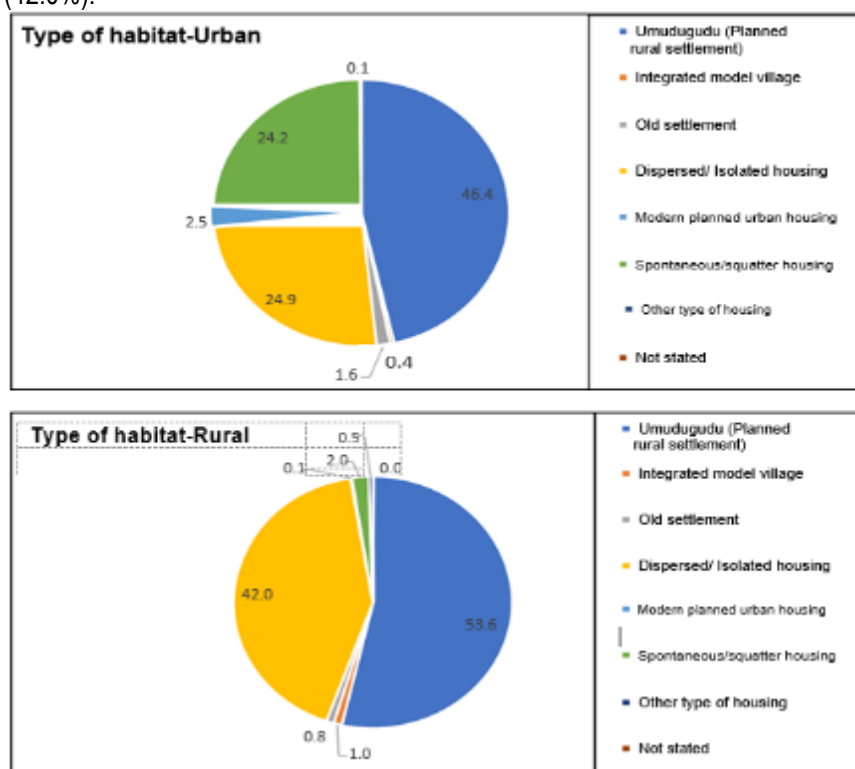


**Figure 3: Distribution of households in Rulindo District by type of habitat and by area of residence.**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### d) Education

In Rulindo District, 14.1% of the population has never attended school, while 2.5% have attended nursery, and 65.5% have attended primary school. Other education levels include 1.0% for INGOBOKA/Vocational, 9.1% for lower

secondary, 5.7% for upper secondary, 2.2% for university, and a small proportion 0.0% is not stated. The distribution of the highest level of education attended varies among sectors, with differences in the percentage of individuals at each education level. For example, Burega has a higher percentage (17.9%) of individuals who have never attended school compared to other sectors, while Shyorongi has a higher percentage (9.3%) of individuals who attended upper secondary school. Each sector has its own unique distribution of educational levels attended by the population. The table below indicates the findings.

**Table 15: Distribution of the resident population of Rulindo District by highest level of school attended**

| Sectors           | Count          | Percentage |                       |         |         |                      |                 |                 |            |            |
|-------------------|----------------|------------|-----------------------|---------|---------|----------------------|-----------------|-----------------|------------|------------|
|                   | Total (counts) | Total      | Never attended school | Nursery | Primary | INGOBOKA /Vocational | Lower secondary | Upper secondary | University | Not stated |
| Rwanda            | 11,999,691     | 100        | 16.7                  | 2.7     | 59.5    | 0.8                  | 9.6             | 7.1             | 3.6        | 0.0        |
| Northern Province | 1,847,684      | 100        | 16.0                  | 2.7     | 61.9    | 0.7                  | 9.6             | 6.4             | 2.6        | 0.0        |
| Rulindo District  | 323,243        | 100        | 14.1                  | 2.5     | 65.5    | 1.0                  | 9.1             | 5.7             | 2.2        | 0.0        |
| Base              | 18,552         | 100        | 11.2                  | 3.7     | 64.2    | 1.3                  | 10.6            | 6.2             | 2.9        | 0.0        |
| Burega            | 12,628         | 100        | 17.9                  | 1.3     | 65.3    | 1.4                  | 8.8             | 4.4             | 1.0        | 0.0        |
| Bushoki           | 21,185         | 100        | 10.5                  | 2.9     | 66.4    | 0.7                  | 9.8             | 6.2             | 3.4        | 0.0        |
| Buyoga            | 22,719         | 100        | 15.0                  | 1.9     | 66.4    | 0.8                  | 8.9             | 5.5             | 1.5        | -          |
| Cyinzuzi          | 14,028         | 100        | 15.6                  | 1.7     | 68.3    | 0.8                  | 7.4             | 4.8             | 1.4        | -          |
| Cyungo            | 13,816         | 100        | 16.3                  | 2.5     | 65.1    | 1.0                  | 8.7             | 4.8             | 1.5        | -          |
| Kinihira          | 15,676         | 100        | 12.3                  | 3.9     | 66.0    | 0.9                  | 8.3             | 6.3             | 2.3        | -          |
| Kisaro            | 20,906         | 100        | 16.5                  | 2.2     | 65.4    | 0.6                  | 8.7             | 5.0             | 1.6        | -          |
| Masoro            | 24,430         | 100        | 15.5                  | 1.7     | 65.2    | 1.5                  | 8.6             | 5.2             | 2.5        | -          |
| Mbogo             | 16,997         | 100        | 13.2                  | 1.3     | 69.9    | 0.7                  | 8.4             | 4.8             | 1.6        | -          |
| Murambi           | 24,328         | 100        | 15.0                  | 1.9     | 64.9    | 1.3                  | 9.0             | 5.5             | 2.3        | 0.0        |
| Ngoma             | 11,325         | 100        | 15.1                  | 1.8     | 68.5    | 1.0                  | 8.4             | 4.1             | 1.2        | -          |
| Ntarabana         | 22,489         | 100        | 16.7                  | 2.3     | 65.3    | 0.7                  | 8.4             | 4.7             | 2.0        | 0.0        |
| Rukozo            | 15,034         | 100        | 15.2                  | 2.4     | 66.3    | 0.8                  | 9.0             | 5.0             | 1.4        | -          |
| Rusiga            | 12,008         | 100        | 13.4                  | 1.9     | 68.0    | 0.7                  | 9.2             | 5.1             | 1.8        | 0.0        |
| Shyorongi         | 38,828         | 100        | 12.2                  | 4.1     | 58.6    | 1.1                  | 11.0            | 9.3             | 3.6        | 0.0        |
| Tumba             | 18,294         | 100        | 10.4                  | 2.1     | 71.1    | 0.9                  | 8.6             | 5.1             | 1.7        | 0.0        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### e) Means of livelihoods

In Rulindo district, crop farming and animal husbandry are on large scale. Agricultural households represent 83.9% with 79.3% of households engaged in crop farming and 66.3% in Livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Tumba (93.7%) and Rusiga (92.1%). Households engaged in crop farming are more represented in Tumba (91.2%) and Ngoma (90.8%) while those engaged in livestock husbandry are in Mbogo (80.9%) and Ngoma (80.4%).

It was also revealed that the employment to population ratio is 39.0% among people residing in Rulindo districts, it is higher in urban areas of Rulindo (51.6 %) than in rural areas of Rulindo (37.5%). The employment to population ratio among males as well as females increases from age group 16-19 to 35-39 and starts decreasing from age group 35-39 to 85 years and above as people starts getting very older and retire. It was observed that in district of Rulindo, the highest employment to population ratio among males stands at 60.8% and was observed in age group 30-34, On the other side the highest employment to population among females is 42.0% and was observed in the age group 30-34. The lowest employment to population ratio among males stands at 3.4% and was observed among males in the age group 85+, the lowest employment to population ratio among females is 4.1% and was observed among females in the age group 85+.

**Table 16: Distribution of household engaged in livestock husbandry in Rulindo District**

| Sector   | Agricultural households |         |           | Households engaged in crop farming |      | Households engaged in Livestock husbandry |      |
|----------|-------------------------|---------|-----------|------------------------------------|------|-------------------------------------------|------|
|          | Total Households        | Private | Counts    | Counts                             | %    | Counts                                    | %    |
| Rwanda   | 3,312,743               |         | 2,280,854 | 2,074,928                          | 62.6 | 1,669,273                                 | 50.4 |
| Northern | 506,064                 |         | 417,503   | 389,305                            | 76.9 | 327,842                                   | 64.8 |

| Sector           | Agricultural households |         |        | Households engaged in crop farming |      | Households engaged in Livestock husbandry |      |
|------------------|-------------------------|---------|--------|------------------------------------|------|-------------------------------------------|------|
|                  | Total Households        | Private | Counts | Counts                             | %    | Counts                                    | %    |
| Province         |                         |         |        |                                    |      |                                           |      |
| Rulindo District | 91,909                  |         | 77,125 | 72,900                             | 79.3 | 60,921                                    | 66.3 |
| Base             | 5,236                   |         | 4,551  | 4,404                              | 84.1 | 3,500                                     | 66.8 |
| Burega           | 3,722                   |         | 3,392  | 3,224                              | 86.6 | 2,881                                     | 77.4 |
| Bushoki          | 5,932                   |         | 5,305  | 5,072                              | 85.5 | 4,451                                     | 75.0 |
| Buyoga           | 6,340                   |         | 5,730  | 5,470                              | 86.3 | 4,783                                     | 75.4 |
| Cyinzuzi         | 3,999                   |         | 3,593  | 3,401                              | 85.0 | 3,006                                     | 75.2 |
| Cyungo           | 3,793                   |         | 3,419  | 3,257                              | 85.9 | 2,667                                     | 70.3 |
| Kinihira         | 4,360                   |         | 3,863  | 3,720                              | 85.3 | 2,852                                     | 65.4 |
| Kisaro           | 5,846                   |         | 5,279  | 5,042                              | 86.2 | 4,336                                     | 74.2 |
| Masoro           | 6,922                   |         | 5,376  | 5,058                              | 73.1 | 3,539                                     | 51.1 |
| Mbogo            | 4,868                   |         | 4,484  | 4,227                              | 86.8 | 3,937                                     | 80.9 |
| Murambi          | 6,831                   |         | 5,119  | 4,678                              | 68.5 | 3,818                                     | 55.9 |
| Ngoma            | 3,246                   |         | 3,057  | 2,948                              | 90.8 | 2,611                                     | 80.4 |
| Ntarabana        | 6,366                   |         | 4,946  | 4,591                              | 72.1 | 3,564                                     | 56.0 |
| Rukozo           | 4,268                   |         | 3,842  | 3,690                              | 86.5 | 2,893                                     | 67.8 |
| Rusiga           | 3,460                   |         | 3,187  | 3,063                              | 88.5 | 2,755                                     | 79.6 |
| Shyorongi        | 11,445                  |         | 7,040  | 6,245                              | 54.6 | 5,121                                     | 44.7 |
| Tumba            | 5,275                   |         | 4,942  | 4,810                              | 91.2 | 4,207                                     | 79.8 |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### f) Health, Water supply and Sanitation facilities

In Rulindo District 95.1% are using Mutuelle as main health insurance, 3.8% using RSSB or RAMA, 0.2% using private insurance, 0.0% using school insurance, 0.0% using NGOs insurance and 0.9% using employer insurance.



**Figure 4: Population who have a medical insurance by main type of insurance in Rulindo District**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In Rulindo district, 86% of private households use improved drinking water sources. At the sector level, the percentage of the private households using water from improved drinking sources is highest in Murambi (95%), and the lowest in Ngoma and (76.6%).

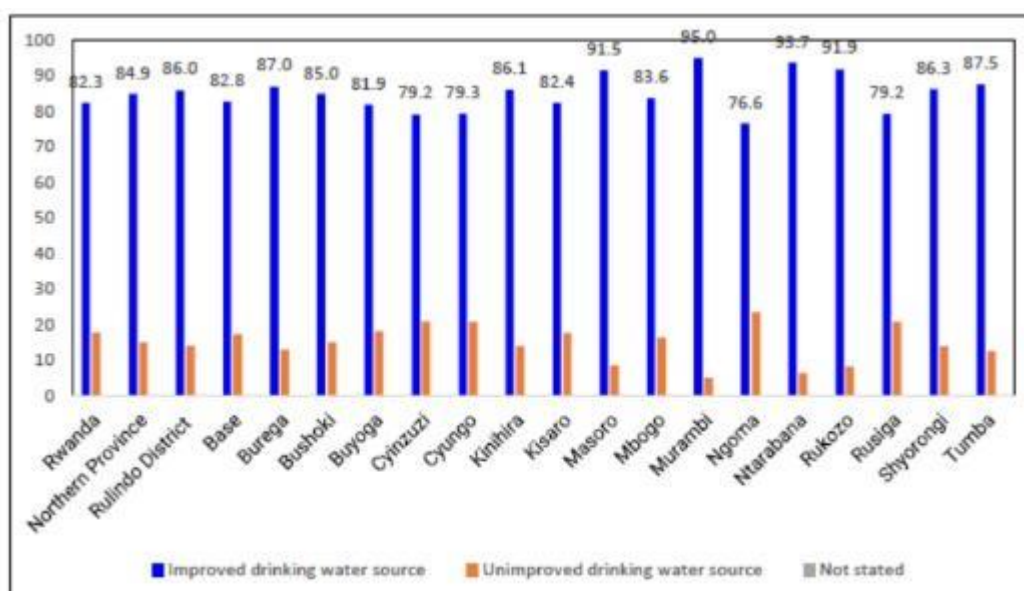


**Figure 5: Percentage of households of Rulindo District by main source of drinking water**  
Source: Fifth Rwanda Population and Housing Census,2022(NISR)

In both urban and rural areas, private households use mainly improved sources of water (94.5% in urban and 85% in rural areas). The percentage of private households using unimproved sources of water is higher in rural (15%) than in urban (5.5%).

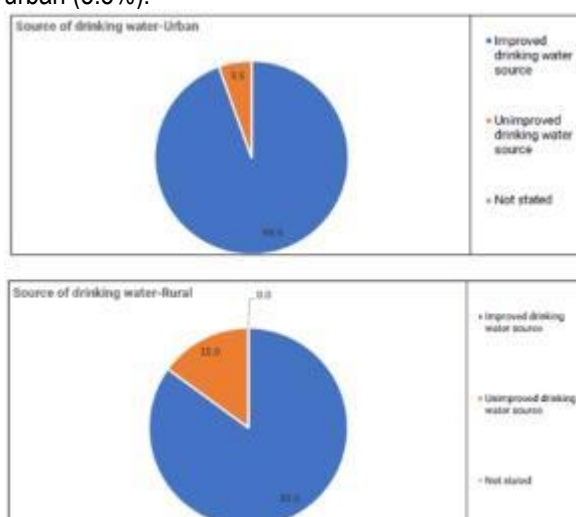


**Figure 6: Distribution of the private households of Rulindo District by main source of water and by area of residence**

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

#### g) Appliance and assets ownership

At the district level, 83.5% of private households possess a radio, 77.8% a mobile phone, 15.4% a smartphone, 9.0% a TV and 2.2% a computer. The percentage of private households possessing a radio is high in Bushoki (88.8%), Murambi (87.8%) Mbogo (87.6%) and Rusiga (87.5%). The percentage of private households possessing a television is high in Shyorongi (22.7%) and Murambi (16.0%). Mobile phone is mostly possessed by private households of Shyorongi (84.1%), Bushoki (83.7%) and Murambi (83.0%). The sectors with high percentage of households with smartphone are Shyorongi (28.8%) Bushoki (21.3%) and Murambi (19.3%) while the percentage of households possessing this asset is low in Base (8.6%). Computer is mostly possessed in Shyorongi (4.8%).

**Table 17: Percentage of private households and of Rulindo District possessing electrical appliance**

| Sectors and area of residence | Total Number of Private | % of HHs owning the specified communication asserts |            |                           |              |          |
|-------------------------------|-------------------------|-----------------------------------------------------|------------|---------------------------|--------------|----------|
|                               |                         | Radio                                               | Television | Mobile phone <sup>2</sup> | Smart Mobile | Computer |
| Rwanda                        | 3,312,743               | 81.5                                                | 12.3       | 78.1                      | 20.8         | 4.2      |
| Northern Province             | 506,064                 | 82.1                                                | 7.5        | 77.6                      | 15.3         | 2.3      |

| Sectors and area of residence | Total Number of Private | % of HHs owning the specified communication asserts |            |                           |              |            |
|-------------------------------|-------------------------|-----------------------------------------------------|------------|---------------------------|--------------|------------|
|                               |                         | Radio                                               | Television | Mobile phone <sup>2</sup> | Smart Mobile | Computer   |
| <b>Rulindo District</b>       | <b>91,909</b>           | <b>83.5</b>                                         | <b>9.0</b> | <b>77.8</b>               | <b>15.4</b>  | <b>2.2</b> |
| Base                          | 5,236                   | 84.0                                                | 6.1        | 80.5                      | 16.6         | 2.2        |
| Burega                        | 3,722                   | 80.0                                                | 3.3        | 70.7                      | 8.6          | 1.0        |
| Bushoki                       | 5,932                   | 88.8                                                | 8.9        | 83.7                      | 21.3         | 2.7        |
| Buyoga                        | 6,340                   | 82.2                                                | 3.7        | 75.4                      | 9.8          | 1.4        |
| Cyinzuzi                      | 3,999                   | 81.4                                                | 4.0        | 73.7                      | 11.0         | 0.9        |
| Cyungo                        | 3,793                   | 77.6                                                | 4.1        | 72.7                      | 9.9          | 1.2        |
| Kinihira                      | 4,360                   | 83.3                                                | 5.6        | 78.2                      | 14.6         | 1.8        |
| Kisaro                        | 5,846                   | 77.3                                                | 3.7        | 70.6                      | 9.0          | 1.5        |
| Masoro                        | 6,922                   | 82.3                                                | 13.1       | 76.2                      | 16.9         | 3.0        |
| Mbogo                         | 4,868                   | 87.6                                                | 5.8        | 79.7                      | 12.0         | 1.8        |
| Murambi                       | 6,831                   | 87.8                                                | 16.0       | 83.0                      | 19.3         | 2.3        |
| Ngoma                         | 3,246                   | 82.8                                                | 4.6        | 77.4                      | 9.1          | 0.7        |
| Ntarabana                     | 6,366                   | 81.4                                                | 10.1       | 75.0                      | 15.0         | 2.6        |
| Rukozo                        | 4,268                   | 78.5                                                | 3.7        | 71.9                      | 9.7          | 0.9        |
| Rusiga                        | 3,460                   | 85.5                                                | 5.2        | 78.7                      | 11.4         | 1.5        |
| Shyorongi                     | 11,445                  | 87.3                                                | 22.7       | 84.1                      | 28.8         | 4.8        |
| Tumba                         | 5,275                   | 84.2                                                | 4.7        | 78.3                      | 13.3         | 1.4        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### h) Access to energy for lighting and cooking

In Rulindo district, the main source of energy for lighting used by households is electricity (54.7%) followed by Flashlight/Phone Flashlight (36%). At the sector level, the percentage of households using electricity for lighting is high in Shyorongi (69.3%), Bushoki (66.3%) and Murambi (62.0%). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Kisaro (51.2%) and Rukozo (45.7%).

According to the area of residence, the sources of energy for lighting in Rulindo district are mainly electricity, and flashlight/phone flashlight. However, the percentages of households using them vary by area of residence. In urban areas, the main source of energy for lighting is electricity (75.5%) followed by flashlight/phone flashlight (15.2%). In rural areas, 52.1% of private households use electricity as main source of energy for lighting while 38.5% use flashlights/Phone.

**Table 18: Distribution of households of Rulindo District by main source of energy for lighting**

| Sector and area of residence | Total number of private households | Total      | Electricity | Kerosene/Paraffin lamp | Biogas     | Candles    | Firewood   | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern    | Other source of energy for Lighting |
|------------------------------|------------------------------------|------------|-------------|------------------------|------------|------------|------------|----------------|-----------------------------|------------------------|------------|-------------------------------------|
| <b>Rwanda</b>                | <b>3,312,743</b>                   | <b>100</b> | <b>61.0</b> | <b>0.4</b>             | <b>0.0</b> | <b>2.9</b> | <b>4.2</b> | <b>1.1</b>     | <b>28.4</b>                 | <b>0.1</b>             | <b>1.2</b> | <b>0.5</b>                          |
| <b>Northern Province</b>     | <b>506,064</b>                     | <b>100</b> | <b>54.1</b> | <b>0.3</b>             | <b>0.0</b> | <b>3.0</b> | <b>5.0</b> | <b>0.8</b>     | <b>35.3</b>                 | <b>0.1</b>             | <b>0.9</b> | <b>0.4</b>                          |
| <b>Rulindo District</b>      | <b>91,909</b>                      | <b>100</b> | <b>54.7</b> | <b>0.3</b>             | <b>0.0</b> | <b>4.0</b> | <b>2.9</b> | <b>0.8</b>     | <b>36.0</b>                 | <b>0.1</b>             | <b>0.9</b> | <b>0.4</b>                          |
| <b>Rulindo Urban</b>         | <b>9,898</b>                       | <b>100</b> | <b>75.5</b> | <b>0.2</b>             | <b>-</b>   | <b>7.0</b> | <b>0.6</b> | <b>0.2</b>     | <b>15.2</b>                 | <b>0.1</b>             | <b>0.6</b> | <b>0.5</b>                          |
| <b>Rulindo Rural</b>         | <b>82,011</b>                      | <b>100</b> | <b>52.1</b> | <b>0.3</b>             | <b>0.0</b> | <b>3.6</b> | <b>3.2</b> | <b>0.9</b>     | <b>38.5</b>                 | <b>0.1</b>             | <b>0.9</b> | <b>0.4</b>                          |
| Base                         | 5,236                              | 100        | 54.0        | 0.3                    | -          | 3.4        | 3.9        | 0.3            | 36.7                        | 0.1                    | 0.9        | 0.3                                 |
| Burega                       | 3,722                              | 100        | 58.1        | 0.2                    | -          | 3.2        | 3.2        | 0.2            | 33.7                        | 0.0                    | 0.5        | 0.8                                 |
| Bushoki                      | 5,932                              | 100        | 66.3        | 0.4                    | -          | 2.3        | 2.6        | 0.1            | 27.4                        | 0.1                    | 0.6        | 0.2                                 |
| Buyoga                       | 6,340                              | 100        | 49.7        | 0.4                    | -          | 2.9        | 4.0        | 0.9            | 40.0                        | 0.1                    | 1.7        | 0.4                                 |
| Cyinzuzi                     | 3,999                              | 100        | 48.8        | 0.3                    | -          | 3.2        | 2.8        | 0.9            | 42.3                        | 0.1                    | 1.3        | 0.4                                 |
| Cyungo                       | 3,793                              | 100        | 47.1        | 0.2                    | -          | 2.3        | 7.4        | 0.1            | 41.4                        | 0.2                    | 0.8        | 0.5                                 |
| Kinihira                     | 4,360                              | 100        | 43.8        | 0.5                    | 0.0        | 3.4        | 6.8        | 0.3            | 44.0                        | 0.0                    | 1.0        | 0.2                                 |
| Kisaro                       | 5,846                              | 100        | 39.8        | 0.1                    | 0.0        | 1.9        | 4.6        | 1.1            | 51.2                        | 0.1                    | 0.8        | 0.4                                 |
| Masoro                       | 6,922                              | 100        | 57.4        | 0.2                    | 0.2        | 7.9        | 1.0        | 0.9            | 31.5                        | 0.1                    | 0.6        | 0.3                                 |
| Mbogo                        | 4,868                              | 100        | 56.9        | 0.3                    | 0.0        | 1.8        | 2.6        | 1.2            | 36.1                        | 0.1                    | 0.7        | 0.1                                 |
| Murambi                      | 6,831                              | 100        | 62.0        | 0.3                    | -          | 7.9        | 0.5        | 0.8            | 26.6                        | 0.2                    | 1.0        | 0.7                                 |
| Ngoma                        | 3,246                              | 100        | 49.6        | 0.5                    | -          | 3.5        | 1.6        | 1.2            | 40.5                        | 0.2                    | 2.3        | 0.4                                 |

| Sector and area of residence | Total number of private households | Total | Electricity | Kerosene/Paraffin lamp | Biogas | Candles | Firewood | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern | Other source of energy for Lighting |
|------------------------------|------------------------------------|-------|-------------|------------------------|--------|---------|----------|----------------|-----------------------------|------------------------|---------|-------------------------------------|
| Ntarabana                    | 6,366                              | 100   | 55.3        | 0.2                    | 0.1    | 5.3     | 1.5      | 1.9            | 34.2                        | 0.1                    | 1.1     | 0.3                                 |
| Rukozo                       | 4,268                              | 100   | 44.6        | 0.2                    | -      | 1.3     | 5.7      | 1.7            | 45.7                        | 0.0                    | 0.5     | 0.1                                 |
| Rusiga                       | 3,460                              | 100   | 50.2        | 0.3                    | 0.0    | 2.5     | 0.6      | 2.1            | 43.7                        | 0.1                    | 0.2     | 0.3                                 |
| Shyorongi                    | 11,445                             | 100   | 69.3        | 0.2                    | 0.0    | 5.6     | 0.5      | 0.6            | 22.8                        | 0.1                    | 0.5     | 0.5                                 |
| Tumba                        | 5,275                              | 100   | 47.8        | 0.1                    | -      | 3.0     | 5.5      | 0.3            | 42.3                        | 0.0                    | 0.6     | 0.4                                 |

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

At the district level, the main sources of energy for cooking used by the private households are firewood (87.9%) followed by charcoal (9.7%). At the sector level, firewood is the most used source of cooking energy by private households in Rukozo (98.3%), Kinihira (96.7%) and Burega (96.6%). Sectors with the high percentage of private households using charcoal as main source of cooking energy are Shyorongi (37.2%) and Murambi (17.5%). By the area of residence, the main sources of energy for cooking used by private households in Rural areas is the firewood (93.1%) and charcoal (5.1%). In urban areas, private households use charcoal (48.2%) and firewood (45.6%).

#### i) Vulnerability

In Rulindo district, the vulnerability prevalence rate is 3.2%. At sector level, the highest prevalence rates of the resident population with vulnerability are in Cyinzuzi (5.1%) and Tumba (4.2%).

**Table 19: Number and share of persons with of Rulindo District**

| Sectors of residence     | Total resident population | Person's with vulnerability |                |                | Prevalence of vulnerability |
|--------------------------|---------------------------|-----------------------------|----------------|----------------|-----------------------------|
|                          | Both sexes                | Both sexes                  | Male           | Female         | Both sexes                  |
| <b>Rwanda</b>            | <b>11,537,934</b>         | <b>391,775</b>              | <b>174,949</b> | <b>216,826</b> | <b>3.4</b>                  |
| <b>Northern Province</b> | <b>1,788,683</b>          | <b>60,336</b>               | <b>26,348</b>  | <b>33,988</b>  | <b>3.4</b>                  |
| <b>Rulindo district</b>  | <b>315,303</b>            | <b>10,093</b>               | <b>4,399</b>   | <b>5,694</b>   | <b>3.2</b>                  |
| Base                     | 18,077                    | 557                         | 213            | 344            | 3.1                         |
| Burega                   | 12,310                    | 436                         | 159            | 277            | 3.5                         |
| Bushoki                  | 20,692                    | 641                         | 269            | 372            | 3.1                         |
| Buyoga                   | 21,887                    | 827                         | 342            | 485            | 3.8                         |
| Cyinzuzi                 | 13,776                    | 698                         | 299            | 399            | 5.1                         |
| Cyungo                   | 13,500                    | 367                         | 171            | 196            | 2.7                         |
| Kinihira                 | 15,219                    | 296                         | 138            | 158            | 1.9                         |
| Kisaro                   | 20,423                    | 576                         | 294            | 282            | 2.8                         |
| Masoro                   | 23,742                    | 657                         | 287            | 370            | 2.8                         |
| Mbogo                    | 16,686                    | 592                         | 255            | 337            | 3.5                         |
| Murambi                  | 23,470                    | 799                         | 338            | 461            | 3.4                         |
| Ngoma                    | 11,223                    | 298                         | 134            | 164            | 2.7                         |
| Ntarabana                | 21,585                    | 628                         | 300            | 328            | 2.9                         |
| Rukozo                   | 14,958                    | 506                         | 251            | 255            | 3.4                         |
| Rusiga                   | 11,810                    | 228                         | 124            | 104            | 1.9                         |
| Shyorongi                | 37,671                    | 1,219                       | 498            | 721            | 3.2                         |
| Tumba                    | 18,274                    | 768                         | 327            | 441            | 4.2                         |

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

### 4.3 Gakenke district

#### 4.3.1 Physical environment

The District of Gakenke is one of the five districts of the Northern Province with 704,06 km<sup>2</sup>. It is subdivided into 19 administrative sectors, 97 cells, 617 villages (Imidugudu) and 84,4562 Households. The district shares borders with Rulindo District to the East, Burera and Musanze Districts to the North, Nyabihu District to the West, Kamonyi and Muhanga Districts to the south. The location of the district on the road Kigali-Musanze provides some opportunities related to some activities that may be attractive to passengers like that of Nyirangarama Enterprise.

### **b. Topography**

Gakenke district is characterized in general by high inclined hills separated by rivers and marshlands. The relief seems to comprise two distinctive regions with the high altitude region with mountains attaining at least 2648m (Mont Kabuye) and another region characterized by low inclined hills of about 1700m of altitude. Marshlands occupy an area representing 361 Hectares. These marshlands are generally exploited during the dry season (May-September).

### **c. Climate and Rainfall**

The District of Gakenke is endowed with reserves that could provide enough water for both consumption and agricultural purposes. These include substantial rainfall (between 1100 and 1500 mm per year) and the abundance of streams and watercourses. The main rivers flowing in Gakenke district are Cyacika, Bahimba, Isumo, Busanane, Kiyembe, Sanzare, Gaseke, Kinoni, Nyamuhanga, Base and Mugobore. The District of Gakenke enjoys parts of Ruhondo Lac on the side of Kamubuga and Kivuruga Sectors. Alongside Gakenke district, two main rivers go along which are Mukungwa River at the western side of the district, and Nyabarongo River at its South. The last two rivers pour their water in Akagera River, tributary of Nile River. Since most houses are situated on the summit and on the slopes of hills and due to the accidental relief in Gakenke district, the erosion takes what would be the fertile soil to Mukungwa and Nyabarongo Rivers then to be taken to Nile River. The district has to take precautions to contain its soil and to protect it against erosion.

### **d. Hydrography**

The District of Gakenke is endowed with reserves that could provide enough water for both consumption and agricultural purposes. These include substantial rainfall (between 1100 and 1500 mm per year) and the abundance of streams and watercourses. The main rivers flowing in Gakenke district are Cyacika, Bahimba, Isumo, Busanane, Kiyembe, Sanzare, Gaseke, Kinoni, Nyamuhanga, Base and Mugobore. The District of Gakenke enjoys parts of Ruhondo Lac on the side of Kamubuga and Kivuruga Sectors. Alongside Gakenke district, two main rivers go along which are Mukungwa River at the western side of the district, and Nyabarongo River at its South. The last two rivers pour their water in Akagera River, tributary of Nile River. Since most houses are situated on the summit and on the slopes of hills and due to the accidental relief in Gakenke district, the erosion takes what would be the fertile soil to Mukungwa and Nyabarongo Rivers then to be taken to Nile River. The district has to take precautions to contain its soil and to protect it against erosion.

#### **4.3.2 Ecological environment**

Gakenke District hosts a diverse range of flora and fauna, shaped by its hilly terrain, river systems, and agricultural practices. While biodiversity has been impacted by human activities, conservation efforts and sustainable land management can help preserve the district's rich ecological heritage.

##### **- Flora of Gakenke district**

The vegetation in Gakenke District is mainly characterized by montane forests, riverine vegetation, and human-modified landscapes dominated by agricultural and agroforestry species.

##### **a) Natural vegetation**

While much of the district's natural forests have been cleared for agriculture, remnants of indigenous vegetation still exist, mainly in wetlands, riverbanks, and hilly areas. These include native tree and plant species such as *Albizia gummifera* (Peacock flower tree) – found in hilly and riverine ecosystems., *Ficus thonningii* (Strangler fig) – common in forest patches and near water sources, *Markhamia lutea* (Nile tulip tree) – found along riverine forests, *Prunus africana* (African cherry) – a medicinal tree species found in high-altitude areas, *Entandrophragma excelsum* (East African mahogany) – a native timber tree, *Erythrina abyssinica* (Red-hot poker tree) – scattered in grasslands and along roadsides, *Syzygium guineense* (Waterberry) – thrives in riverine habitats. *Carissa edulis* (Simple-spined num-num) – used for medicinal purposes and *Vernonia amygdalina* (Bitter leaf) – a shrub found in farmlands and forest edges.

##### **b) Agroforestry and cultivated plants**

Due to the district's high population and agricultural dependence, several exotic tree species have been introduced for agroforestry, soil conservation, and economic purposes: these include *Grevillea robusta* (Silk oak) – commonly planted for timber and soil protection, *Eucalyptus* spp. – widely cultivated for construction wood and fuel, *Persea americana* (Avocado tree) – common in homesteads., *Mangifera indica* (Mango tree) – provides fruit and shade, *Coffea arabica* (Arabica coffee) – a major cash crop in Gakenke, *Camellia sinensis* (Tea) – found in highland areas used for commercial tea plantations and *Pinus patula* (Mexican weeping pine) – planted for afforestation and wood production.

### c) Wetland and riverine vegetation

Gakenke District contains wetland and riparian ecosystems along rivers such as the Nyabarongo River. These areas are characterized by: *Cyperus papyrus* (Papyrus) – dominant in wetlands, *Phragmites mauritanus* (Reed grass) – grows in swampy areas, and *Typha domingensis* (Cattail) – found along water bodies.

### - Fauna of Gakenke District

The fauna of Gakenke District includes a mix of forest, wetland, and savanna species, although wildlife populations have declined due to habitat loss and human activity.

#### a) Mammals

Some small to medium-sized mammals still inhabit the district's forests and agricultural landscapes, including: *Cercopithecus mitis* (Blue monkey) – found in remaining forest patches, *Papio anubis* (Olive baboon) – observed in forested and hilly areas, *Hystrix cristata* (Crested porcupine) – common in bushlands, *Atilax paludinosus* (Marsh mongoose) – found in wetland ecosystems, *Genetta genetta* (Common genet) – occurs in forested areas, *Lepus microtis* (African savanna hare) – widespread in farmlands and *Tragelaphus scriptus* (Bushbuck) – present in isolated forest patches.

#### b) Birds

Gakenke District is home to various bird species, particularly those associated with montane forests, farmlands, and wetlands. Some notable species include: *Tauraco leucotis* (White-cheeked turaco) – found in forested areas, *Buteo buteo* (Common buzzard) – a bird of prey in hilly landscapes, *Corvus albus* (Pied crow) – widespread in both rural and urban areas, *Cisticola* spp. (Cisticolas) – common in grasslands and wetlands, *Columba arquatrix* (African olive pigeon) – found in high-altitude forests, *Platysteira cyanea* (Brown-throated wattle-eye) – observed in secondary forests, *Ceryle rudis* (Pied kingfisher) – common near rivers and wetlands.

#### c) Reptiles and amphibians

These include diverse species such as *Varanus niloticus* (Nile monitor lizard) – found near wetlands and rivers, *Python sebae* (African rock python) – occurs in dense vegetation areas, *Naja nigricollis* (Black-necked spitting cobra) – found in agricultural fields, *Xenopus laevis* (African clawed frog) – common in wetlands and streams, and *Leptopelis flavomaculatus* (Yellow-spotted tree frog) – lives in forested and wetland areas.

#### d) Insects and aquatic life

Gakenke's biodiversity also includes numerous insect species, particularly pollinators and aquatic organisms that include: *Apis mellifera* (African honeybee) – plays a vital role in pollination, *Anopheles* spp. (Mosquitoes) – common in wetland areas, *Papilio demodocus* (Citrus swallowtail butterfly) – found in gardens and farms, *Labeobarbus* spp. (Barbus fish) – native to rivers like Nyabarongo, *Clarias gariepinus* (African catfish) – found in riverine habitats.

### 4.3.3 Socio-economic environment

#### a) Population

Gakenke district has a total population of 365,292 residents. Its population is predominantly female: 192,692 are women corresponding to 52.8% of the total population. Females are predominant in all 19 sectors of the district. Gakenke (25,325 population) and Kamubuga (23,336 population) are the most populated sectors. They represent 6.9% and 6.4% of the total population of Gakenke district, respectively. The two less populated sectors are Karambo (13,617 inhabitants) and Minazi (14,193 inhabitants).

**Table 20: Population of Gakenke District by sector and sex**

| District and Sector | Frequency  |           |           | Percent    |      |        | Share of the population |
|---------------------|------------|-----------|-----------|------------|------|--------|-------------------------|
|                     | Both sexes | Male      | Female    | Both sexes | Male | Female | Both sexes              |
| Rwanda              | 13,246,394 | 6,429,326 | 6,817,068 | 100        | 48.5 | 51.5   |                         |
| Northern Province   | 2,038,511  | 972,960   | 1,065,551 | 100        | 47.7 | 52.3   |                         |
| Gakenke district    | 365,292    | 172,600   | 192,692   | 100        | 47.2 | 52.8   | 100.0                   |
| Busengo             | 21,392     | 10,048    | 11,344    | 100        | 47.0 | 53.0   | 5.9                     |
| Coko                | 17,942     | 8,673     | 9,269     | 100        | 48.3 | 51.7   | 4.9                     |
| Cyabingo            | 18,785     | 8,917     | 9,868     | 100        | 47.5 | 52.5   | 5.1                     |
| Gakenke             | 25,325     | 11,934    | 13,391    | 100        | 47.1 | 52.9   | 6.9                     |
| Gashenyi            | 22,647     | 10,661    | 11,986    | 100        | 47.1 | 52.9   | 6.2                     |

| District and Sector | Frequency  |        |        | Percent    |      |        | Share of the population |
|---------------------|------------|--------|--------|------------|------|--------|-------------------------|
|                     | Both sexes | Male   | Female | Both sexes | Male | Female | Both sexes              |
| Janja               | 16,007     | 7,423  | 8,584  | 100        | 46.4 | 53.6   | 4.4                     |
| Kamubuga            | 23,336     | 10,950 | 12,386 | 100        | 46.9 | 53.1   | 6.4                     |
| Karambo             | 13,617     | 6,318  | 7,299  | 100        | 46.4 | 53.6   | 3.7                     |
| Kivuruga            | 19,967     | 9,333  | 10,634 | 100        | 46.7 | 53.3   | 5.5                     |
| Mataba              | 15,520     | 7,397  | 8,123  | 100        | 47.7 | 52.3   | 4.2                     |
| Minazi              | 14,193     | 6,729  | 7,464  | 100        | 47.4 | 52.6   | 3.9                     |
| Mugunga             | 19,963     | 9,450  | 10,513 | 100        | 47.3 | 52.7   | 5.5                     |
| Muhondo             | 21,334     | 10,296 | 11,038 | 100        | 48.3 | 51.7   | 5.8                     |
| Muyongwe            | 16,053     | 7,461  | 8,592  | 100        | 46.5 | 53.5   | 4.4                     |
| Muzo                | 21,816     | 10,099 | 11,717 | 100        | 46.3 | 53.7   | 6.0                     |
| Nemba               | 16,854     | 7,851  | 9,003  | 100        | 46.6 | 53.4   | 4.6                     |
| Ruli                | 22,464     | 10,962 | 11,502 | 100        | 48.8 | 51.2   | 6.1                     |
| Rusasa              | 19,242     | 9,124  | 10,118 | 100        | 47.4 | 52.6   | 5.3                     |
| Rushashi            | 18,835     | 8,974  | 9,861  | 100        | 47.6 | 52.4   | 5.2                     |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Gakenke district population is predominantly rural (96.0%) while urban represents 4.0%. The sectors of Gakenke district which are entirely rural are Busengo, Coko, Cyabingo, Gashenyi, Janja, Kamubuga, Karambo, Kivuruga, Mataba, Minazi, Mugunga, Muhondo, Muyongwe, Muzo, Rusasa, Rushashi.

#### b) Number of households and size of household

The average household size in Gakenke District is 3.9 persons per household. At the Sector level, the highest sizes are found in Kamubuga, Kivuruga and Rusasa (4.1 persons/household each). The smallest household size is found in Ruli (3.6 persons/household). The results of 5th RPHC 2022 revealed that nationally 28.9% of private households are headed by women. In Gakenke district, private households headed by females are 27.4%. At sector level, the highest percentages of households headed by women are found in Karambo sector (31.5%), Mugunga sector (30.8%) and Muzo sector (30.6%) while the lowest are found in Coko sector (22.6%) and Ruli sector (23.2%).

**Table 21: Number of households and their corresponding population, mean size and sex of household head**

| Sectors                  | Total number of private households | Corresponding Population <sup>1</sup> | Household Size | Percentage      |                   |
|--------------------------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|                          |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| <b>Rwanda</b>            | <b>3,312,743</b>                   | <b>13,100,600</b>                     | <b>4.0</b>     | <b>71.1</b>     | <b>28.9</b>       |
| <b>Northern Province</b> | <b>506,064</b>                     | <b>2,024,173</b>                      | <b>4.0</b>     | <b>73.1</b>     | <b>26.9</b>       |
| <b>Gakenke District</b>  | <b>93,609</b>                      | <b>364,810</b>                        | <b>3.9</b>     | <b>72.6</b>     | <b>27.4</b>       |
| Busengo                  | 5,343                              | 21,378                                | 4.0            | 75.0            | 25.0              |
| Coko                     | 4,598                              | 17,932                                | 3.9            | 77.4            | 22.6              |
| Cyabingo                 | 4,824                              | 18,769                                | 3.9            | 72.4            | 27.6              |
| Gakenke                  | 6,384                              | 25,282                                | 4.0            | 72.6            | 27.4              |
| Gashenyi                 | 5,884                              | 22,634                                | 3.8            | 70.2            | 29.8              |
| Janja                    | 3,937                              | 15,922                                | 4.0            | 71.3            | 28.7              |
| Kamubuga                 | 5,694                              | 23,334                                | 4.1            | 72.6            | 27.4              |
| Karambo                  | 3,622                              | 13,617                                | 3.8            | 68.5            | 31.5              |
| Kivuruga                 | 4,841                              | 19,961                                | 4.1            | 72.7            | 27.3              |
| Mataba                   | 4,085                              | 15,519                                | 3.8            | 71.0            | 29.0              |
| Minazi                   | 3,615                              | 14,172                                | 3.9            | 71.9            | 28.1              |
| Mugunga                  | 5,210                              | 19,956                                | 3.8            | 69.2            | 30.8              |
| Muhondo                  | 5,580                              | 21,320                                | 3.8            | 76.2            | 23.8              |
| Muyongwe                 | 4,190                              | 16,043                                | 3.8            | 71.6            | 28.4              |
| Muzo                     | 5,537                              | 21,802                                | 3.9            | 69.4            | 30.6              |
| Nemba                    | 4,365                              | 16,833                                | 3.9            | 71.7            | 28.3              |
| Ruli                     | 6,251                              | 22,433                                | 3.6            | 76.8            | 23.2              |
| Rusasa                   | 4,738                              | 19,238                                | 4.1            | 73.2            | 26.8              |
| Rushashi                 | 4,911                              | 18,665                                | 3.8            | 72.5            | 27.5              |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

### c) Housing characteristics

In Northern Province the predominant type of habitat is Umudugudu (Planned rural settlement) (70.5%) and Dispersed/ Isolated housing (22.3%). It is in the same as in Gakenke district as one of districts of the Northern Province. The most common type of habitat in Gakenke district is Umudugudu (Planned rural settlement) (85.5%) followed by Dispersed/ Isolated housing (13.1%) and Integrated model village (0.5%). The type of habitat varies across sectors. Umudugudu (Planned rural settlement) is most prevalent in Busengo (96.9%) and Mugunga (94.4%) and low in Gashenyi (59.8%). The sectors with the highest percentages of dispersed/isolated housing units are Gashenyi (36.4%) and Muyongwe (26.7%).

**Table 22: Distribution of households in Gakenke district by type of habitat and Sector**

| Sectors           | Total Number of Households | Percentage |                                     |                          |                |                            |                |                              |                       |            |
|-------------------|----------------------------|------------|-------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|                   |                            | Total      | Umudugudu(Planned rural settlement) | Integrated model village | Old settlement | Dispersed/Isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| Rwanda            | 3,312,743                  | 100        | 65.4                                | 0.8                      | 2.3            | 14.9                       | 6.9            | 8.9                          | 0.8                   | 0.0        |
| Northern Province | 506,064                    | 100        | 70.5                                | 0.6                      | 1.7            | 22.3                       | 0.5            | 4.1                          | 0.3                   | 0.0        |
| Gakenke District  | 93,609                     | 100        | 85.5                                | 0.5                      | 0.3            | 13.1                       | 0.1            | 0.3                          | 0.2                   | -          |
| Gakenke urban     | 4,009                      | 100        | 92.5                                | 0.3                      | 0.1            | 5.9                        | 0.3            | 0.4                          | 0.3                   | -          |
| Gakenke Rural     | 89,600                     | 100        | 85.2                                | 0.5                      | 0.3            | 13.4                       | 0.1            | 0.3                          | 0.2                   | -          |
| Busengo           | 5,343                      | 100        | 96.9                                | 0.2                      | 0.3            | 2.5                        | -              | 0.1                          | 0.0                   | -          |
| Coko              | 4,598                      | 100        | 93.6                                | 0.1                      | 0.4            | 5.6                        | 0.0            | 0.1                          | 0.1                   | -          |
| Cyabingo          | 4,824                      | 100        | 92.6                                | 0.0                      |                | 6.5                        | -              | 0.6                          | 0.3                   | -          |
| Gakenke           | 6,384                      | 100        | 81.7                                | 0.7                      | 0.6            | 15.4                       | 0.2            | 1.3                          | 0.2                   | -          |
| Gashenyi          | 5,884                      | 100        | 59.8                                | 3.2                      | 0.2            | 36.4                       | -              | 0.2                          | 0.2                   | -          |
| Janja             | 3,937                      | 100        | 89.8                                | 0.0                      | 0.2            | 9.4                        | 0.0            | 0.3                          | 0.3                   | -          |
| Kamubuga          | 5,694                      | 100        | 93.3                                | 0.1                      | 0.6            | 5.8                        | -              | 0.2                          | 0.1                   | -          |
| Karambo           | 3,622                      | 100        | 82.6                                | 1.0                      | 1.1            | 15.0                       | -              | 0.4                          | -                     | -          |
| Kivuruga          | 4,841                      | 100        | 93.2                                | 0.2                      | 0.5            | 5.8                        | -              | 0.0                          | 0.4                   | -          |
| Mataba            | 4,085                      | 100        | 86.9                                | 0.9                      | 0.2            | 11.8                       | -              | 0.2                          | 0.0                   | -          |
| Minazi            | 3,615                      | 100        | 92.2                                | 0.1                      | 0.1            | 7.3                        | -              | 0.1                          | 0.2                   | -          |
| Mugunga           | 5,210                      | 100        | 94.4                                | 0.9                      | 0.1            | 2.5                        | 2.0            | 0.1                          | 0.0                   | -          |
| Muhondo           | 5,580                      | 100        | 72.8                                | 0.0                      | 0.1            | 26.4                       | -              | 0.5                          | 0.3                   | -          |
| Muyongwe          | 4,190                      | 100        | 72.6                                | 0.1                      |                | 26.7                       | -              | 0.2                          | 0.4                   | -          |
| Muzo              | 5,537                      | 100        | 85.9                                | 0.3                      | 0.0            | 13.5                       | -              | 0.1                          | 0.1                   | -          |
| Nemba             | 4,365                      | 100        | 81.8                                | 0.0                      | 0.0            | 17.6                       | -              | 0.1                          | 0.4                   | -          |
| Ruli              | 6,251                      | 100        | 87.9                                | 0.8                      | 0.1            | 10.1                       | -              | 0.4                          | 0.6                   | -          |
| Rusasa            | 4,738                      | 100        | 87.2                                | 0.1                      | 0.3            | 12.3                       | 0.0            | 0.0                          | 0.1                   | -          |
| Rushashi          | 4,911                      | 100        | 84.9                                | 0.1                      | 0.3            | 14.6                       | -              | 0.0                          | 0.1                   | -          |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

According to the area of residence, the predominant type is Umudugudu (Planned rural settlement) (92.5%) followed by Dispersed/ Isolated housing (5.9%) in urban areas. It is the same in rural areas, the predominant type is Umudugudu (Planned rural settlement) (85.2%) followed by Dispersed/ Isolated housing (13.4%).

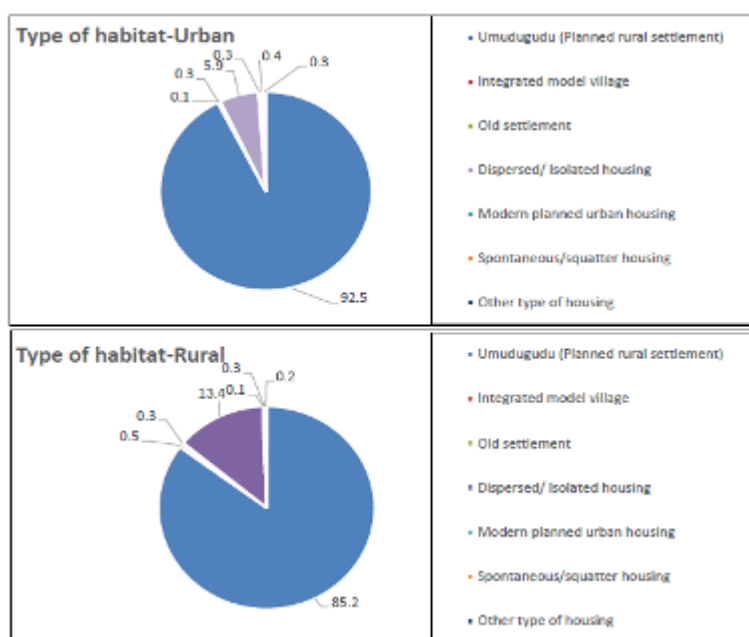


**Figure 7: Distribution of households in Gakenke district by type of habitat and by Area of residence.**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### d) Education

In Gakenke District, 14.2% of the population has never attended school, while 1.8% have attended nursery, and 67.7% have attended primary school. Other education levels include 0.9% for INGOBOKA/Vocational, 8.9% for lower secondary, 4.8% for upper secondary, 1.6% for university, and 0.0% is not stated. The distribution of the highest level of education attended varies among sectors, with differences in the percentage of individuals at each education level. For example, Kamubuga has a higher percentage (20.1%) of individuals who have never attended school compared to other sectors, while Ruli has a higher percentage (7.5%) of individuals who attended upper secondary school. Each sector has its own unique distribution of educational levels attended by the population.

**Table 23: Distribution of the resident population of Gakenke District by highest level of school attended**

| Sectors           | Count         | Percentage |                       |         |         |                      |                 |                 |            |            |
|-------------------|---------------|------------|-----------------------|---------|---------|----------------------|-----------------|-----------------|------------|------------|
|                   | Total(counts) | Total      | Never attended school | Nursery | Primary | INGOBOKA /Vocational | Lower secondary | Upper secondary | University | Not stated |
| Rwanda            | 11,999,691    | 100        | 16.7                  | 2.7     | 59.5    | 0.8                  | 9.6             | 7.1             | 3.6        | 0.0        |
| Northern Province | 1,847,684     | 100        | 16.0                  | 2.7     | 61.9    | 0.7                  | 9.6             | 6.4             | 2.6        | 0.0        |
| Gakenke District  | 328,561       | 100        | 14.2                  | 1.8     | 67.7    | 0.9                  | 8.9             | 4.8             | 1.6        | 0.0        |
| Busengo           | 18,913        | 100        | 10.8                  | 1.6     | 75.0    | 0.6                  | 7.6             | 3.3             | 1.0        | 0.0        |
| Coko              | 16,111        | 100        | 11.5                  | 1.6     | 69.0    | 1.8                  | 11.0            | 4.3             | 0.8        | 0.0        |
| Cyabingo          | 16,719        | 100        | 11.4                  | 1.8     | 68.8    | 1.3                  | 9.1             | 6.2             | 1.4        | 0.0        |
| Gakenke           | 22,569        | 100        | 14.6                  | 1.7     | 65.0    | 0.6                  | 8.9             | 6.1             | 3.1        | 0.0        |
| Gashenyi          | 20,470        | 100        | 17.8                  | 1.9     | 67.4    | 0.5                  | 6.7             | 4.3             | 1.3        | 0.0        |
| Janja             | 14,398        | 100        | 11.9                  | 1.7     | 67.7    | 0.9                  | 9.5             | 5.8             | 2.5        | 0.0        |
| Kamubuga          | 20,934        | 100        | 20.1                  | 2.1     | 64.3    | 0.2                  | 7.8             | 4.1             | 1.3        | 0.0        |
| Karambo           | 12,078        | 100        | 19.4                  | 1.5     | 66.4    | 0.3                  | 8.0             | 3.3             | 1.0        | 0.0        |
| Kivuruga          | 17,943        | 100        | 13.0                  | 2.1     | 66.8    | 0.5                  | 10.3            | 5.5             | 1.8        | 0.0        |
| Mataba            | 14,018        | 100        | 17.8                  | 1.2     | 69.1    | 0.2                  | 7.0             | 3.7             | 1.0        | 0.0        |
| Minazi            | 12,881        | 100        | 16.8                  | 1.8     | 68.4    | 0.8                  | 8.3             | 3.3             | 0.6        | 0.0        |
| Mugunga           | 18,258        | 100        | 10.6                  | 2.4     | 68.2    | 1.5                  | 10.3            | 5.2             | 1.8        | 0.0        |
| Muhondo           | 19,304        | 100        | 11.3                  | 1.5     | 66.6    | 1.5                  | 10.5            | 6.7             | 1.8        | 0.0        |
| Muyongwe          | 14,501        | 100        | 13.8                  | 1.8     | 71.3    | 1.4                  | 7.2             | 3.5             | 1.0        | 0.0        |
| Muzo              | 19,640        | 100        | 13.4                  | 1.3     | 70.3    | 1.0                  | 8.7             | 4.1             | 1.1        | 0.0        |
| Nemba             | 15,150        | 100        | 15.9                  | 2.2     | 66.7    | 0.9                  | 7.3             | 4.4             | 2.6        | 0.0        |

| Sectors  | Count         | Percentage |                       |         |         |                      |                 |                 |            |            |
|----------|---------------|------------|-----------------------|---------|---------|----------------------|-----------------|-----------------|------------|------------|
|          | Total(counts) | Total      | Never attended school | Nursery | Primary | INGOBOKA /Vocational | Lower secondary | Upper secondary | University | Not stated |
| Ruli     | 20,549        | 100        | 11.5                  | 2.4     | 61.4    | 1.8                  | 12.4            | 7.5             | 3.0        | 0.0        |
| Rusasa   | 17,215        | 100        | 15.3                  | 1.4     | 69.0    | 0.7                  | 9.0             | 3.9             | 0.6        | 0.0        |
| Rushashi | 16,910        | 100        | 14.3                  | 1.7     | 67.3    | 1.0                  | 8.9             | 4.9             | 1.9        | 0.0        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### e) Means of livelihoods

In Gakenke district, crop farming and animal husbandry are on small scale. Agricultural households represent 92.7% with 89.0% of households engaged in crop farming and 80.7% Households engaged in Livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Busengo (96.9%). Households engaged in crop farming are more represented in Busengo (94.8%), Kivuruga (94.0%) and Minazi (93.9%) while those engaged in livestock husbandry are in Busengo (91.4%), Kivuruga (88.0%) and Minazi (87.6%).

It was also revealed that the employment to population ratio is 44.0% among people residing in Gakenke districts, it is higher in urban areas of Gakenke (59.2%) than in rural areas of Gakenke (43.4 %). The employment to population ratio among males as well as females increases from age group 16-19 to 30-34 and starts decreasing from age group 35-39 to 85 years and above as people starts getting very older and retire. It was observed that in district of Gakenke, the highest employment to population ratio among males stands at 61.5% and was observed in age group 30-34, On the other side the highest employment to population among females is 48.8% and was observed in the age group 30-34. The lowest employment to population ratio among males stands at 6.0% and was observed among males in the age group 85 years and above, the lowest employment to population ratio among females is 5.6% and was observed among females in the age group 85 years and above.

**Table 24: Distribution of household engaged in livestock husbandry in Gakenke District**

| Sector                   | Agricultural households  |                  |             | Households engaged in crop farming |             | Households engaged in Livestock |             |
|--------------------------|--------------------------|------------------|-------------|------------------------------------|-------------|---------------------------------|-------------|
|                          | Total Private Households | Counts           | %           | Counts                             | %           | Counts                          | %           |
| <b>Rwanda</b>            | <b>3,312,743</b>         | <b>2,280,854</b> | <b>68.9</b> | <b>2,074,928</b>                   | <b>62.6</b> | <b>1,669,273</b>                | <b>50.4</b> |
| <b>Northern Province</b> | <b>506,064</b>           | <b>417,503</b>   | <b>82.5</b> | <b>389,305</b>                     | <b>76.9</b> | <b>327,842</b>                  | <b>64.8</b> |
| <b>Gakenke District</b>  | <b>93,609</b>            | <b>86,772</b>    | <b>92.7</b> | <b>83,335</b>                      | <b>89.0</b> | <b>75,537</b>                   | <b>80.7</b> |
| <b>Busengo</b>           | <b>5,343</b>             | <b>5,180</b>     | <b>96.9</b> | <b>5,067</b>                       | <b>94.8</b> | <b>4,882</b>                    | <b>91.4</b> |
| Coko                     | 4,598                    | 4,388            | 95.4        | 4,304                              | 93.6        | 3,825                           | 83.2        |
| Cyabingo                 | 4,824                    | 4,516            | 93.6        | 4,320                              | 89.6        | 4,026                           | 83.5        |
| Gakenke                  | 6,384                    | 5,692            | 89.2        | 5,225                              | 81.8        | 4,907                           | 76.9        |
| Gashenyi                 | 5,884                    | 5,343            | 90.8        | 5,046                              | 85.8        | 4,500                           | 76.5        |
| Janja                    | 3,937                    | 3,717            | 94.4        | 3,599                              | 91.4        | 3,349                           | 85.1        |
| Kamubuga                 | 5,694                    | 5,319            | 93.4        | 5,101                              | 89.6        | 4,420                           | 77.6        |
| Karambo                  | 3,622                    | 3,485            | 96.2        | 3,392                              | 93.6        | 3,068                           | 84.7        |
| Kivuruga                 | 4,841                    | 4,644            | 96.0        | 4,552                              | 94.0        | 4,260                           | 88.0        |
| Mataba                   | 4,085                    | 3,855            | 94.4        | 3,752                              | 91.8        | 3,223                           | 78.9        |
| Minazi                   | 3,615                    | 3,480            | 96.3        | 3,396                              | 93.9        | 3,166                           | 87.6        |
| Mugunga                  | 5,210                    | 4,724            | 90.7        | 4,368                              | 83.8        | 3,943                           | 75.7        |
| Muhondo                  | 5,580                    | 5,266            | 94.4        | 5,100                              | 91.4        | 4,632                           | 83.0        |
| Muyongwe                 | 4,190                    | 4,010            | 95.7        | 3,923                              | 93.6        | 3,620                           | 86.4        |
| Muzo                     | 5,537                    | 5,218            | 94.2        | 5,016                              | 90.6        | 4,487                           | 81.0        |
| Nemba                    | 4,365                    | 3,949            | 90.5        | 3,751                              | 85.9        | 3,379                           | 77.4        |
| Ruli                     | 6,251                    | 5,028            | 80.4        | 4,818                              | 77.1        | 4,090                           | 65.4        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### f) Health, Water supply and sanitation facilities

In Gakenke District 96.9% are using Mutuelle as main health insurance, 3.3% using RSSB or RAMA, 0.1% using private insurance, 0.0% using school insurance, 0.0% using NGOs insurance and 0.7% using employer insurance.

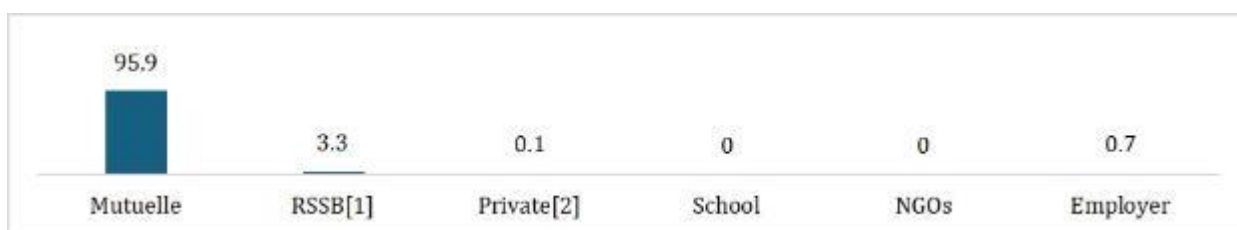


**Figure 8: Population who have a medical insurance by main type of insurance in Gakenke District**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of 5RPHC 2022 reveal that improved drinking water sources are the most water sources in Rwanda that represent (82.3%). In Gakenke district, 76.5% of private households use improved drinking water sources. At the sector level, the percentage of the private households using water from improved sources is highest in Ruli (93.0%), and the lowest in Mataba (49.8%).

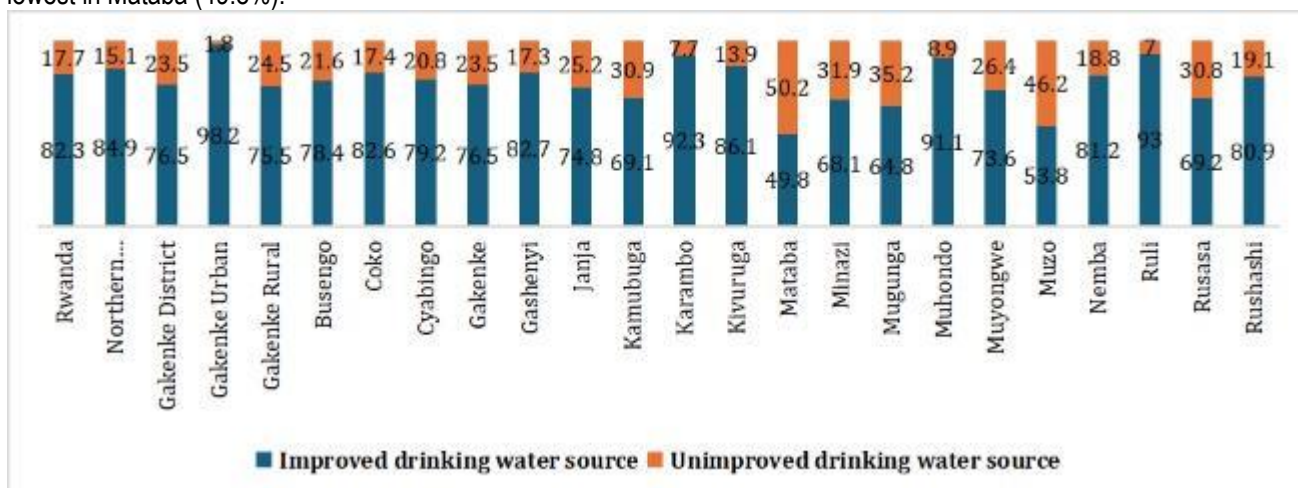


**Figure 9: Percentage of households of Gakenke District by main source of drinking water**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In both urban and rural areas of Gakenke district, private households use mainly improved drinking water sources (98.2% in urban and 75.5% in rural). The percentage of private households using unimproved drinking water sources is higher in rural (24.5%) than in urban (1.8%).

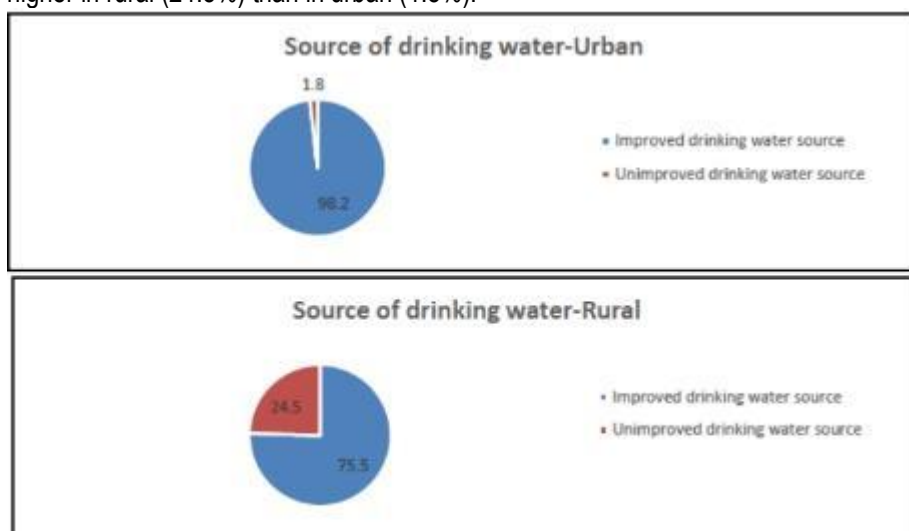


**Figure 10: Distribution of the private households of Gakenke District by main source of water and by area of residence**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### g) Appliance and assets ownership

At the district level, 81.4% of private households possess a radio, 76.2% a mobile phone, 10.7% a smartphone, 3.7% a TV and 1.1% a computer. The percentage of private households possessing a radio is high in Ruli (88.8%), Coko

(97.3%) and Muhondo (86.4%). It is low in Muzo (74.2%). The percentage of private households possessing a television is high in Ruli (12.5%) while it is low in Busengo (1.2%). Mobile phone is mostly possessed by private households of Ruli (84.4%), Coko (82.4%) and Kivuruga (80.5%). The sectors with high percentage of households with smartphone are Ruli (19.9%) and Gakenke (16.4%) while the percentage of households possessing this asset is low in Rusasa (6.5%). The computer is mostly possessed in Gakenke (2.8%) and Nemba, Ruli (2.2%, each).

**Table 25: Percentage of private households and of Gakenke District possessing electrical appliance**

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |             |                           |              |            |
|-------------------------------|------------------------------------|-----------------------------------------------------|-------------|---------------------------|--------------|------------|
|                               |                                    | Radio                                               | Television  | Mobile phone <sup>2</sup> | Smart Mobile | Computer   |
| <b>Rwanda</b>                 | <b>3,312,743</b>                   | <b>81.5</b>                                         | <b>12.3</b> | <b>78.1</b>               | <b>20.8</b>  | <b>4.2</b> |
| <b>Northern Province</b>      | <b>506,064</b>                     | <b>82.1</b>                                         | <b>7.5</b>  | <b>77.6</b>               | <b>15.3</b>  | <b>2.3</b> |
| <b>Gakenke District</b>       | <b>93,609</b>                      | <b>81.4</b>                                         | <b>3.7</b>  | <b>76.2</b>               | <b>10.7</b>  | <b>1.1</b> |
| Busengo                       | 5,343                              | 80.4                                                | 1.2         | 74.2                      | 7.8          | 0.6        |
| Coko                          | 4,598                              | 87.1                                                | 5.0         | 82.4                      | 9.5          | 0.4        |
| Cyabingo                      | 4,824                              | 83.4                                                | 2.6         | 79.0                      | 10.6         | 0.9        |
| Gakenke                       | 6,384                              | 84.1                                                | 5.7         | 78.5                      | 16.4         | 2.8        |
| Gashenyi                      | 5,884                              | 80.8                                                | 3.5         | 74.3                      | 10.4         | 0.7        |
| Janja                         | 3,937                              | 80.3                                                | 1.9         | 76.4                      | 9.1          | 0.5        |
| Kamubuga                      | 5,694                              | 77.8                                                | 2.8         | 74.0                      | 8.4          | 0.7        |
| Karambo                       | 3,622                              | 79.4                                                | 1.5         | 71.0                      | 8.3          | 0.5        |
| Kivuruga                      | 4,841                              | 85.3                                                | 2.6         | 80.5                      | 12.5         | 0.9        |
| Mataba                        | 4,085                              | 74.5                                                | 1.5         | 69.4                      | 6.6          | 0.7        |
| Minazi                        | 3,615                              | 83.9                                                | 1.5         | 78.7                      | 7.7          | 0.5        |
| Mugunga                       | 5,210                              | 77.0                                                | 3.0         | 74.1                      | 10.0         | 1.2        |
| Muhondo                       | 5,580                              | 86.4                                                | 6.0         | 80.3                      | 13.2         | 1.4        |
| Muyongwe                      | 4,190                              | 81.4                                                | 3.0         | 74.6                      | 8.9          | 0.6        |
| Muzo                          | 5,537                              | 74.2                                                | 1.9         | 69.9                      | 6.6          | 0.6        |
| Nemba                         | 4,365                              | 79.2                                                | 4.6         | 73.4                      | 12.3         | 2.2        |
| Ruli                          | 6,251                              | 88.8                                                | 12.5        | 84.4                      | 19.9         | 2.2        |
| Rusasa                        | 4,738                              | 75.7                                                | 1.5         | 70.2                      | 6.5          | 0.4        |
| Rushashi                      | 4,911                              | 83.8                                                | 4.3         | 78.9                      | 11.9         | 1.3        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### **h) Access to energy for lighting and cooking**

In Gakenke district, the main source of energy for lighting used by households is electricity (49.7%) followed by flashlight/phone flashlight (39.2%). At the sector level, the percentage of households using electricity for lighting is high in Muhondo (67.3%), Ruli; (65.5%) and Kivuruga (63.3%). The sectors with the highest percentages of private households using flashlight/phone flashlight for lighting are Mataba (50.5%) and Janja (50.1%). According to the area of residence, the main source of energy for lighting is electricity (78.4%) and flashlight/phone flashlight (16.0%) in urban areas. In rural areas, 48.4% of private households use electricity as their main source of energy for lighting while 40.2% use flashlight or phone flashlight.

**Table 26: Distribution of households of Gakenke District by main source of energy for lighting**

| Sector and area of residence | Total number of private households | Total      | Electricity | Kerosene/Paraffin lamp | Biogas     | Candles    | Firewood   | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern    | Other source of energy for Lighting |
|------------------------------|------------------------------------|------------|-------------|------------------------|------------|------------|------------|----------------|-----------------------------|------------------------|------------|-------------------------------------|
| <b>Rwanda</b>                | <b>3,312,743</b>                   | <b>100</b> | <b>61.0</b> | <b>0.4</b>             | <b>0.0</b> | <b>2.9</b> | <b>4.2</b> | <b>1.1</b>     | <b>28.4</b>                 | <b>0.1</b>             | <b>1.2</b> | <b>0.5</b>                          |
| <b>Northern Province</b>     | <b>506,064</b>                     | <b>100</b> | <b>54.1</b> | <b>0.3</b>             | <b>0.0</b> | <b>3.0</b> | <b>5.0</b> | <b>0.8</b>     | <b>35.3</b>                 | <b>0.1</b>             | <b>0.9</b> | <b>0.4</b>                          |
| <b>Gakenke District</b>      | <b>93,609</b>                      | <b>100</b> | <b>49.7</b> | <b>0.3</b>             | <b>-</b>   | <b>1.2</b> | <b>6.9</b> | <b>1.1</b>     | <b>39.2</b>                 | <b>0.1</b>             | <b>1.1</b> | <b>0.4</b>                          |
| <b>Gakenke Urban</b>         | <b>4,009</b>                       | <b>100</b> | <b>78.4</b> | <b>0.1</b>             | <b>-</b>   | <b>1.5</b> | <b>1.8</b> | <b>1.1</b>     | <b>16.0</b>                 | <b>0.0</b>             | <b>0.7</b> | <b>0.4</b>                          |
| <b>Gakenke Rural</b>         | <b>89,600</b>                      | <b>100</b> | <b>48.4</b> | <b>0.3</b>             | <b>-</b>   | <b>1.2</b> | <b>7.1</b> | <b>1.1</b>     | <b>40.2</b>                 | <b>0.1</b>             | <b>1.1</b> | <b>0.4</b>                          |
| Busengo                      | 5,343                              | 100        | 45.6        | 0.2                    | -          | 0.6        | 10.6       | 0.8            | 40.7                        | 0.1                    | 0.9        | 0.4                                 |

| Sector and area of residence | Total number of private households | Total | Electricity | Kerosene/Paraffin lamp | Biogas | Candles | Firewood | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern | Other source of energy for Lighting |
|------------------------------|------------------------------------|-------|-------------|------------------------|--------|---------|----------|----------------|-----------------------------|------------------------|---------|-------------------------------------|
| Coko                         | 4,598                              | 100   | 51.4        | 0.3                    | -      | 0.8     | 3.1      | 4.3            | 39.4                        | 0.1                    | 0.4     | 0.1                                 |
| Cyabingo                     | 4,824                              | 100   | 52.4        | 0.6                    | -      | 1.7     | 3.3      | 0.1            | 40.0                        |                        | 1.5     | 0.4                                 |
| Gakenke                      | 6,384                              | 100   | 49.1        | 0.5                    | -      | 1.6     | 4.6      | 1.0            | 41.1                        | 0.1                    | 1.0     | 1.1                                 |
| Gashenyi                     | 5,884                              | 100   | 49.1        | 0.1                    | -      | 1.1     | 4.0      | 0.2            | 44.3                        | 0.2                    | 0.8     | 0.2                                 |
| Janja                        | 3,937                              | 100   | 31.3        | 0.1                    | -      | 1.4     | 14.0     | 0.8            | 50.1                        | 0.3                    | 1.5     | 0.5                                 |
| Kamubuga                     | 5,694                              | 100   | 57.7        | 0.2                    | -      | 0.5     | 10.6     | 0.4            | 29.6                        | 0.1                    | 0.6     | 0.4                                 |
| Karambo                      | 3,622                              | 100   | 48.6        |                        | -      | 1.2     | 3.0      | 2.5            | 43.3                        | 0.1                    | 0.7     | 0.7                                 |
| Kivuruga                     | 4,841                              | 100   | 63.3        | 0.2                    | -      | 1.2     | 5.3      | 0.4            | 27.4                        | 0.1                    | 1.8     | 0.2                                 |
| Mataba                       | 4,085                              | 100   | 32.4        | 0.5                    | -      | 1.4     | 14.2     | 0.3            | 50.5                        | 0.1                    | 0.5     | 0.1                                 |
| Minazi                       | 3,615                              | 100   | 49.7        | 0.1                    | -      | 0.7     | 3.6      | 3.2            | 41.1                        | 0.2                    | 0.8     | 0.6                                 |
| Mugunga                      | 5,210                              | 100   | 49.4        | 0.8                    | -      | 2.2     | 11.0     | 1.7            | 31.8                        | 0.2                    | 2.7     | 0.1                                 |
| Muhondo                      | 5,580                              | 100   | 67.3        | 0.1                    | -      | 0.6     | 0.9      | 0.4            | 29.8                        | 0.3                    | 0.4     | 0.3                                 |
| Muyongwe                     | 4,190                              | 100   | 46.5        | 0.3                    | -      | 1.5     | 3.2      | 1.1            | 46.2                        | 0.1                    | 0.8     | 0.4                                 |
| Muzo                         | 5,537                              | 100   | 32.3        | 0.4                    | -      | 1.0     | 15.6     | 0.6            | 49.0                        | 0.3                    | 0.4     | 0.5                                 |
| Nemba                        | 4,365                              | 100   | 43.3        | 0.3                    | -      | 0.9     | 7.9      | 0.4            | 44.1                        | 0.1                    | 1.8     | 1.3                                 |
| Ruli                         | 6,251                              | 100   | 65.5        | 0.2                    | -      | 1.6     | 0.9      | 1.9            | 29.2                        | 0.1                    | 0.5     | 0.1                                 |
| Rusasa                       | 4,738                              | 100   | 40.4        | 0.3                    | -      | 2.4     | 11.9     | 1.7            | 40.0                        | 0.1                    | 2.8     | 0.4                                 |
| Rushashi                     | 4,911                              | 100   | 55.1        | 0.8                    | -      | 1.2     | 4.3      | 0.7            | 36.6                        | 0.1                    | 0.6     | 0.5                                 |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

At the district level, the main sources of energy for cooking used by the private households are firewood (96.6%) followed by charcoal (2.2%). At the sector level, firewood is the most used source of cooking energy by private households in Muzo (98.8%), Busengo and Karambo (98.6%, each). Sectors with the high percentage of private households using charcoal are found in Gakenke (7.3%) and Ruli (6.9%). By area of residence, private households use mostly firewood (97.5%) and charcoal (1.4%) in rural areas. In urban areas, private households use most firewood (75.0%) and charcoal (20.4%).

#### i) Vulnerability

In Gakenke district the vulnerability prevalence rate is 3.2%. At sector level, the highest prevalence rates of the resident population with vulnerability are in Kamubuga (4.5%) and Muyongwe (4.2%) and while the lowest is in Ruli (1.9%) and Muhondo (2.0%).

**Table 27: Number and share of persons with vulnerability of Gakenke District**

| Sectors of residence | Total resident population | Person with vulnerability |         |         | Prevalence of vulnerability |
|----------------------|---------------------------|---------------------------|---------|---------|-----------------------------|
|                      | Both sexes                | Both sexes                | Male    | Female  | Both sexes                  |
| Rwanda               | 11,537,934                | 391,775                   | 174,949 | 216,826 | 3.4                         |
| Northern Province    | 1,788,683                 | 60,336                    | 26,348  | 33,988  | 3.4                         |
| Gakenke district     | 323,132                   | 10,474                    | 4,605   | 5,869   | 3.2                         |
| Busengo              | 18,871                    | 735                       | 320     | 415     | 3.9                         |
| Coko                 | 15,984                    | 446                       | 203     | 243     | 2.8                         |
| Cyabingo             | 16,625                    | 686                       | 307     | 379     | 4.1                         |
| Gakenke              | 22,347                    | 712                       | 313     | 399     | 3.2                         |
| Gashenyi             | 19,907                    | 654                       | 273     | 381     | 3.3                         |

| Sectors of residence | Total resident population | Person with vulnerability |      |        | Prevalence of vulnerability |
|----------------------|---------------------------|---------------------------|------|--------|-----------------------------|
|                      | Both sexes                | Both sexes                | Male | Female | Both sexes                  |
| Janja                | 14,114                    | 527                       | 215  | 312    | 3.7                         |
| Kamubuga             | 20,384                    | 917                       | 351  | 566    | 4.5                         |
| Karambo              | 12,012                    | 365                       | 160  | 205    | 3                           |
| Kivuruga             | 17,563                    | 394                       | 183  | 211    | 2.2                         |
| Mataba               | 13,662                    | 499                       | 224  | 275    | 3.7                         |
| Minazi               | 12,536                    | 296                       | 134  | 162    | 2.4                         |
| Mugunga              | 17,844                    | 659                       | 295  | 364    | 3.7                         |
| Muhondo              | 19,042                    | 373                       | 182  | 191    | 2                           |
| Muyongwe             | 14,248                    | 605                       | 243  | 362    | 4.2                         |
| Muzo                 | 19,362                    | 641                       | 317  | 324    | 3.3                         |
| Nemba                | 14,922                    | 544                       | 227  | 317    | 3.6                         |
| Ruli                 | 20,004                    | 389                       | 185  | 204    | 1.9                         |
| Rusasa               | 17,032                    | 504                       | 239  | 265    | 3                           |
| Rushashi             | 16,673                    | 528                       | 234  | 294    | 3.2                         |

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

## 4.4 Musanze district

### 4.4.1 Physical environment t

#### a. Location

Musanze District is one of the six secondary cities and one of the 5 districts comprising in the Northern Province of Rwanda. The total area of the district is 530,4 km<sup>2</sup>, 60 km<sup>2</sup> of the Volcanoes National Park and 28 km<sup>2</sup> by Lake Ruhondo. Musanze City is about 110 km from Kigali on the major Kigali-Musanze-Rubavu-Goma Road and it borders with Uganda and DR Congo in the North, Gakenke District in the South, Burera District in the East and Nyabihu District in the West. The district has 15 administrative sectors, 68 cells and 432 villages.

#### b. Topography

Musanze District is the most mountainous part of Rwanda and contains the largest part of the Volcanoes National Park. Five of the eight volcanoes of the Virunga chain are Karisimbi, Bisoke, Sabyinyo, Gahinga and Muhabura. They are within the district boundaries. Karisimbi is the tallest point in Rwanda at 4,507m and is the sixth tallest peak in Africa. The Rwanda and Democratic Republic of Congo border crosses over the peak of Karisimbi.

#### c. Climate and rainfall

Musanze receives high rainfall almost all year round. The region is characterized by four distinct seasons: a first rainy season from September to December, a short dry season in January followed by a long rainy season from February to May and a long dry season from June to August. The district is located at an altitude of 1,850m and has one of the most agreeable climate in Rwanda. Warm and breezy days are followed by cooler nights. April and May bring about the heaviest rains, whereas October and November have a much more moderate rainy period. The Average amount of rainfall during the rainy seasons is 1 000-1 200mm per month

#### d. Geology and Soils

The district has 2 distinct zones and consequently related types of soils, one being volcanic area with moderate slopes and volcanic ash soils with lava predominant stones. The other part comprises steeply hills where erosion is active. The soils of the City of Musanze can be categorized as volcanic on moderate to steep slopes, with volcanic ash soils and volcanic lava predominating with stones and shallow rocks. Soil erosion and soil nutrient loss are major problems, with only about half the land protected against soil erosion The rich volcanic soils are ideal for agriculture, especially crops such as the Irish potato, which is commonly grown in Cyuve, Busogo, Gataraga, Kinigi, Muhoza, Muko, Musanze, Nyange and Shingiro. The Irish potato has been proposed for processing into potato crisps.

#### e. Hydrography

Musanze District is made of different water sources including lakes, rivers and swamps. Among them include Susa, Muhe, Rwebeya, Rungu, Cyuve, Kansoro and Mudakama which have their origin in Volcanoes National park and

mainly during rainy season.

There are also main rivers such as Mpenge, Kigombe and Mutobo which flows into Mukungwa River which in return flows into Nyabarongo River. Musanze also touches on Lake Ruhondo with an area estimated at 28 km<sup>2</sup>.

#### 4.4.2 Ecological environment

Musanze District is an ecological hotspot in Rwanda, with its diverse flora and fauna largely shaped by the presence of Volcanoes National Park. The district's montane forests, bamboo zones, and alpine ecosystems provide critical habitats for a wide range of species, including the endangered mountain gorilla, golden monkeys, and numerous Albertine Rift endemics. It is important to note that the project will not affected these ecosystems since it will not pass in any of the protected or sensitive ecological area.

##### - Flora of Musanze district

Musanze's vegetation is mainly influenced by its high-altitude climate, volcanic soils, and rainfall patterns. The district is home to **afro-montane forests, bamboo forests, and sub-alpine vegetation**, which create a unique ecological zone.

##### a) Montane forest vegetation

This type of vegetation is dominant in the lower altitudes of the Volcanoes National Park. The key plant species include: *Hagenia abyssinica* (African redwood) – A characteristic tree species of montane forests., *Hypericum revolutum* (East African St. John's Wort) – A shrub commonly found in forest clearings., *Dombeya torrida* – A flowering tree species commonly found in high-altitude forests, *Prunus africana* (African cherry) – Known for its medicinal properties, *Polyscias fulva* – A tall tree providing habitat for various bird species.

##### b) Bamboo forests

The mid-elevation zones of Musanze are dominated by bamboo forests, which provide a habitat for various animals, including mountain gorillas. Some key species include: *Arundinaria alpina* (Highland bamboo) – An important food source for gorillas and other wildlife.

##### c) Sub-Alpine and Afro-Alpine vegetation

At higher elevations, near the summits of volcanoes, vegetation is sparse and consists mainly of giant lobelias and heathers adapted to cold and harsh conditions. Species found in this zone include: *Lobelia wollastonii* – A giant lobelia species adapted to high-altitude environments, *Senecio erici-rosenii* – A giant groundsel species found in alpine zones, *Erica arborea* – A heather species forming dense thickets in higher elevations.

##### d) Wetland and riparian vegetation

Some wetlands and rivers in Musanze provide habitat for aquatic plants, including: **Cyperus** papyrus – A dominant wetland species, *Phragmites mauritianus* – Found along riverbanks and swampy areas, and *Typha capensis* – A common aquatic plant.

##### - Fauna of Musanze district

Musanze's fauna is dominated by species adapted to montane forests, bamboo zones, and alpine habitats. The Volcanoes National Park is the most important wildlife conservation area in the district.

##### a) Mammals

Musanze is famous for being home to the endangered mountain gorilla (*Gorilla beringei beringei*), but it also hosts a variety of other mammals, including: *Gorilla beringei beringei* (Mountain gorilla) – The flagship species of the district, *Cercopithecus mitis kandti* (Golden monkey) – Found in bamboo forests, *Panthera pardus* (African leopard) – Rarely seen but known to inhabit the area, *Hystrix cristata* (Crested porcupine) – Found in forested areas, *Aonyx capensis* (African clawless otter) – Found in wetlands and rivers and *Tragelaphus scriptus* (Bushbuck) – Present in the montane forests.

##### b) Birds

Musanze is a key birdwatching destination, with several Albertine Rift endemic species, including: *Turaco leucotis* (White-cheeked turaco) – Found in forested areas, *Cryptospiza jacksoni* (Jackson's francolin) – An Albertine Rift endemic, *Cossypha archeri* (Archer's ground robin) – A forest-dwelling bird, *Buteo oreophilus* (Mountain buzzard) – A raptor species found in the area, *Tauraco johnstoni* (Ruwenzori turaco) – A strikingly colorful bird found in montane forests and *Ploceus alienus* (Strange weaver) – An Albertine Rift endemic.

### c) Reptiles and amphibians

Although less found, the district is home to several reptile and amphibian species adapted to high-altitude conditions, such as: *Rhampholeon boulengeri* (Boulenger's pygmy chameleon) – Found in dense vegetation, *Trioceros ellioti* (Elliot's chameleon) – A species commonly seen in forested areas., *Afraxalus orophilus* (Mountain reed frog) – An amphibian species found in wetlands, and *Leptopelis karissimbensis* (Karisimbi tree frog) – An endemic frog species in the Virunga region.

### d) Invertebrates

Musanze is home to numerous insect and arachnid species, including endemic butterflies and beetles. Notable species include: *Papilio nireus* (Green-banded swallowtail) – A butterfly species found in montane forests, *Graphium polices* (Small striped swordtail) – A butterfly species seen in open clearings, and *Goliathus albosignatus* (Goliath beetle) – One of the largest beetles in Africa.

## 4.4.3 Socio-economic environment

### a) Population

Musanze accounts 476,522 residents which represent 23.4% % of the total population of the Northern Province (2,038,511 residents). The population of Musanze district is predominantly female: 249,182 are women corresponding to 52.3 % of the total population of Musanze district. Females are predominant in all sectors of the district except Muhoza sector with 49.4%. Muhoza (69,741 population), Cyuve (62,179 population), and Musanze (47,720 population) are the most populated sectors. They represent 14.6%, 13%, and 10% of the total population of Musanze district, respectively. The two less populated sectors are Gashaki (14,272 inhabitants) and Nkotsi (17,349 inhabitants). They represent 3% and 3.6% of the total resident population of Musanze district, respectively.

**Table 28: Population of Musanze District by Sector and sex**

| Sectors           | Counts            |                  |                  | Percent    |             |             | Population share (%) |
|-------------------|-------------------|------------------|------------------|------------|-------------|-------------|----------------------|
|                   | Both sexes        | Male             | Female           | Both sexes | Male        | Female      | Both sexes           |
| <b>Rwanda</b>     | <b>13,246,394</b> | <b>6,429,326</b> | <b>6,817,068</b> | <b>100</b> | <b>48.5</b> | <b>51.5</b> | <b>-</b>             |
| Northern Province | 2,038,511         | 972,960          | 1,065,551        | 100        | 47.7        | 52.3        | -                    |
| Musanze           | 476,522           | 227,340          | 249,182          | 100        | 47.7        | 52.3        | 100                  |
| Busogo            | 28,264            | 13,290           | 14,974           | 100        | 47          | 53          | 5.9                  |
| Cyuve             | 62,179            | 29,347           | 32,832           | 100        | 47.2        | 52.8        | 13                   |
| Gacaca            | 30,719            | 14,591           | 16,128           | 100        | 47.5        | 52.5        | 6.4                  |
| Gashaki           | 14,272            | 6,761            | 7,511            | 100        | 47.4        | 52.6        | 3                    |
| Gataraga          | 26,721            | 12,686           | 14,035           | 100        | 47.5        | 52.5        | 5.6                  |
| Kimonyi           | 21,681            | 10,114           | 11,567           | 100        | 46.6        | 53.4        | 4.5                  |
| Kinigi            | 32,297            | 15,423           | 16,874           | 100        | 47.8        | 52.2        | 6.8                  |
| Muhoza            | 69,741            | 35,311           | 34,430           | 100        | 50.6        | 49.4        | 14.6                 |
| Muko              | 26,472            | 12,496           | 13,976           | 100        | 47.2        | 52.8        | 5.6                  |
| Musanze           | 47,720            | 22,478           | 25,242           | 100        | 47.1        | 52.9        | 10                   |
| Nkotsi            | 17,349            | 8,108            | 9,241            | 100        | 46.7        | 53.3        | 3.6                  |
| Nyange            | 31,274            | 14,612           | 16,662           | 100        | 46.7        | 53.3        | 6.6                  |
| Remera            | 19,987            | 9,522            | 10,465           | 100        | 47.6        | 52.4        | 4.2                  |
| Rwaza             | 23,120            | 10,998           | 12,122           | 100        | 47.6        | 52.4        | 4.9                  |
| Shingiro          | 24,726            | 11,603           | 13,123           | 100        | 46.9        | 53.1        | 5.2                  |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Musanze district population is predominantly rural (50.8%) while urban represents 49.2%. The sectors of Musanze district which are almost urban are Muhoza, Kimonyi, Busogo, and Cyuve. Gashaki and Remera Sectors are entirely rural while Rwaza, Shingiro, Gacaca, and Kinigi sectors are almost rural.

### b) Number of households and size of household

The results of 5<sup>th</sup> RPHC 2022 indicate the total of 119,387 households in Musanze district. The average household size in Musanze district is 3.9 persons per household. At the Sector level, the average Household Size (persons per household) is almost the same in all sectors of district. The results of 5<sup>th</sup> RPHC 2022 revealed that in Musanze district, private households headed by females are 27.7%. At sector level, the highest percentages of households headed by

women are found in Busogo sector (30.5%) and Kinigi sector (30.1%) while the lowest is found in Gashaki sector (22.5%).

**Table 29: Number of households and their corresponding population, mean size and sex of household head**

| Sectors                  | Total number of private households | Corresponding Population <sup>8</sup> | Household Size | Percentage      |                   |
|--------------------------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|                          |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| <b>Rwanda</b>            | <b>3 312 743</b>                   | <b>13 100 600</b>                     | <b>4.0</b>     | <b>71.1</b>     | <b>28.9</b>       |
| <b>Northern Province</b> | <b>506,064</b>                     | <b>2,024,173</b>                      | <b>4.0</b>     | <b>73.1</b>     | <b>26.9</b>       |
| <b>Musanze</b>           | <b>119,387</b>                     | <b>469,415</b>                        | <b>3.9</b>     | <b>72.3</b>     | <b>27.7</b>       |
| Busogo                   | 6,940                              | 28,221                                | 4.1            | 69.5            | 30.5              |
| Cyuve                    | 15,444                             | 62,103                                | 4.0            | 73              | 27                |
| Gacaca                   | 7,384                              | 30,704                                | 4.2            | 76.7            | 23.3              |
| Gashaki                  | 3,460                              | 14,271                                | 4.1            | 77.5            | 22.5              |
| Gataraga                 | 6,333                              | 26,596                                | 4.2            | 72.8            | 27.2              |
| Kimonyi                  | 5,629                              | 21,645                                | 3.8            | 70.9            | 29.1              |
| Kinigi                   | 8,201                              | 31,643                                | 3.9            | 69.9            | 30.1              |
| Muhoza                   | 16,900                             | 63,811                                | 3.8            | 72.1            | 27.9              |
| Muko                     | 6,937                              | 26,434                                | 3.8            | 72.1            | 27.9              |
| Musanze                  | 12,335                             | 47,655                                | 3.9            | 71.9            | 28.1              |
| Nkotsi                   | 4,556                              | 17,320                                | 3.8            | 71.2            | 28.8              |
| Nyange                   | 8,174                              | 31,253                                | 3.8            | 70.2            | 29.8              |
| Remera                   | 4,953                              | 19,945                                | 4.0            | 75.1            | 24.9              |
| Rwaza                    | 6,044                              | 23,101                                | 3.8            | 74.1            | 25.9              |
| Shingiro                 | 6,097                              | 24,713                                | 4.1            | 71.3            | 28.7              |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

### c) Housing characteristics

the most common type of habitat in Musanze district is Umudugudu (Planned rural settlement) (76.4%) followed by Spontaneous/squatter housing (9.3%) and dispersed or isolated housing (7.7%). The type of habitat varies across sectors. Umudugudu (Planned rural settlement) is most prevalent in Kinigi sector (98.1%), and low in Kimonyi sector (23.2%).

**Table 30: Distribution of households in Musanze District by type of habitat and sector**

| Sectors                  | Total Number of Households | Percentage |                     |                          |                 |                            |                |                      |                       |            |
|--------------------------|----------------------------|------------|---------------------|--------------------------|-----------------|----------------------------|----------------|----------------------|-----------------------|------------|
|                          |                            | Total      | Umudugudu (Planned) | Integrated model village | Old settlements | Dispersed/Isolated housing | Modern planned | Spontaneous/squatter | Other type of housing | Not stated |
| <b>Rwanda</b>            | <b>3,312,743</b>           | <b>100</b> | <b>65.4</b>         | <b>0.8</b>               | <b>2.3</b>      | <b>14.9</b>                | <b>6.9</b>     | <b>8.9</b>           | <b>0.8</b>            | <b>-</b>   |
| <b>Northern Province</b> | <b>506,064</b>             | <b>100</b> | <b>70.5</b>         | <b>0.6</b>               | <b>1.7</b>      | <b>22.3</b>                | <b>0.5</b>     | <b>4.1</b>           | <b>0.3</b>            | <b>0</b>   |
| <b>Musanze District</b>  | <b>119,387</b>             | <b>100</b> | <b>76.4</b>         | <b>0.7</b>               | <b>4</b>        | <b>7.7</b>                 | <b>1.6</b>     | <b>9.3</b>           | <b>0.2</b>            | <b>0</b>   |
| Musanze urban            | 58,426                     | 100        | 75.9                | 0.7                      | 4.5             | 3.7                        | 3.2            | 11.6                 | 0.3                   | 0          |
| Musanze Rural            | 60,961                     | 100        | 76.8                | 0.7                      | 3.5             | 11.6                       | 0              | 7.2                  | 0.2                   | 0          |
| Busogo                   | 6,940                      | 100        | 77.5                | 0.1                      | 4.4             | 7.8                        | 2.5            | 7.6                  | 0.1                   | 0          |
| Cyuve                    | 15,444                     | 100        | 84.6                | 0.5                      | 1               | 1.7                        | 7              | 5                    | 0.3                   |            |
| Gacaca                   | 7,384                      | 100        | 93.4                | 1                        | 3.5             | 2                          | 0              | 0.1                  | 0.1                   |            |
| Gashaki                  | 3,460                      | 100        | 94.9                | 1.8                      |                 | 1.8                        |                | 1.4                  | 0.1                   |            |
| Gataraga                 | 6,333                      | 100        | 25.5                | 1                        | 8.6             | 52                         | 0              | 12.6                 | 0.1                   |            |
| Kimonyi                  | 5,629                      | 100        | 23.2                | 0.1                      | 0.6             | 19.7                       | 0              | 56.4                 | 0.1                   |            |
| Kinigi                   | 8,201                      | 100        | 98.1                | 1.9                      | 0               | 0                          |                |                      | 0                     |            |
| Muhoza                   | 16,900                     | 100        | 79                  | 1                        | 5.7             | 2                          | 2.4            | 9                    | 0.7                   | 0          |
| Muko                     | 6,937                      | 100        | 53                  | 0.2                      | 21.1            | 24.8                       | 0.1            | 0.8                  | 0                     |            |
| Musanze                  | 12,335                     | 100        | 58.9                | 0.1                      | 3.4             | 2.4                        | 1.6            | 33.4                 | 0.2                   |            |
| Nkotsi                   | 4,556                      | 100        | 92                  | 0.2                      | 0.3             | 6.9                        |                | 0.6                  | 0                     |            |
| Nyange                   | 8,174                      | 100        | 97.2                | 0.1                      | 2.3             | 0.2                        | 0.1            | 0                    | 0                     |            |
| Remera                   | 4,953                      | 100        | 93                  | 2.5                      | 0.3             | 3.9                        |                | 0.2                  | 0.1                   |            |
| Rwaza                    | 6,044                      | 100        | 92.7                | 1.4                      | 1.7             | 3.4                        |                | 0.7                  | 0.1                   |            |
| Shingiro                 | 6,097                      | 100        | 81.2                | 0.2                      | 5.3             | 11.6                       |                | 0.7                  | 1                     |            |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

By area of residence, in urban areas, the predominant types are umudugudu/Planned rural settlement (75.9%) and Spontaneous/squatter housing (11.6%). In rural areas it is the same, the predominant type is umudugudu/Planned rural settlement (76.8%) followed by Dispersed/ Isolated housing (11.6%).

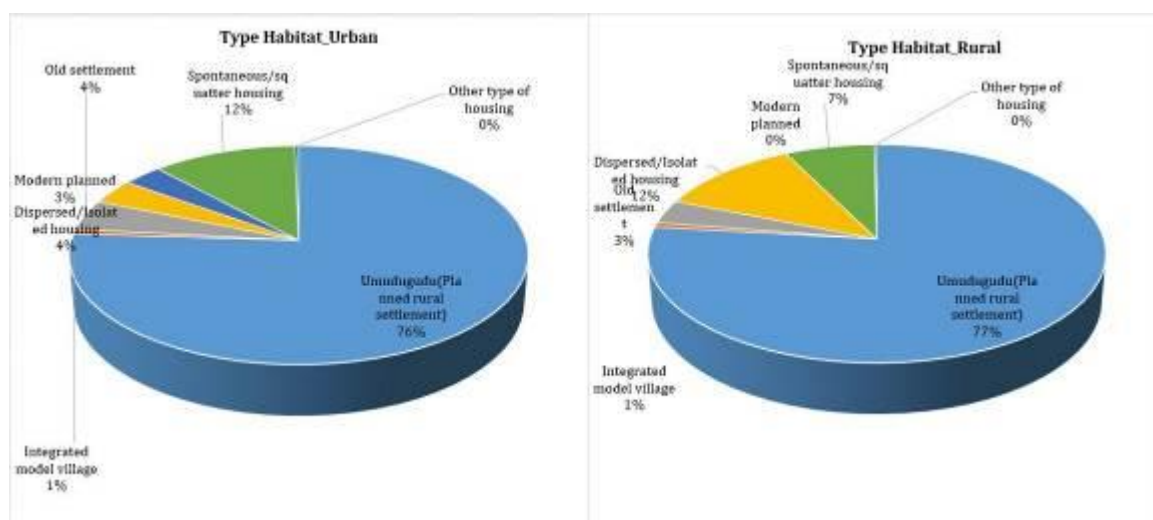


**Figure 11: Distribution of households in Musanze District by type of habitat and by area of residence.**  
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### d) Education

In Musanze District, 15.6% of the population has never attended school, while 3.2% have attended nursery, and 55.8% have attended primary school. Other education levels include 0.5% for INGOBOKA/Vocational, 10.8% for lower secondary, 9.2% for upper secondary, and 4.9% for university.

**Table 31: Distribution of the resident population of Musanze District by highest level of school attended**

| Sectors           | Count             | Percentage |                       |          |           |                      |                 |                 |            |
|-------------------|-------------------|------------|-----------------------|----------|-----------|----------------------|-----------------|-----------------|------------|
|                   | Total(counts)     | Total      | Never attended School | Nursery  | Primary   | INGOBOKA/ Vocational | Lower secondary | Upper secondary | University |
| <b>Rwanda</b>     | <b>11,999,691</b> | <b>100</b> | <b>16.7</b>           | <b>3</b> | <b>60</b> | <b>0.8</b>           | <b>9.6</b>      | <b>7.1</b>      | <b>4</b>   |
| Northern Province | 1,847,684         | 100        | 16                    | 3        | 62        | 0.7                  | 9.6             | 6.4             | 3          |
| Musanze District  | 437,445           | 100        | 15.6                  | 3        | 56        | 0.5                  | 10.8            | 9.2             | 5          |
| Busogo            | 25,930            | 100        | 13.6                  | 4        | 52        | 0.5                  | 12.9            | 11.3            | 6          |
| Cyuve             | 57,017            | 100        | 14.9                  | 4        | 50        | 0.6                  | 10.9            | 11.7            | 8          |
| Gacaca            | 28,112            | 100        | 17.2                  | 2        | 66        | 0.5                  | 7.9             | 4.8             | 2          |
| Gashaki           | 12,709            | 100        | 12.4                  | 3        | 64        | 0.7                  | 11.6            | 6.7             | 1          |
| Gataraga          | 24,539            | 100        | 16                    | 3        | 60        | 0.6                  | 10.6            | 7.4             | 2          |
| Kimonyi           | 19,865            | 100        | 19.6                  | 3        | 57        | 0.3                  | 9.8             | 6.6             | 4          |
| Kinigi            | 30,033            | 100        | 18.8                  | 2        | 55        | 0.3                  | 12.6            | 8.2             | 3          |
| Muhoza            | 64,859            | 100        | 9.6                   | 4        | 44        | 0.6                  | 12.1            | 16              | 13         |
| Muko              | 24,022            | 100        | 17.3                  | 4        | 59        | 0.7                  | 10.4            | 7               | 2          |
| Musanze           | 43,748            | 100        | 18.2                  | 3        | 54        | 0.3                  | 10.4            | 9.2             | 5          |
| Nkotsi            | 15,595            | 100        | 14.2                  | 4        | 61        | 0.8                  | 11.1            | 6.6             | 2          |
| Nyange            | 28,907            | 100        | 19.6                  | 3        | 57        | 0.3                  | 10.6            | 7.5             | 2          |
| Remera            | 17,895            | 100        | 10.9                  | 2        | 68        | 1.2                  | 10.2            | 6.2             | 1          |
| Rwaza             | 21,400            | 100        | 15.1                  | 2        | 67        | 0.8                  | 8.8             | 4.7             | 1          |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### e) Means of livelihoods

In Musanze district, Agricultural households occupy 66.3%, with 59.4% of households engaged in crop farming and 44.4% Households engaged in Livestock husbandry. Musanze district has sectors located in rural areas where the agriculture activities are applied, Gashaki, Rwaza, and Remera sectors have a high proportion of Households engaged in agriculture activities (93.6%, 91.2% and 91% respectively). Gashaki sector has a high percentage of Households engaged in crop farming (90.9%) and Households engaged in Livestock husbandry (82.4%).

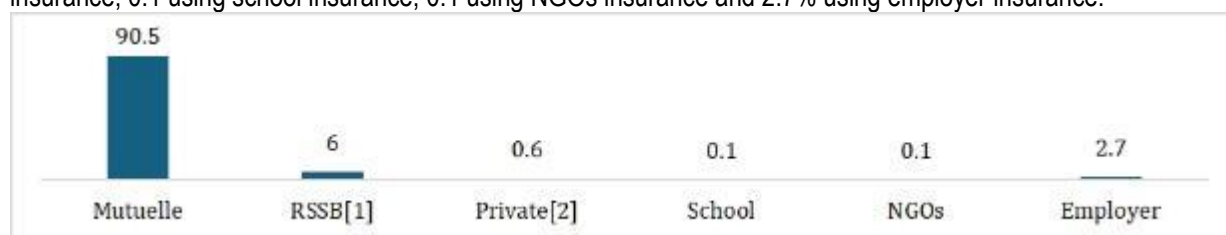
**Table 32: Distribution of household engaged in livestock husbandry in Musanze district**

| Sector            | Agricultural households |                    |           | Households engaged in crop farming |           | Households engaged in Livestock husbandry |           |      |
|-------------------|-------------------------|--------------------|-----------|------------------------------------|-----------|-------------------------------------------|-----------|------|
|                   | Total Households        | Private Households | Counts    | %                                  | Counts    | %                                         | Counts    | %    |
| Rwanda            | 3,312,743               |                    | 2,280,854 | 68.9                               | 2,074,928 | 62.6                                      | 1,669,273 | 50.4 |
| Northern Province | 506,064                 |                    | 417,503   | 82.5                               | 389,305   | 76.9                                      | 327,842   | 64.8 |
| Musanze District  | 119,387                 |                    | 79,190    | 66.3                               | 70,889    | 59.4                                      | 53,034    | 44.4 |
| Busogo            | 6,940                   |                    | 4,252     | 61.3                               | 3,857     | 55.6                                      | 2,286     | 32.9 |
| Cyuve             | 15,444                  |                    | 7,456     | 48.3                               | 5,971     | 38.7                                      | 4,525     | 29.3 |
| Gacaca            | 7,384                   |                    | 5,657     | 76.6                               | 5,182     | 70.2                                      | 3,746     | 50.7 |
| Gashaki           | 3,460                   |                    | 3,238     | 93.6                               | 3,145     | 90.9                                      | 2,850     | 82.4 |
| Gataraga          | 6,333                   |                    | 5,034     | 79.5                               | 4,655     | 73.5                                      | 3,377     | 53.3 |
| Kimonyi           | 5,629                   |                    | 4,127     | 73.3                               | 3,741     | 66.5                                      | 2,668     | 47.4 |
| Kinigi            | 8,201                   |                    | 6,206     | 75.7                               | 5,399     | 65.8                                      | 4,160     | 50.7 |
| Muhoza            | 16,900                  |                    | 5,344     | 31.6                               | 4,214     | 24.9                                      | 3,047     | 18   |
| Muko              | 6,937                   |                    | 5,106     | 73.6                               | 4,531     | 65.3                                      | 3,393     | 48.9 |
| Musanze           | 12,335                  |                    | 7,420     | 60.2                               | 6,498     | 52.7                                      | 4,580     | 37.1 |
| Nkotsi            | 4,556                   |                    | 3,853     | 84.6                               | 3,714     | 81.5                                      | 2,631     | 57.7 |
| Nyange            | 8,174                   |                    | 6,286     | 76.9                               | 5,619     | 68.7                                      | 4,036     | 49.4 |
| Remera            | 4,953                   |                    | 4,509     | 91                                 | 4,225     | 85.3                                      | 3,726     | 75.2 |
| Rwaza             | 6,044                   |                    | 5,515     | 91.2                               | 5,282     | 87.4                                      | 4,390     | 72.6 |
| Shingiro          | 6,097                   |                    | 5,187     | 85.1                               | 4,856     | 79.6                                      | 3,619     | 59.4 |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

f) Health, Water supply and Sanitation facilities

In Musanze District 90.5% are using Mutuelle as main health insurance, 6% using RSSB or RAMA, 0.6% using private insurance, 0.1 using school insurance, 0.1 using NGOs insurance and 2.7% using employer insurance.

**Figure 12: Population who have a medical insurance by main type of insurance in Musanze District**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In Musanze district, 93.7% of private households use improved water sources. At the sector level, the percentage of the private households using water from improved sources is highest in Cyuve (99.5%), and the lowest in Gataraga (72.5%).

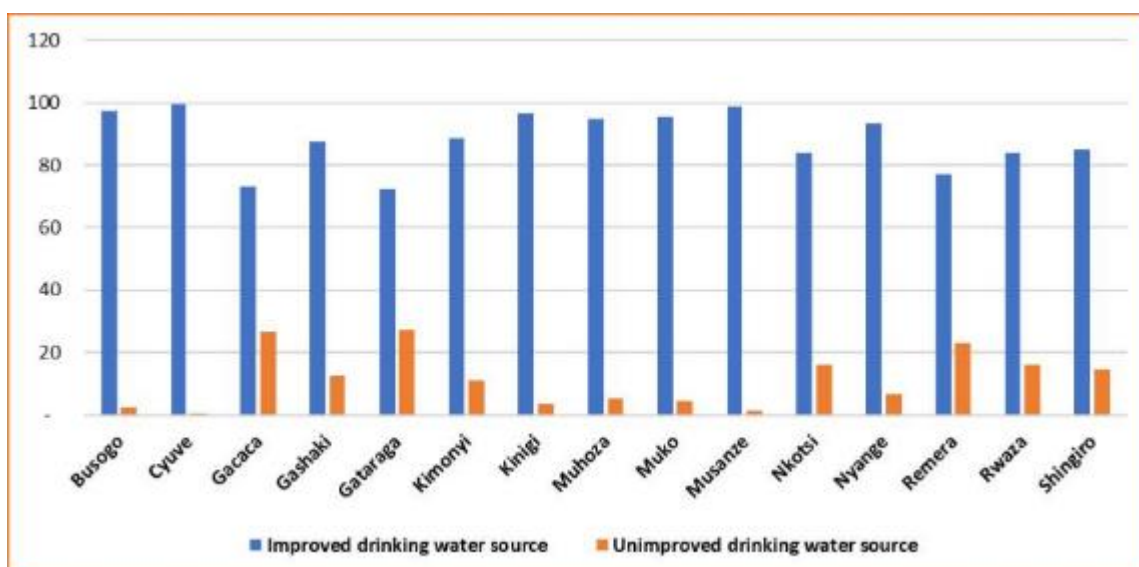


**Figure 13: Percentage of households of Musanze District by main source of drinking water**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In Musanze district, both urban and rural areas, private households use mainly improved sources of water (93.7% in urban and 88.0% in rural). The percentage of private households using unimproved source of water is higher in rural (12.0%) than in urban (6.3%).

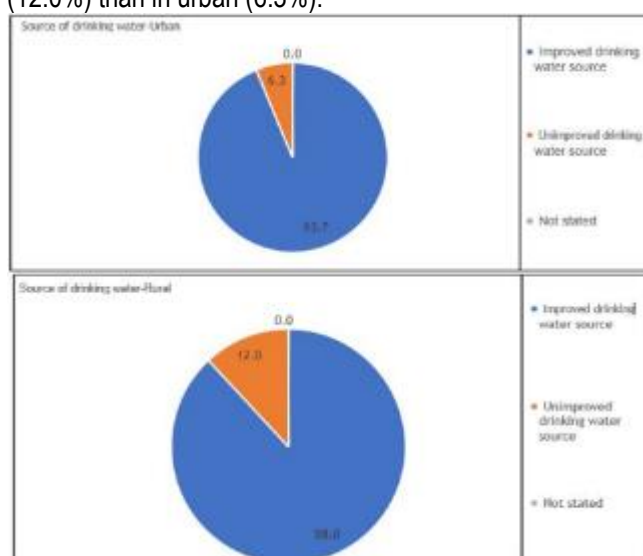


**Figure 14: Distribution of the private households of Musanze District by main source of water and by area of residence**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### g) Appliance and assets ownership

At the district level, 84.7% of private households possess a radio, 81.6% a mobile phone, 24.1% a smartphone, 13.4% a TV and 5.1% a computer. The percentage of private households possessing a radio is high in Muhoza (93.5%), and it is low in Shingiro (75.1%). The percentage of private households possessing a television is high in Muhoza (34.6%) and Cyuve (23.5%) while it is low in Rwaza, Remera, and Shingiro sectors (about 3% each). Mobile phone is mostly possessed by private households of Muhoza sector (91.1%). The sectors with high percentage of households with smartphone is Muhoza (53.1%), while the percentage of households possessing this asset is low in Rwaza and Shingiro sectors (8% each). The computer is mostly possessed in Muhoza (15.9%).

**Table 33: Percentage of private households and of Musanze District possessing electrical appliance**

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |            |              |              |          |
|-------------------------------|------------------------------------|-----------------------------------------------------|------------|--------------|--------------|----------|
|                               |                                    | Radio                                               | Television | Mobile phone | Smart Mobile | Computer |
| Rwanda                        | 3,312,743                          | 81.5                                                | 12.3       | 78.1         | 20.8         | 4.2      |
| Northern Province             | 506,064                            | 82.1                                                | 7.5        | 77.6         | 15.3         | 2.3      |

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |            |              |              |          |
|-------------------------------|------------------------------------|-----------------------------------------------------|------------|--------------|--------------|----------|
|                               |                                    | Radio                                               | Television | Mobile phone | Smart Mobile | Computer |
| Musanze                       | 119,387                            | 84.7                                                | 13.4       | 81.6         | 24.1         | 5.1      |
| Busogo                        | 6,940                              | 86.3                                                | 12.8       | 84.0         | 29.7         | 3.9      |
| Cyuve                         | 15,444                             | 88.2                                                | 23.5       | 86.1         | 37.5         | 9.3      |
| Gacaca                        | 7,384                              | 82.2                                                | 5.7        | 76.7         | 11.7         | 1.3      |
| Gashaki                       | 3,460                              | 83.9                                                | 4.1        | 78.2         | 11           | 0.6      |
| Gataraga                      | 6,333                              | 79.9                                                | 5.7        | 77.3         | 12.8         | 1.4      |
| Kimonyi                       | 5,629                              | 82.1                                                | 10.5       | 78.9         | 18.5         | 3.5      |
| Kinigi                        | 8,201                              | 84.9                                                | 10.1       | 82.9         | 18.4         | 1.9      |
| Muhoza                        | 16,900                             | 93.5                                                | 34.6       | 91.1         | 53.1         | 15.9     |
| Muko                          | 6,937                              | 81.6                                                | 8.2        | 76.6         | 15           | 1.9      |
| Musanze                       | 12,335                             | 83.4                                                | 11.9       | 81.5         | 23.1         | 5.8      |
| Nkotsi                        | 4,556                              | 79.7                                                | 4.8        | 74.5         | 12.7         | 1.4      |
| Nyange                        | 8,174                              | 81.8                                                | 6.6        | 79.9         | 15.5         | 1.3      |
| Remera                        | 4,953                              | 85.0                                                | 3.1        | 80.0         | 12.6         | 0.5      |
| Rwaza                         | 6,044                              | 82.7                                                | 3.2        | 77.9         | 8.8          | 0.8      |
| Shingiro                      | 6,097                              | 75.1                                                | 2.8        | 72.4         | 8.2          | 0.8      |

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

#### h) Access to energy for lighting and cooking

In Musanze district, the main source of energy for lighting used by households is electricity (62.9%). At the sector level, the percentage of households using electricity for lighting is high in Muhoza (88.0%), Gashaki (74.4%), Remera (72.7%), and Busogo sectors (72.3%). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Shingiro (53.7%), and Gataraga (44.7%). According to the area of residence, in urban areas, the main source of energy for lighting is electricity (77.8%), followed by flashlight/phone flashlight (14.0%) and candles (5.2%). In rural areas, 48.6% of private households use electricity as main source of energy for lighting while 37.8% use flashlight, 7.2% use firewood, and 4.1% use candles.

**Table 34: Distribution (count and %) of households of Musanze District by main source of energy for lighting**

| Sector and area of residence | Total number of private households | Total      | Electricity | Kerosene/Paraffin lamp | Biogas     | Candles    | Firewood   | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern    | Other source of energy for | Not stated |
|------------------------------|------------------------------------|------------|-------------|------------------------|------------|------------|------------|----------------|-----------------------------|------------------------|------------|----------------------------|------------|
| <b>Rwanda</b>                | <b>3,312,743</b>                   | <b>100</b> | <b>61.0</b> | <b>0.4</b>             | <b>0.0</b> | <b>2.9</b> | <b>4.2</b> | <b>1.1</b>     | <b>28.4</b>                 | <b>0.1</b>             | <b>1.2</b> | <b>0.5</b>                 | <b>0.0</b> |
| Northern Province            | 506,064                            | 100        | 54.1        | 0.3                    | 0.0        | 3.0        | 5.0        | 0.8            | 35.3                        | 0.1                    | 0.9        | 0.4                        | 0.0        |
| Musanze District             | 119,387                            | 100        | 63          | 0.2                    | 0.0        | 5          | 5          | 0.2            | 26.1                        | 0.1                    | 1          | 0.3                        | 0.0        |
| Musanze Urban                | 58,426                             | 100        | 78          | 0.2                    | 0.0        | 5          | 2          | 0.2            | 14                          | 0.1                    | 1          | 0.2                        | 0.0        |
| Musanze Rural                | 60,961                             | 100        | 49          | 0.3                    | 0.0        | 4          | 7          | 0.3            | 37.8                        | 0.1                    | 1          | 0.5                        | 0.0        |
| Busogo                       | 6,940                              | 100        | 72          | 0.2                    |            | 3          | 5          | 0.0            | 17.5                        | 0.0                    | 1          | 0.9                        | 0.0        |
| Cyuve                        | 15,444                             | 100        | 68          | 0.1                    | 0.0        | 8          | 2          | 0.3            | 21.1                        | 0.1                    | 1          | 0.3                        |            |
| Gacaca                       | 7,384                              | 100        | 66          | 0.2                    | 0          | 4.0        | 4          | 0.4            | 23.8                        | 0.1                    | 1          | 0.3                        |            |
| Gashaki                      | 3,460                              | 100        | 74          | 0.0                    |            | 1.0        | 4          | 0.3            | 19.2                        |                        | 1          | 0.0                        |            |
| Gataraga                     | 6,333                              | 100        | 38          | 0.4                    |            | 4          | 11         | 0.1            | 44.7                        | 0.1                    | 2          | 0.0                        |            |
| Kimonyi                      | 5,629                              | 100        | 60          | 0.3                    |            | 3          | 3          | 0.2            | 31.8                        | 0.1                    | 1          | 0.5                        |            |
| Kinigi                       | 8,201                              | 100        | 54          | 0.2                    | 0.0        | 5          | 5          | 0.2            | 35.1                        | 0.1                    | 1          | 0.3                        |            |
| Muhoza                       | 16,900                             | 100        | 88.0        | 0.3                    | 0.0        | 5          | 1          | 0.2            | 4.9                         | 0.0                    | 1          | 0.1                        | 0.0        |
| Muko                         | 6,937                              | 100        | 66          | 0.2                    | 0.0        | 6          | 4          | 0.3            | 21.3                        |                        | 1          | 0.0                        |            |
| Musanze                      | 12,335                             | 100        | 55          | 0.1                    | 0.0        | 7          | 6          | 0.2            | 31.0                        | 0.2                    | 1          | 0.3                        |            |
| Nkotsi                       | 4,556                              | 100        | 59          | 0.2                    |            | 1          | 5          | 0.2            | 32.7                        | 0.2                    | 2          | 0.2                        |            |
| Nyange                       | 8,174                              | 100        | 52.0        | 0.1                    | 0.0        | 5.0        | 7          | 0.4            | 34.5                        | 0.1                    | 1          | 0.1                        |            |
| Remera                       | 4,953                              | 100        | 73          | 0.1                    |            | 2          | 2          | 0.2            | 21.6                        | 0.0                    | 1          | 0.2                        |            |
| Rwaza                        | 6,044                              | 100        | 58          | 0.4                    | 0.0        | 2          | 3          | 0.4            | 33.4                        | 0.1                    | 1          | 0.0                        |            |
| Shingiro                     | 6,097                              | 100        | 29          | 0.2                    |            | 3          | ##         | 0.4            | 53.7                        | 0.1                    | 2          | 0.2                        |            |

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

The main sources of energy for cooking used by the private households are firewood (73.9%) followed by charcoal

(21.0%) and gas (4.0%). At the sector level, firewood is the most used source of cooking energy by private households in Remera (98.2%) and Gashaki (98.0%). The sector with the high percentage of private households using charcoal as main source of cooking energy is Muhoza (55.1%). Sectors with the highest percentages of private households using gas as main source of cooking energy are Muhoza (16.4%), and Cyuve (7.0%).

#### i) Vulnerability

In Musanze district the vulnerability prevalence rate is 3.1%. At sector level, the highest prevalence rates of the resident population with vulnerability are in Remera sector (4.3%), and while the lowest is in Busogo sector (1.9%).

**Table 35: Number and share of persons with vulnerability of Musanze district**

| Sectors of residence     | Total resident population | Persons with vulnerability |                |                | Prevalence of vulnerability |
|--------------------------|---------------------------|----------------------------|----------------|----------------|-----------------------------|
|                          | Both sexes                | Both sexes                 | Male           | Female         | Both sexes                  |
| <b>Rwanda</b>            | <b>11,537,934</b>         | <b>391,775</b>             | <b>174,949</b> | <b>216,826</b> | <b>3.4</b>                  |
| <b>Northern Province</b> | <b>1,788,683</b>          | <b>60,336</b>              | <b>26,348</b>  | <b>33,988</b>  | <b>3.4</b>                  |
| <b>Musanze district</b>  | <b>417,350</b>            | <b>13,025</b>              | <b>5,623</b>   | <b>7,402</b>   | <b>3.1</b>                  |
| Busogo                   | 24,522                    | 467                        | 225            | 242            | 1.9                         |
| Cyuve                    | 53,908                    | 1,598                      | 654            | 944            | 3                           |
| Gacaca                   | 26,809                    | 756                        | 371            | 385            | 2.8                         |
| Gashaki                  | 12,405                    | 327                        | 145            | 182            | 2.6                         |
| Gataraga                 | 23,378                    | 779                        | 341            | 438            | 3.3                         |
| Kimonyi                  | 18,738                    | 530                        | 220            | 310            | 2.8                         |
| Kinigi                   | 28,679                    | 932                        | 366            | 566            | 3.2                         |
| Muhoza                   | 61,904                    | 1,806                      | 880            | 926            | 2.9                         |
| Muko                     | 22,929                    | 788                        | 338            | 450            | 3.4                         |
| Musanze                  | 41,428                    | 1,361                      | 524            | 837            | 3.3                         |
| Nkotsi                   | 15,106                    | 548                        | 235            | 313            | 3.6                         |
| Nyange                   | 27,577                    | 1,072                      | 420            | 652            | 3.9                         |
| Remera                   | 17,620                    | 752                        | 324            | 428            | 4.3                         |
| Rwaza                    | 20,334                    | 584                        | 266            | 318            | 2.9                         |
| Shingiro                 | 22,013                    | 725                        | 314            | 411            | 3.3                         |

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

## 4.5 Burera district

### 4.5.1 Physical environment

#### a. Location

Burera District lies in the Northern Province of Rwanda, adjacent to the Ugandan border to the North and East, and between the cities of Musanze and Gicumbi. Within it is boarded by Gakenke and Rulindo Districts in the East and in the South by Musanze District in the West. It is home to Lakes Burera and Ruhondo. The district also contains the Cyanika border post, gateway to Kisoro and southwestern Uganda. The total surface area of the district is 645 km<sup>2</sup>. Burera district is divided into 17 Sectors 69 cells and 571 villages distributed in all sectors.

#### b. Topography

The topography of Burera District is characterized by a mix of hilly and mountainous terrain. The district's elevation ranges from about 1,800 meters to over 2,600 meters above sea level. The higher elevations are typically found in the northern and western parts of the district, contributing to its diverse topography. The district is part of the Virunga massif, which includes prominent volcanic mountains such as Mount Muhabura, Mount Gahinga, and Mount Sabyinyo. These mountains form part of the border with Uganda and the Democratic Republic of Congo.

#### c. Climate and Rainfall

Burera District experiences a moderate climate and generally the district enjoys mild temperatures due to its elevation. Average temperatures range between 14°C and 25°C throughout the year, with cooler temperatures typically experienced during the night and early morning.

District has a bimodal rainfall pattern, meaning it experiences two main rainy seasons: (i) the long rainy season occurs from March to May and (ii) the short rainy season that occurs from September to November.

The annual average rainfall ranges from 1200mm to 1600mm, with the heaviest rains usually falling in April and May.

#### **d. Geology and Soils**

The district is part of the volcanic region of the Virunga Massif, which includes a range of mountains and extinct volcanoes. The geology is dominated by volcanic rocks, such as basalts and andesites, as well as pyroclastic deposits. These volcanic formations contribute to the region's fertile soils, which are conducive to agriculture. Additionally, the district contains sedimentary rocks that are primarily composed of limestone, sandstone, and shales, which are indicative of the area's geological history and the processes that have shaped its landscape over time.

#### **e. Hydrography**

The district is home to Lake Burera, one of the twin lakes (along with Lake Ruhondo) that lie at the base of the Virunga Mountains. These lakes are a significant feature of the district's landscape and are important for local agriculture and tourism. Numerous rivers and streams flow through the district, often creating deep valleys and gorges. These water bodies contribute to the fertile soils and lush vegetation found in the region.

#### **4.5.2 Ecological environment**

Burera District's biodiversity is shaped by its high-altitude terrain with rolling hills, wetlands and lakes such as Lake Burera and Lake Ruhondo, and proximity to Volcanoes National Park. The district supports a range of montane forest species, aquatic life, and cultivated ecosystems.

##### **- Flora of Burera district**

The vegetation in Burera district consists of montane forests, savanna grasslands, wetlands, and cultivated landscapes. The following are the key plant species found in the area:

##### **a) Natural vegetation**

- Montane forests: Found in high-altitude areas, especially near Volcanoes National Park. These include: *Hagenia abyssinica* (African Redwood), *Dombeya torrida* (Wild Pear), *Hypericum revolutum* (Everlasting Flower), *Erica arborea* (Tree Heath) and *Myrsine africana* (Cape Myrtle)
- Wetlands and Riparian vegetation: Common around lakes Burera and Ruhondo. These include *Cyperus papyrus* (Papyrus), *Phragmites mauritianus* (Common Reed), *Typha domingensis* (Cattail) and *Nymphaea lotus* (Water Lily)
- Savanna and grasslands: Found in lower elevations and open areas. These include *Loudetia simplex* (Savanna Grass), *Themeda triandra* (Red Grass), *Hyparrhenia rufa* (Jaragua Grass), and *Sporobolus festinus* (Wild Ryegrass)

##### **b) Cultivated and agroforestry species**

Agriculture plays a dominant role in the district, with key cultivated crops and tree species used for agroforestry:

- Crops: such as *Zea mays* (Maize), *Solanum tuberosum* (Potato), *Phaseolus vulgaris* (Beans), *Brassica carinata* (Ethiopian Kale), *Coffea arabica* (Arabica Coffee), and *Musa* spp. (Banana)
- Agroforestry and Reforestation Trees: such as *Eucalyptus* spp. (Eucalyptus), *Grevillea robusta* (Silky Oak), *Pinus patula* (Mexican Weeping Pine), *Acacia mearnsii* (Black Wattle), *Calliandra calothyrsus* (Calliandra)

##### **- Fauna of Burera district**

The fauna of Burera district is diverse, influenced by its proximity to the Volcanoes National Park and the aquatic ecosystems of Lakes Burera and Ruhondo.

##### **a) Mammals**

- Large Mammals (found near the Volcanoes National Park) include *Gorilla beringei beringei* (Mountain Gorilla), *Panthera pardus* (Leopard), *Cerval serval* (Serval), *Hystrix cristata* (African Crested Porcupine)
- Small Mammals include *Atilax paludinosus* (Marsh Mongoose), *Dendromus mystacalis* (Long-Tailed Climbing Mouse), and *Crocidura olivieri* (African White-Toothed Shrew).

##### **b) Birds**

Burera District is home to various bird species, particularly water birds and forest birds.

- Water Birds (common in lakes Burera and Ruhondo), *Ardea melanocephala* (Black-headed Heron), *Egretta garzetta* (Little Egret), *Alopochen aegyptiaca* (Egyptian Goose), *Podiceps cristatus* (Great Crested Grebe) and *Phalacrocorax africanus* (Reed Cormorant)
- Forest and Savanna Birds such as *Buteo buteo* (Common Buzzard), *Tauraco leucolophus* (White-crested Turaco),

*Ploceus baglafecht* (Baglafecht Weaver), *Cinnyris regius* (Regal Sunbird) and *Laniarius funebris* (Slate-colored Boubou)

### c) Reptiles and amphibians

- Reptiles including *Naja nigricollis* (Black-necked Spitting Cobra), *Bitis arietans* (Puff Adder), *Varanus niloticus* (Nile Monitor Lizard), *Chamaeleo dilepis* (Flap-necked Chameleon)
- Amphibians such as *Hyperolius viridiflavus* (Variable Reed Frog), *Xenopus laevis* (African Clawed Frog), *Leptopelis flavomaculatus* (Yellow-spotted Tree Frog).

### d) Aquatic life

Lakes Burera and Ruhondo host a variety of fish species and other aquatic organisms:

- Fish Species include *Oreochromis niloticus* (Nile Tilapia), *Clarias gariepinus* (African Catfish), *Barbus neumayeri* (Neumayer's Barb) and *Haplochromis* spp. (Cichlid Fish)

## 4.5.3 Socio-economic environment

### a) Population

Burera district counts 387,729 residents predominantly female: 202,947 are women corresponding to 52.3% of its total population. Females are predominant in all sectors of Burera district: Butaro (51.7%), Cyanika (52%), Kagogo (52%), Gatebe (52.8%), Nemba (53.3%), Ruhumde 52.7 and Rwerere (52.6% respectively. The two less populated sectors are Gitovu (11,531 inhabitants) and Cyeru (14,719 inhabitants). They represent 3% and 3.8% of the total resident population of BURERA district, respectively.

**Table 36: Population of Burera District by Sector and sex**

| District and Sector    | Frequency         |                  |                  | Percent    |             |             | Share of the population |
|------------------------|-------------------|------------------|------------------|------------|-------------|-------------|-------------------------|
|                        | Both sexes        | Male             | Female           | Both sexes | Male        | Female      | Both sexes              |
| <b>Rwanda</b>          | <b>13,246,394</b> | <b>6,429,326</b> | <b>6,817,068</b> | <b>100</b> | <b>48.5</b> | <b>51.5</b> |                         |
| <b>North province</b>  | <b>2,038,511</b>  | <b>972,960</b>   | <b>1,065,551</b> | <b>100</b> | <b>47.7</b> | <b>52.3</b> |                         |
| <b>Burera district</b> | <b>387,729</b>    | <b>184,782</b>   | <b>202,947</b>   | <b>100</b> | <b>47.7</b> | <b>52.3</b> | <b>100</b>              |
| Bungwe                 | 16,322            | 7,712            | 8,610            | 100        | 47.2        | 52.8        | 4.2                     |
| Butaro                 | 38,013            | 18,352           | 19,661           | 100        | 48.3        | 51.7        | 9.8                     |
| Cyanika                | 44,510            | 21,362           | 23,148           | 100        | 48          | 52          | 11.5                    |
| Cyeru                  | 14,719            | 7,020            | 7,699            | 100        | 47.7        | 52.3        | 3.8                     |
| Gahunga                | 28,059            | 13,282           | 14,777           | 100        | 47.3        | 52.7        | 7.2                     |
| Gatebe                 | 18,867            | 8,900            | 9,967            | 100        | 47.2        | 52.8        | 4.9                     |
| Gitovu                 | 11,531            | 5,516            | 6,015            | 100        | 47.8        | 52.2        | 3                       |
| Kagogo                 | 23,089            | 11,084           | 12,005           | 100        | 48          | 52          | 6                       |
| Kinoni                 | 19,017            | 9,093            | 9,924            | 100        | 47.8        | 52.2        | 4.9                     |
| Kinyababa              | 23,746            | 11,281           | 12,465           | 100        | 47.5        | 52.5        | 6.1                     |
| Kivuye                 | 18,057            | 8,609            | 9,448            | 100        | 47.7        | 52.3        | 4.7                     |
| Nemba                  | 21,401            | 10,002           | 11,399           | 100        | 46.7        | 53.3        | 5.5                     |
| Rugarama               | 27,051            | 13,046           | 14,005           | 100        | 48.2        | 51.8        | 7                       |
| Rugengabari            | 20,920            | 9,768            | 11,152           | 100        | 46.7        | 53.3        | 5.4                     |
| Ruhunde                | 20,157            | 9,528            | 10,629           | 100        | 47.3        | 52.7        | 5.2                     |
| Rusarabuye             | 20,659            | 9,991            | 10,668           | 100        | 48.4        | 51.6        | 5.3                     |
| Rwerere                | 21,611            | 10,236           | 11,375           | 100        | 47.4        | 52.6        | 5.6                     |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Burera district population is predominantly rural area (90.1%) while urban represents 9.9%. The sectors of Burera district which don't have urban areas are Bungwe, Cyeru, Gitovu, Kinyababa, Nemba, Rugengabari, Ruhunde and Rwerere. The sectors with less urban areas are Kinoni (50.3%) and Gahunga (79.2%).

### b) Number of households and size of household

The results of 5<sup>th</sup> RPHC 2022 indicate the total of 91786 households in Burera district. The average household size in Burera district is 4.2 persons per household. At the Sector level, the highest sizes are found in Kagogo (4.4 persons/household), and Kivuye (4.4), Butaro, Cyanika, and Kinyababa with all 4.3. The smallest household size is found in Gatebe, Nemba and Ruhunde (4.0 persons/household). The results of 5<sup>th</sup> RPHC 2022 revealed that in Burera

district, private households headed by females are 25.4%. At sector level, the highest percentages of households headed by women are found in Bungwe sector (28.7%) and Nemba sector (28.6%) while the lowest is found in Kinyababa sector (22.9%).

**Table 37: Number of households and their corresponding population, mean size and sex of household head**

| Sectors                  | Total number of private households | Corresponding Population <sup>8</sup> | Household Size | Percentage      |                   |
|--------------------------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|                          |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| <b>Rwanda</b>            | <b>3 312 743</b>                   | <b>13 100 600</b>                     | <b>4.0</b>     | <b>71.1</b>     | <b>28.9</b>       |
| <b>Northern Province</b> | <b>506,064</b>                     | <b>2,024,173</b>                      | <b>4.0</b>     | <b>73.1</b>     | <b>26.9</b>       |
| <b>Burera</b>            | <b>91,786</b>                      | <b>386,685</b>                        | <b>4.2</b>     | <b>74.6</b>     | <b>25.4</b>       |
| Bungwe                   | 3,956                              | 16,276                                | 4.1            | 71.3            | 28.7              |
| Butaro                   | 8,727                              | 37,710                                | 4.3            | 76              | 24                |
| Cyanika                  | 10,238                             | 44,435                                | 4.3            | 76.1            | 23.9              |
| Cyeru                    | 3,559                              | 14,705                                | 4.1            | 74.3            | 25.7              |
| Gahunga                  | 6,652                              | 28,018                                | 4.2            | 72.9            | 27.1              |
| Gatebe                   | 4,675                              | 18,862                                | 4.0            | 71.8            | 28.2              |
| Gitovu                   | 2,751                              | 11,528                                | 4.2            | 75.8            | 24.2              |
| Kagogo                   | 5,290                              | 23,059                                | 4.4            | 77.4            | 22.6              |
| Kinoni                   | 4,653                              | 18,946                                | 4.1            | 76.4            | 23.6              |
| Kinyababa                | 5,453                              | 23,692                                | 4.3            | 77.1            | 22.9              |
| Kivuye                   | 4,117                              | 18,012                                | 4.4            | 73.5            | 26.5              |
| Nemba                    | 5,271                              | 21,234                                | 4.0            | 71.4            | 28.6              |
| Rugarama                 | 6,365                              | 27,045                                | 4.2            | 76.3            | 23.7              |
| Rugengabari              | 5,032                              | 20,891                                | 4.2            | 74.4            | 25.6              |
| Ruhunde                  | 5,076                              | 20,156                                | 4.0            | 72.2            | 27.8              |
| Rusarabuye               | 4,870                              | 20,584                                | 4.2            | 75.9            | 24.1              |
| Rwerere                  | 5,101                              | 21,532                                | 4.2            | 72.3            | 27.7              |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

### c) Housing characteristics

Umudugudu/planned rural housing is much higher in Burera district (83.9%) as one of districts of the North province. Another common type of habitat in Burera district is Dispersed/ Isolated housing (12.1%). The type of habitat varies across sectors. Planned rural settlement or housing is much higher in Gahunga (99.3%), followed by Gitovu (99.2%). Dispersed/isolated housing is 40.8% and Nemba 40.6%.

**Table 38: Distribution of households in Burera District by type of habitat and Sector**

| Sectors                  | Total Number of Households | Percentage |                                      |                          |                |                            |                |                              |                       |            |
|--------------------------|----------------------------|------------|--------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|                          |                            | Total      | Umudugudu (Planned rural settlement) | Integrated model village | Old settlement | Dispersed/Isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| <b>Rwanda</b>            | <b>3,312,743</b>           | <b>100</b> | <b>65.4</b>                          | <b>0.8</b>               | <b>2.3</b>     | <b>14.9</b>                | <b>6.9</b>     | <b>8.9</b>                   | <b>0.8</b>            | <b>-</b>   |
| <b>Northern Province</b> | <b>506,064</b>             | <b>100</b> | <b>70.5</b>                          | <b>0.6</b>               | <b>1.7</b>     | <b>22.3</b>                | <b>0.5</b>     | <b>4.1</b>                   | <b>0.3</b>            | <b>0</b>   |
| <b>Burera District</b>   | <b>91,786</b>              | <b>100</b> | <b>83.9</b>                          | <b>0.6</b>               | <b>2.2</b>     | <b>12.1</b>                | <b>0</b>       | <b>1</b>                     | <b>0.2</b>            | <b>0</b>   |
| Burera Urban             | 9,158                      | 100        | 88.5                                 | 0.9                      | 1.2            | 8.8                        |                | 0.3                          | 0.3                   |            |
| Burera Rural             | 82,628                     | 100        | 83.4                                 | 0.5                      | 2.3            | 12.5                       | 0              | 1.1                          | 0.2                   | 0          |
| Bungwe                   | 3,956                      | 100        | 78.7                                 | 0.2                      | 12.6           | 8.3                        |                | 0.1                          | 0.2                   |            |
| Butaro                   | 8,727                      | 100        | 81.3                                 | 1                        | 4.2            | 11.5                       |                | 1.4                          | 0.7                   |            |
| Cyanika                  | 10,238                     | 100        | 89.6                                 | 0.3                      | 3.1            | 6.4                        |                | 0.6                          | 0.1                   |            |
| Cyeru                    | 3,559                      | 100        | 80.6                                 | 0.1                      | 1.7            | 17.6                       |                | 0.1                          |                       |            |
| Gahunga                  | 6,652                      | 100        | 99.3                                 | 0.1                      | 0              | 0.3                        | 0              | 0.1                          | 0.1                   | 0          |
| Gatebe                   | 4,675                      | 100        | 88.5                                 | 0                        | 1              | 7.3                        |                | 3.1                          |                       |            |
| Gitovu                   | 2,751                      | 100        | 99.2                                 | 0                        | 0.1            | 0.5                        |                | 0                            | 0.1                   |            |
| Kagogo                   | 5,290                      | 100        | 85.2                                 | 1.2                      | 1.7            | 7.9                        | 0              | 3.8                          | 0.2                   |            |
| Kinoni                   | 4,653                      | 100        | 52.8                                 | 0.2                      | 4.2            | 40.8                       |                | 1.9                          | 0.1                   |            |
| Kinyababa                | 5,453                      | 100        | 67.3                                 | 2.4                      | 5.2            | 24.1                       | 0.1            | 0.5                          | 0.4                   |            |
| Kivuye                   | 4,117                      | 100        | 88.8                                 | 0                        | 0.1            | 11.1                       |                | 0.1                          |                       |            |

| Sectors     | Total Number of Households | Percentage |                                     |                          |                |                            |                |                              |                       |            |
|-------------|----------------------------|------------|-------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|             |                            | Total      | Umuugudu (Planned rural settlement) | Integrated model village | Old settlement | Dispersed/isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| Nemba       | 5,271                      | 100        | 55.1                                | 0.3                      | 1.2            | 40.6                       | 0              | 2.8                          | 0                     |            |
| Rugarama    | 6,365                      | 100        | 88.5                                | 1.7                      | 0.8            | 8.7                        |                | 0                            | 0.3                   |            |
| Rugengabari | 5,032                      | 100        | 90.6                                | 0.4                      | 0.1            | 6.6                        |                | 2.2                          | 0.1                   |            |
| Ruhunde     | 5,076                      | 100        | 82.1                                | 0.6                      | 0.4            | 16.8                       | 0              |                              |                       |            |
| Rusarabuye  | 4,870                      | 100        | 97.7                                | 0.2                      | 0.7            | 1.1                        |                | 0.2                          | 0.2                   |            |
| Rwerere     | 5,101                      | 100        | 97.3                                | 0.1                      | 0.1            | 2.4                        |                |                              | 0                     | 0          |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

By area of residence, in urban areas, the predominant the planned rural settlement housing (88.5%) and Dispersed/Isolated housing (8.8%) while in rural areas, the planned rural settlement represents 83.4%, while dispersed/isolated housing represents 12.5%.

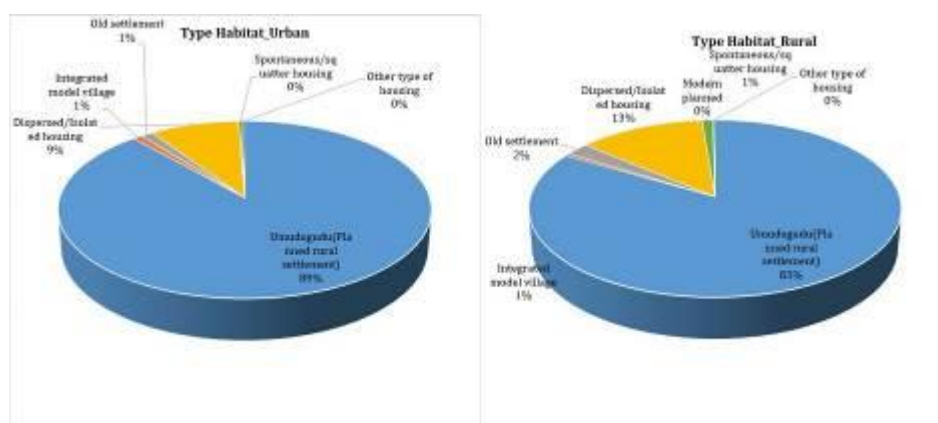


**Figure 15: Distribution of households in Burera District by type of habitat and by area of residence.**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### d) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in North province, 16.0 % of them has never attended any formal school, 61.9% attended primary, 9.6% attended Low secondary, 6.4% attended Upper secondary, while 2.6% attended university. In Burera district, 61.6% of the population aged 3 years and above attended primary level, 8.9% attended lower secondary level, 5.9% has attended upper secondary and 1.9% attended university level.

**Table 39: Distribution of the resident population of Burera District by highest level of school attended**

| Sectors           | Count         | Percentage |                       |         |         |                      |                 |                 |            |            |
|-------------------|---------------|------------|-----------------------|---------|---------|----------------------|-----------------|-----------------|------------|------------|
|                   | Total(counts) | Total      | Never attended School | Nursery | Primary | INGOBOKA/ Vocational | Lower secondary | Upper secondary | University | Not stated |
| Rwanda            | 11,999,691    | 100        | 16.7                  | 3       | 60      | 0.8                  | 9.6             | 7.1             | 4          | 0          |
| Northern Province | 1,847,684     | 100        | 16                    | 3       | 62      | 0.7                  | 9.6             | 6.4             | 3          | 0          |
| Burera District   | 348,916       | 100        | 18.2                  | 3       | 62      | 0.4                  | 8.9             | 5.9             | 2          | 0          |
| Bungwe            | 14,342        | 100        | 17.1                  | 3       | 63      | 0.3                  | 8.9             | 6.2             | 2          |            |
| Butaro            | 34,150        | 100        | 19.3                  | 4       | 59      | 0.3                  | 8.4             | 5.6             | 3          |            |
| Cyanika           | 40,640        | 100        | 20.3                  | 3       | 61      | 0.5                  | 7.6             | 5.8             | 2          |            |
| Cyeru             | 13,239        | 100        | 17.8                  | 4       | 62      | 0.3                  | 8.7             | 6.3             | 2          |            |
| Gahunga           | 25,524        | 100        | 20.8                  | 3       | 61      | 0.4                  | 8.2             | 5.1             | 2          | 0          |
| Gatebe            | 17,091        | 100        | 19.6                  | 3       | 63      | 0.4                  | 9.1             | 4.7             | 1          |            |
| Gitovu            | 10,372        | 100        | 15.6                  | 4       | 62      | 0.4                  | 9.5             | 5.9             | 2          | 0          |
| Kagogo            | 20,865        | 100        | 18.7                  | 3       | 63      | 0.5                  | 8               | 5.7             | 2          |            |
| Kinoni            | 17,514        | 100        | 13.2                  | 3       | 62      | 0.7                  | 10.8            | 7.9             | 2          | 0          |
| Kinyababa         | 21,247        | 100        | 17.9                  | 3       | 59      | 0.4                  | 10.3            | 7.6             | 2          | 0          |
| Kivuye            | 16,033        | 100        | 18.7                  | 3       | 61      | 0.4                  | 10              | 5.5             | 2          |            |
| Nemba             | 19,152        | 100        | 17.5                  | 3       | 63      | 0.6                  | 8.9             | 5.5             | 2          |            |

| Sectors     | Count         | Percentage |                       |         |         |                     |                 |                 |            |            |
|-------------|---------------|------------|-----------------------|---------|---------|---------------------|-----------------|-----------------|------------|------------|
|             | Total(counts) | Total      | Never attended School | Nursery | Primary | INGOBOKA/Vocational | Lower secondary | Upper secondary | University | Not stated |
| Rugarama    | 24,495        | 100        | 16.1                  | 3       | 62      | 0.6                 | 10.1            | 6.8             | 2          |            |
| Rugengabari | 18,588        | 100        | 14.9                  | 4       | 66      | 0.4                 | 8.9             | 5.3             | 1          |            |
| Rusarabuye  | 18,569        | 100        | 16.2                  | 4       | 62      | 0.3                 | 8.9             | 6.8             | 2          | 0          |
| Rwerere     | 19,409        | 100        | 19.6                  | 3       | 59      | 0.3                 | 10              | 6.5             | 2          | 0          |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### e) Means of livelihoods

Burera district is the one of districts of the Northern province where crop farming and animal husbandry are on large scale. In Burera district, Agricultural households occupy (85.1%), 78.3% of households are engaged in crop farming and 64.5% Households engaged in Livestock husbandry. Burera district has more sectors located in rural areas where the agriculture activities are applied, Gitovu sector has a high proportion of Households engaged in Agricultural households (92.8%), followed by Nemba (92.4%) and Rwerere (92.2%). Rwerere is the highest engaged in household's crop farming with 89.7% of private households, while Gitovu (81.2%) and Gatebe (75.9%) are more engaged in Livestock husbandry.

**Table 40: Distribution of household engaged in livestock husbandry in Burera District**

| Sector            | Agricultural households |         |           | Households engaged in crop farming |           | Households engaged in Livestock husbandry |           |
|-------------------|-------------------------|---------|-----------|------------------------------------|-----------|-------------------------------------------|-----------|
|                   | Total Households        | Private | Counts    | %                                  | Counts    | %                                         | Counts    |
| Rwanda            | 3,312,743               |         | 2,280,854 | 68.9                               | 2,074,928 | 62.6                                      | 1,669,273 |
| Northern Province | 506,064                 |         | 417,503   | 82.5                               | 389,305   | 76.9                                      | 327,842.0 |
| Burera District   | 91,786                  |         | 78,077    | 85.1                               | 71,886    | 78.3                                      | 59,232    |
| Bungwe            | 3,956                   |         | 3,609     | 91.2                               | 3,425     | 86.6                                      | 2,873     |
| Butaro            | 8,727                   |         | 7,126     | 81.7                               | 6,814     | 78.1                                      | 4,947     |
| Cyanika           | 10,238                  |         | 7,381     | 72.1                               | 6,152     | 60.1                                      | 5,211     |
| Cyeru             | 3,559                   |         | 3,241     | 91.1                               | 2,953     | 83.0                                      | 2,619     |
| Gahunga           | 6,652                   |         | 5,185     | 78.0                               | 4,572     | 68.7                                      | 3,500     |
| Gatebe            | 4,675                   |         | 4,246     | 90.8                               | 3,884     | 83.1                                      | 3,549     |
| Gitovu            | 2,751                   |         | 2,553     | 92.8                               | 2,297     | 83.5                                      | 2,233     |
| Kagogo            | 5,290                   |         | 4,423     | 83.6                               | 4,044     | 76.4                                      | 3,237     |
| Kinoni            | 4,653                   |         | 3,860     | 83.0                               | 3,501     | 75.2                                      | 2,814     |
| Kinyababa         | 5,453                   |         | 4,774     | 87.5                               | 4,503     | 82.6                                      | 3,746     |
| Kivuye            | 4,117                   |         | 3,639     | 88.4                               | 3,452     | 83.8                                      | 2,768     |
| Nemba             | 5,271                   |         | 4,868     | 92.4                               | 4,675     | 88.7                                      | 3,861     |
| Rugarama          | 6,365                   |         | 5,054     | 79.4                               | 4,360     | 68.5                                      | 3,654     |
| Rugengabari       | 5,032                   |         | 4,556     | 90.5                               | 4,299     | 85.4                                      | 3,726     |
| Ruhunde           | 5,076                   |         | 4,521     | 89.1                               | 4,184     | 82.4                                      | 3,533     |
| Rusarabuye        | 4,870                   |         | 4,338     | 89.1                               | 4,195     | 86.1                                      | 3,431     |
| Rwerere           | 5,101                   |         | 4,703     | 92.2                               | 4,576     | 89.7                                      | 3,530     |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### f) Health, Water supply and sanitation facilities

In Burera District 95.7% are using Mutuelle as main health insurance, 3.5% using RSSB or RAMA, 0.1% using private insurance, none using school insurance, none using NGOs insurance and 0.7% using employer insurance.



**Figure 16: Population who have a medical insurance by main type of insurance in Burera District**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of 5RPHC 2022 reveal that improved water sources are the most water sources in Rwanda that present (82.3%). In Burera District, 80.8% of private households use improved water sources. At the sector level, the percentage of the private households using water from improved sources is highest in Cyanika (99.8%) Gahunga

(99.1%) and Rugarama (95.5%). The lowest sector to use an improved source of water is Gatebe (60.3%).

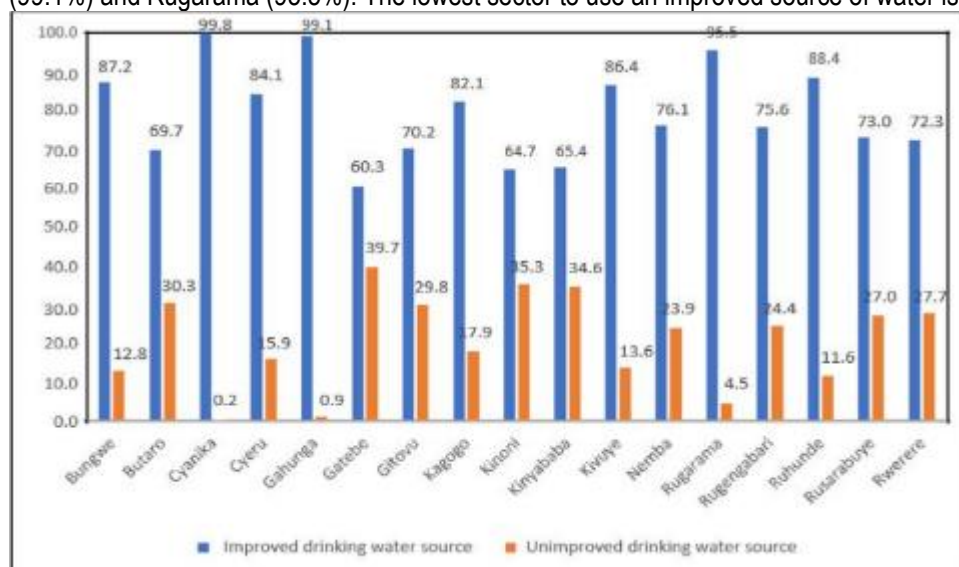


**Figure 17: Percentage of households of Burera District by main source of drinking water**  
Source: Fifth Rwanda Population and Housing Census,2022(NISR)

In Burera District, both urban and rural areas, private households use mainly improved source of water (83.7% in urban and 80.5% in rural). The percentage of private households using unimproved source of water is higher in rural (19.5%) than in urban (16.3%).

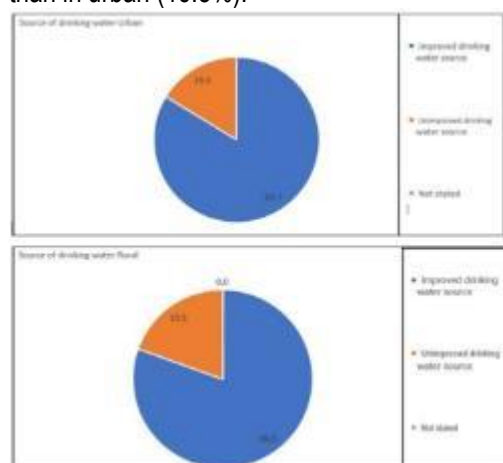


**Figure 18: Distribution of the private households of Burera District by main source of water and by area of residence**

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

#### g) Appliance and assets ownership

At the district level, 81% of private households possess a radio, 77.6% a mobile phone, 11.4% a smartphone, 4.1% has TV and 1.1% a computer. The percentage of private households possessing a radio is high in Kinoni (85.2%), Kivuye (84.1%) and Butaro (83.6%) and all others have between 77% to 83%. The percentage of private households possessing a television is high in Kinoni (6.8%) and Bungwe 5.6%, Gahunga and Rugarama 5.2% and 5.0% respectively. The private households with mobile phone are high in Kinoni, Kagogo and Butaro at 81%, Kivuye at 79.5% and all sectors varies from 72 to 80%. Private households possessing smart phones are high in Kinoni at 14.6%, followed by Cyanika13.9%, Rugarama 14%, Kagogo and Kivuye at 12.9%. The private households for all sectors have at least one percent of the computer.

**Table 41: Percentage of private households and of Burera District possessing electrical appliance**

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |            |                |              |          |
|-------------------------------|------------------------------------|-----------------------------------------------------|------------|----------------|--------------|----------|
|                               |                                    | Radio                                               | Television | Mobile phone10 | Smart Mobile | Computer |
| Rwanda                        | 3,312,743                          | 81.5                                                | 12.3       | 78.1           | 20.8         | 4.2      |
| Northern Province             | 506,064                            | 82.1                                                | 7.5        | 77.6           | 15.3         | 2.3      |

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |            |                            |              |          |
|-------------------------------|------------------------------------|-----------------------------------------------------|------------|----------------------------|--------------|----------|
|                               |                                    | Radio                                               | Television | Mobile phone <sup>10</sup> | Smart Mobile | Computer |
| Burera District               | 91,786                             | 81.2                                                | 4.1        | 77.6                       | 11.4         | 1.1      |
| Bungwe                        | 3,956                              | 82.2                                                | 5.6        | 79.4                       | 11.9         | 1.1      |
| Butaro                        | 8,727                              | 83.6                                                | 3.6        | 80.7                       | 12.1         | 1.4      |
| Cyanika                       | 10,238                             | 81.0                                                | 4.8        | 79.8                       | 13.9         | 1.3      |
| Cyeru                         | 3,559                              | 81.1                                                | 4.3        | 75.6                       | 9.9          | 1.0      |
| Gahunga                       | 6,652                              | 77.8                                                | 5.2        | 75.5                       | 11.1         | 1.4      |
| Gatebe                        | 4,675                              | 81.2                                                | 3.6        | 74.3                       | 8.7          | 0.6      |
| Gitovu                        | 2,751                              | 80.8                                                | 2.3        | 74.8                       | 9.5          | 0.6      |
| Kagogo                        | 5,290                              | 82.6                                                | 4.3        | 80.5                       | 12.9         | 1.1      |
| Kinoni                        | 4,653                              | 85.2                                                | 6.8        | 80.8                       | 14.6         | 1.4      |
| Kinyababa                     | 5,453                              | 81.7                                                | 3.2        | 79.4                       | 12.3         | 0.7      |
| Kivuye                        | 4,117                              | 84.1                                                | 4.3        | 79.5                       | 12.9         | 1.2      |
| Nemba                         | 5,271                              | 78.7                                                | 3.1        | 73.4                       | 9.0          | 1.0      |
| Rugarama                      | 6,365                              | 80.9                                                | 5.0        | 79.2                       | 14.0         | 1.1      |
| Rugengabari                   | 5,032                              | 76.7                                                | 2.1        | 72.0                       | 8.1          | 0.7      |
| Ruhunde                       | 5,076                              | 78.5                                                | 2.7        | 72.3                       | 6.4          | 0.7      |
| Rusarabuye                    | 4,870                              | 83.4                                                | 3.7        | 79.0                       | 11.4         | 1.3      |
| Rwerere                       | 5,101                              | 82.2                                                | 3.9        | 77.7                       | 9.6          | 1.1      |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### h) Access to energy for lighting and cooking

The main source of energy for lighting used by households is electricity (52.7%). At the sector level, the percentage of households using electricity for lighting is high in Rusarabuye (70.8%), Kivuye (69%), Kinoni (67.3%) and Butaro which has 64.7%. The sectors with the percentages of private households using flashlight/phone flashlight for lighting are Ruhunde (49.7%), Gatebe (46.3%), Cyanika (46.1%), and Gahunga (45.8%). According to the area of residence, the main source of energy for lighting is electricity (50.8%), followed by flashlight/phone flashlight (36.6%) and firewood (8.3%) in rural areas. In urban areas, 69% of private households use electricity as main source of energy for lighting while use 24.9% use flashlight or phone flashlight.

**Table 42: Distribution of households of Burera district by main source of energy for lighting**

| Sector and area of residence | Total number of private households | Total | Electricity | Kerosene/Paraffin lamp | Biogas | Candles | Firewood | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern | Other source of energy for |
|------------------------------|------------------------------------|-------|-------------|------------------------|--------|---------|----------|----------------|-----------------------------|------------------------|---------|----------------------------|
| Rwanda                       | 3,312,743                          | 100   | 61.0        | 0.4                    | 0.0    | 2.9     | 4.2      | 1.1            | 28.4                        | 0.1                    | 1.2     | 0.5                        |
| Northern Province            | 506,064                            | 100   | 54.1        | 0.3                    | 0.0    | 3.0     | 5.0      | 0.8            | 35.3                        | 0.1                    | 0.9     | 0.4                        |
| Burera District              | 91,786                             | 100   | 52.7        | 0.2                    | 0.0    | 1.8     | 7.7      | 0.4            | 35.4                        | 0.1                    | 1.3     | 0.5                        |
| Burera Urban                 | 9,158                              | 100   | 69.0        | 0.3                    |        | 1.7     | 2.2      | 0.1            | 24.9                        | 0.1                    | 1.4     | 0.4                        |
| Burera Rural                 | 82,628                             | 100   | 50.8        | 0.2                    | 0.0    | 1.8     | 8.3      | 0.5            | 36.6                        | 0.1                    | 1.2     | 0.5                        |
| Bungwe                       | 3,956                              | 100   | 52.1        | 0.3                    | 0.0    | 1.5     | 6.8      | 0.1            | 38.1                        | 0.1                    | 0.3     | 0.7                        |
| Butaro                       | 8,727                              | 100   | 64.7        | 0.1                    |        | 1.3     | 8.7      | 0.7            | 23.0                        | 0.1                    | 0.9     | 0.5                        |
| Cyanika                      | 10,238                             | 100   | 44.6        | 0.5                    | 0.0    | 2.7     | 1.9      | 0.2            | 46.1                        | 0.1                    | 3.7     | 0.3                        |
| Cyeru                        | 3,559                              | 100   | 54.5        | 0.1                    | 0.1    | 1.5     | 11.2     | 0.1            | 31.0                        | 0.0                    | 0.8     | 0.7                        |
| Gahunga                      | 6,652                              | 100   | 39.2        | 0.2                    |        | 2.7     | 9.2      | 0.1            | 45.8                        | 0.1                    | 1.3     | 1.5                        |
| Gatebe                       | 4,675                              | 100   | 41.6        | 0.1                    | 0.0    | 1.4     | 8.6      | 0.5            | 46.3                        | 0.0                    | 1.1     | 0.4                        |
| Gitovu                       | 2,751                              | 100   | 46.9        | 0.1                    | 0.0    | 1.6     | 14.6     | 0.3            | 33.6                        | 0.1                    | 1.1     | 1.6                        |
| Kagogo                       | 5,290                              | 100   | 49.2        | 0.2                    |        | 1.2     | 3.8      | 0.5            | 43.8                        | 0.1                    | 1.2     | 0.2                        |
| Kinoni                       | 4,653                              | 100   | 67.3        | 0.2                    |        | 1.4     | 2.3      | 0.0            | 27.8                        | 0.1                    | 0.6     | 0.2                        |
| Kinyababa                    | 5,453                              | 100   | 59.9        | 0.1                    |        | 0.9     | 9.5      | 0.1            | 28.3                        | 0.0                    | 1.0     | 0.2                        |
| Kivuye                       | 4,117                              | 100   | 69.0        | 0.0                    |        | 2.0     | 7.2      | 0.1            | 21.2                        | 0.1                    | 0.3     | 0.2                        |
| Nemba                        | 5,271                              | 100   | 53.7        | 0.1                    |        | 2.5     | 9.9      | 1.1            | 31.3                        | 0.1                    | 0.8     | 0.5                        |
| Rugarama                     | 6,365                              | 100   | 46.9        | 0.3                    |        | 3.5     | 3.4      | 0.4            | 43.4                        | 0.1                    | 1.7     | 0.3                        |
| Rugengabari                  | 5,032                              | 100   | 41.3        | 0.4                    |        | 0.7     | 17.0     | 1.0            | 37.9                        | 0.0                    | 1.5     | 0.3                        |
| Ruhunde                      | 5,076                              | 100   | 40.3        | 0.3                    |        | 2.3     | 5.0      | 1.0            | 49.7                        | 0.3                    | 0.9     | 0.2                        |
| Rusarabuye                   | 4,870                              | 100   | 70.8        | 0.1                    |        | 0.8     | 9.5      | 0.5            | 16.9                        | 0.0                    | 0.8     | 0.6                        |
| Rwerere                      | 5,101                              | 100   | 59.9        | 0.2                    | 0.0    | 0.7     | 11.9     | 0.3            | 25.9                        | 0.1                    | 0.4     | 0.5                        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In Burera district, the main cooking source of energy used are firewood 93.4% followed by charcoal 3.3% and crop waste at 2.4%. At the sector level, firewood is the most used source of cooking energy by private households in Rugengabari (98.2%), Gitovu (98.1%) and Nemba (97.8%) but almost all sectors are using over 90% of firewood in Burera sectors. Sectors with the Low percentage of private households using firewood as main source of cooking energy is Kinoni (69%) with high percentage use of crop waste of 27%.

#### i) Vulnerability

in Burera district the vulnerability prevalence rate is 3.6%. At sector level, the highest prevalence rates of the resident population are in Rusarabuye (4.7%) and Kinoni (5%) while the lowest is in Cyanika (2.5%) and Kinyababa (3.1%) respectively.

**Table 43: Number and share of persons with vulnerability of Burera District**

| Sectors of residence     | Total resident population | Person with vulnerability |                |                | Prevalence of vulnerability |
|--------------------------|---------------------------|---------------------------|----------------|----------------|-----------------------------|
|                          | Both sexes                | Both sexes                | Male           | Female         | Both sexes                  |
| <b>Rwanda</b>            | <b>11,537,934</b>         | <b>391,775</b>            | <b>174,949</b> | <b>216,826</b> | <b>3.4</b>                  |
| <b>Northern Province</b> | <b>1,788,683</b>          | <b>60,336</b>             | <b>26,348</b>  | <b>33,988</b>  | <b>3.4</b>                  |
| <b>Burera district</b>   | <b>339,737</b>            | <b>12,347</b>             | <b>5,304</b>   | <b>7,043</b>   | <b>3.6</b>                  |
| Bungwe                   | 14,189                    | 629                       | 275            | 354            | 4.4                         |
| Butaro                   | 32,910                    | 1,213                     | 521            | 692            | 3.7                         |
| Cyanika                  | 39,073                    | 980                       | 441            | 539            | 2.5                         |
| Cyeru                    | 12,842                    | 493                       | 209            | 284            | 3.8                         |
| Gahunga                  | 24,947                    | 1,010                     | 427            | 583            | 4                           |
| Gatebe                   | 16,460                    | 586                       | 273            | 313            | 3.6                         |
| Gitovu                   | 10,136                    | 359                       | 147            | 212            | 3.5                         |
| Kagogo                   | 20,206                    | 655                       | 294            | 361            | 3.2                         |
| Kinoni                   | 17,032                    | 850                       | 359            | 491            | 5                           |
| Kinyababa                | 20,716                    | 648                       | 281            | 367            | 3.1                         |
| Kivuye                   | 15,634                    | 598                       | 250            | 348            | 3.8                         |
| Nemba                    | 18,764                    | 704                       | 260            | 444            | 3.8                         |
| Rugarama                 | 24,073                    | 907                       | 386            | 521            | 3.8                         |
| Rugengabari              | 18,289                    | 641                       | 261            | 380            | 3.5                         |
| Ruhunde                  | 17,486                    | 599                       | 275            | 324            | 3.4                         |
| Rusarabuye               | 18,102                    | 845                       | 366            | 479            | 4.7                         |
| Rwerere                  | 18,878                    | 630                       | 279            | 351            | 3.3                         |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

## 4.6 Gicumbi district

### 4.6.1 Physical environment

Gicumbi District is one of the five districts that make up the Northern Province. It is made up of twenty-one (21) administrative sectors a hundred and nine cells (109) and six hundred and thirty (630) villages (Imidugudu). It is bordered by Burera district in the North, Nyagatare, Rwamagana and Gatsibo in the East, Gasabo and Rwamagana in the South and in the West, it borders Gasabo, Burera and Rulindo. The district extends over a total surface area of 829 km<sup>2</sup>.

#### b. Topography

The relief of the district is characterized with steep slopes and a mountainous topography. The plateau is surrounded by steep ravines with small valleys segmented by multiple swamps. It is a succession of steep hills giving rise to multitude of watersheds all converging towards the Great Basin of the Nile. Gicumbi district area is hilly characterized with lateritic soils and granites which leads to high rates of soil erosion during the long and heavy rain. The Eastern part of Gicumbi is not hilly and it is composed of valleys with altitudes ranging from 1,500 and 1,800m. In the Southern part of the district, there is lake Muhazi located at an altitude of 1,500m.

#### c. Climate and Rainfall

Gicumbi district has four seasonal climates: 2 rainy seasons and 2 dry seasons. Ordinary the minor rainy season

begins in September to December and the short dry season extends from January to February while the long rainy season extends from March to May when the long dry seasons begins June to August. The district has a tropical climate with a rainfall ranging between 1200mm and 1500mm; therefore, agriculture is favored by the presence of humid soils

#### **d. Geology and Soils**

Gicumbi district exhibits a complex geological composition. The district's geology is characterized by Precambrian rocks, which are among the oldest rock formations. These rocks primarily consist of granites, gneisses, and schists. The area also features volcanic rocks due to historical volcanic activity in the region, contributing to its diverse geological structure. The presence of these rock types indicates significant tectonic activity and metamorphic processes that have shaped the landscape over millions of years.

Soils are predominantly derived from the weathering of the underlying geological formations. These soils are generally fertile and suitable for agriculture, which is a key activity in the region. The main soil types include:

- **Ferralsols:** These are deeply weathered soils rich in iron and aluminum oxides, giving them a reddish color. They are typically found on hills and highland areas and are good for growing crops like tea and coffee.
- **Andosols:** Found in areas influenced by volcanic activity, these soils are rich in organic matter and nutrients, making them highly fertile and ideal for various crops.
- **Nitisols:** Known for their high clay content and good structure, these soils are also fertile and support intensive agricultural practices, including the cultivation of crops such as maize, beans, and potatoes.

#### **e. Hydrography**

The hydrographic network of the district consists of many rivers and streams. These rivers and streams lie in the plains forming swamp. Such rivers include Mwange, Mulindi, Mutulirwa, Walufu, Muyanaza and Gaseke among others. Hydrography of the district is also characterized by the wetlands of Rugezi and Lake Muhazi whose waters are shared with Burera district in the North and Rwamagana in the eastern region and Gasabo. Gicumbi falls in the catchments of Muvumba and Nyabarongo and 60% of its land area is situated in the degraded Muvumba watershed located in the Kagera sub-basin part, the upstream section of the Nile Basin, with its ultimate outflow into the Mediterranean Sea.

#### **4.6.2 Ecological environment**

Gicumbi district hosts a diverse range of plant and animal species composition due to its varied topography, climate, and hydrological conditions. The district is characterized by high-altitude hills, wetlands, and forested areas, which support a variety of plant and animal species. Below is a detailed description of the fauna and flora of the district.

##### **- Flora of Gicumbi district**

The vegetation cover in Gicumbi is mainly composed of natural forests, agroforestry plantations, and wetlands. The plant species vary depending on the specific ecosystem.

##### **a) Natural forest vegetation**

Although much of the district's original forest cover has been cleared for agriculture, some remaining forest patches host native plant species, including: *Albizia gummifera* (Peacock flower), *Podocarpus falcatus* (East African yellowwood), *Polyscias fulva* (Parasol tree), *Newtonia buchananii* (Forest bean tree), *Maesa lanceolata* (False assegai), *Macaranga kilimandscharica* (Macaranga) and *Hagenia abyssinica* (African redwood).

##### **b) Agroforestry and planted trees**

Due to deforestation, agroforestry practices have been implemented in the district, with commonly planted tree species including: *Grevillea robusta* (Silk oak), *Eucalyptus* spp. (*Eucalyptus* species), *Pinus patula* (Patula pine), and *Markhamia lutea* (Nile tulip tree), *Calliandra calothyrsus* (*Calliandra*)

##### **c) Wetland and riparian vegetation**

Gicumbi has several wetlands that support aquatic plant species, including: *Cyperus papyrus* (*Papyrus*), *Phragmites mauritanus* (Reed grass) and *Typha domingensis* (Cattail), *Echinochloa pyramidalis* (Antelope grass).

##### **d) Grasslands and shrublands**

Outside of forested and wetland areas, grasslands dominate much of the landscape. Dominant species include: *Themeda triandra* (Red oat grass), *Hyparrhenia rufa* (Jaragua grass), *Panicum maximum* (Guinea grass), *Brachiaria* spp. (Signal grass), *Acacia* spp. (*Acacias*) and *Vernonia amygdalina* (Bitter leaf)

#### - Fauna of Gicumbi District

The fauna of Gicumbi consists of mammals, birds, reptiles, amphibians, and insects, adapted to the district's various ecosystems.

##### a) Mammals

Due to deforestation and agricultural expansion, large mammals are less common, but some small to medium-sized species are still found in forest patches and grasslands: *Cercopithecus mitis* (Blue monkey), *Papio anubis* (Olive baboon), *Hystrix cristata* (Crested porcupine), *Canis mesomelas* (Black-backed jackal), *Herpestes ichneumon* (Egyptian mongoose), *Atilax paludinosus* (Marsh mongoose), *Cephalophus harveyi* (Harvey's duiker) *Sylvicapra grimmia* (Common duiker) and *Lepus microtis* (African savanna hare).

##### b) Birds

Birds are the most abundant and diverse wildlife group in Gicumbi, especially in wetlands, forests, and agricultural landscapes. Common bird species include: *Corythornis cristatus* (Malachite kingfisher), *Anas sparsa* (African black duck), *Vanellus armatus* (Blacksmith lapwing), *Phoenicopterus minor* (Lesser flamingo) – Occasional visitor in wetlands, *Tauraco fischeri* (Fischer's turaco), *Bostrychia hagedash* (Hadada ibis), *Haliaeetus vocifer* (African fish eagle), *Cisticola chiniana* (Rattling cisticola), *Colius striatus* (Speckled mousebird) and *Ploceus cucullatus* (Village weaver).

##### c) Reptiles

Gicumbi has a moderate diversity of reptiles, mainly found in wetland areas, forest remnants, and agricultural zones. These include: *Varanus niloticus* (Nile monitor), *Naja nigricollis* (Black-necked spitting cobra), *Bitis arietans* (Puff adder), *Agama agama* (Common agama), *Leptotyphlops scutifrons* (Peter's thread snake), and *Trachylepis striata* (African striped skink).

##### d) Amphibians

Amphibians are common in wetlands, streams, and forested areas, including: *Xenopus laevis* (African clawed frog), *Afraxalus fornasini* (Banana frog), *Hemisus guineensis* (Guinea snout-burrower), *Phrynobatrachus natalensis* (Natal puddle frog) and *Hyperolius viridiflavus* (Striped reed frog)

##### e) Insects and other invertebrates

The district also hosts a variety of invertebrates, including pollinators, decomposers, and aquatic species such as *Apis mellifera* (Honeybee), *Papilio demodocus* (Citrus swallowtail), *Anopheles gambiae* (Malaria mosquito) *Goliathus regius* (Goliath beetle) and *Lethocerus patruelis* (Giant water bug).

#### 4.6.3 Socio-economic environment

##### a) Population

Gicumbi district accounts 448,824 residents which represent 22.0% of the total population of the Northern Province (2,038,511 residents). The population of Gicumbi district is predominantly female: 232,435 are female corresponding to 51.8% of the total population of Gicumbi district. The results in previous table 1.1 indicates that, the population share of Gicumbi district is 3.4% of the total Rwandan population and 22.0% of the total residents of the Northern Province.

Females are predominant in all sectors of Gicumbi district, except Nyankenke sector where females represent 45.4%. The most populated sectors in Gicumbi district are: Byumba sector with 43,134 residents; representing 9.6% of the total population of the district and Rukomo sector with 28,127 residents; representing 6.3% of the total population of the district while the least populated sectors are: Rwamiko with 14,821 residents representing 3.3% of the total population of the district and Rubaya with 12,044 residents; representing 2.7% of the total residents of the district.

**Table 44: Population of Gicumbi District by Sector and sex**

| District and Sector | Frequency  |           |           | Percent    |      |        | Share of the population |
|---------------------|------------|-----------|-----------|------------|------|--------|-------------------------|
|                     | Both sexes | Male      | Female    | Both sexes | Male | Female | Both sexes              |
| Rwanda              | 13,246,394 | 6,429,326 | 6,817,068 | 100        | 48.5 | 51.5   |                         |
| Northern Province   | 2,038,511  | 972,960   | 1,065,551 | 100        | 47.7 | 52.3   |                         |
| Gicumbi district    | 448,824    | 216,389   | 232,435   | 100        | 48.2 | 51.8   | 100.0                   |
| Bukure              | 20,454     | 9,943     | 10,511    | 100        | 48.6 | 51.4   | 4.6                     |

| District and Sector | Frequency  |        |        | Percent    |      |        | Share of the population |
|---------------------|------------|--------|--------|------------|------|--------|-------------------------|
|                     | Both sexes | Male   | Female | Both sexes | Male | Female | Both sexes              |
| Bwisige             | 17,274     | 8,229  | 9,045  | 100        | 47.6 | 52.4   | 3.8                     |
| Byumba              | 43,134     | 20,372 | 22,762 | 100        | 47.2 | 52.8   | 9.6                     |
| Cyumba              | 17,218     | 8,158  | 9,060  | 100        | 47.4 | 52.6   | 3.8                     |
| Giti                | 17,431     | 8,495  | 8,936  | 100        | 48.7 | 51.3   | 3.9                     |
| Kageyo              | 20,888     | 9,887  | 11,001 | 100        | 47.3 | 52.7   | 4.7                     |
| Kaniga              | 16,772     | 8,056  | 8,716  | 100        | 48.0 | 52.0   | 3.7                     |
| Manyagiro           | 22,635     | 10,933 | 11,702 | 100        | 48.3 | 51.7   | 5.0                     |
| Miyove              | 20,223     | 9,510  | 10,713 | 100        | 47.0 | 53.0   | 4.5                     |
| Mukarange           | 18,543     | 8,831  | 9,712  | 100        | 47.6 | 52.4   | 4.1                     |
| Muko                | 20,050     | 9,656  | 10,394 | 100        | 48.2 | 51.8   | 4.5                     |
| Mutete              | 27,517     | 12,960 | 14,557 | 100        | 47.1 | 52.9   | 6.1                     |
| Nyamiyaga           | 20,939     | 10,040 | 10,899 | 100        | 47.9 | 52.1   | 4.7                     |
| Nyankenke           | 27,183     | 14,830 | 12,353 | 100        | 54.6 | 45.4   | 6.1                     |
| Rubaya              | 12,044     | 5,801  | 6,243  | 100        | 48.2 | 51.8   | 2.7                     |
| Rukomo              | 28,127     | 13,486 | 14,641 | 100        | 47.9 | 52.1   | 6.3                     |
| Rushaki             | 15,048     | 7,102  | 7,946  | 100        | 47.2 | 52.8   | 3.4                     |
| Rutare              | 27,837     | 13,371 | 14,466 | 100        | 48.0 | 52.0   | 6.2                     |
| Ruvune              | 21,990     | 10,606 | 11,384 | 100        | 48.2 | 51.8   | 4.9                     |
| Rwamiko             | 14,821     | 7,163  | 7,658  | 100        | 48.3 | 51.7   | 3.3                     |
| Shangasha           | 18,696     | 8,960  | 9,736  | 100        | 47.9 | 52.1   | 4.2                     |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Gicumbi district population is predominantly made of rural residents that represent 93.7% while urban residents represent 7.3%. Almost all sectors of Gicumbi district are entirely rural except Byumba, Kageyo and Rukomo. The district has no sector that is entirely urban.

#### b) Number of households and size of household

The results of 5<sup>th</sup> RPHC 2022 indicate the total 2,024,173 households in Gicumbi District. The average household size in Gicumbi District is 4.1 persons per household. At Sector level, the highest sizes are found in Bukure (4.3), Giti and Mukarange (4.2, each). The smallest household sizes are found in Miyove, Mutete and Ruvune sectors (3.9, each). The results of 5<sup>th</sup> RPHC 2022 revealed that at national level, 28.9% of private households are headed by women. In Gicumbi district, private households headed by females are 26.5%. At sector level, the highest percentages of households headed by women are found in Cyumba (33.2%) and Rubaya (31.0%) while the lowest percentages are found in Ruvune (22.0%) and Bwisige (20.8%).

**Table 45: Number of households and their corresponding population, mean size and sex of household head**

| Sectors                  | Total number of private households | Corresponding Population <sup>1</sup> | Household Size | Percentage      |                   |
|--------------------------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|                          |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| <b>Rwanda</b>            | <b>3,312,743</b>                   | <b>13,100,600</b>                     | <b>4.0</b>     | <b>71.1</b>     | <b>28.9</b>       |
| <b>Northern Province</b> | <b>506,064</b>                     | <b>2,024,173</b>                      | <b>4.0</b>     | <b>73.1</b>     | <b>26.9</b>       |
| <b>Gicumbi</b>           | <b>109,373</b>                     | <b>443,688</b>                        | <b>4.1</b>     | <b>73.5</b>     | <b>26.5</b>       |
| Bukure                   | 4,774                              | 20,420                                | 4.3            | 75.0            | 25.0              |
| Bwisige                  | 4,328                              | 17,271                                | 4.0            | 78.0            | 22.0              |
| Byumba                   | 10,762                             | 42,895                                | 4.0            | 71.4            | 28.6              |
| Cyumba                   | 4,203                              | 17,156                                | 4.1            | 66.8            | 33.2              |
| Giti                     | 4,164                              | 17,427                                | 4.2            | 76.1            | 23.9              |
| Kageyo                   | 4,994                              | 20,773                                | 4.2            | 72.6            | 27.4              |
| Kaniga                   | 4,003                              | 16,734                                | 4.2            | 71.7            | 28.3              |
| Manyagiro                | 5,479                              | 22,616                                | 4.1            | 73.6            | 26.4              |
| Miyove                   | 5,138                              | 20,218                                | 3.9            | 74.3            | 25.7              |
| Mukarange                | 4,431                              | 18,532                                | 4.2            | 74.9            | 25.1              |
| Muko                     | 5,054                              | 20,030                                | 4.0            | 72.4            | 27.6              |
| Mutete                   | 6,990                              | 27,482                                | 3.9            | 71.5            | 28.5              |

| Sectors   | Total number of private households | Corresponding Population <sup>1</sup> | Household Size | Percentage      |                   |
|-----------|------------------------------------|---------------------------------------|----------------|-----------------|-------------------|
|           |                                    |                                       |                | Male Headed HHs | Female Headed HHs |
| Nyamiyaga | 5,056                              | 20,925                                | 4.1            | 74.4            | 25.6              |
| Nyankenke | 5,846                              | 23,132                                | 4.0            | 72.1            | 27.9              |
| Rubaya    | 2,954                              | 12,028                                | 4.1            | 69.0            | 31.0              |
| Rukomo    | 6,921                              | 27,793                                | 4.0            | 75.4            | 24.6              |
| Rushaki   | 3,644                              | 15,010                                | 4.1            | 74.9            | 25.1              |
| Rutare    | 6,904                              | 27,805                                | 4.0            | 72.0            | 28.0              |
| Ruvune    | 5,583                              | 21,981                                | 3.9            | 79.2            | 20.8              |
| Rwamiko   | 3,623                              | 14,793                                | 4.1            | 74.7            | 25.3              |
| Shangasha | 4,522                              | 18,667                                | 4.1            | 75.3            | 24.7              |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

### c) Housing characteristics

In the Northern Province the predominant types of habitats are planned rural settlement (70.5%) and dispersed/isolated housing (22.3%). These types of habitats are also more frequent in Gicumbi district where planned rural settlements represent 54.8% while dispersed/isolated housing represent 39.6%. Across sectors, dispersed/isolated housing units are more frequent in Nyankenke (86.2%) and Rushaki (76.9%) while they are less frequent in Rubaya (5.4%) and Cyumba (10.6%). These last two sectors are on top in having modern rural planned housing with 91.6% and 77.2%: respectively. Modern planned urban housing units are found in Byumba (2.2%) and Kageyo (2.1%) and, represent a negligible share in other sectors having rural areas.

**Table 46: Distribution of households in Gicumbi District by type of habitat and Sector**

| Sectors                  | Total Number Households | Percentage |                                     |                          |                |                            |                |                              |                       |            |
|--------------------------|-------------------------|------------|-------------------------------------|--------------------------|----------------|----------------------------|----------------|------------------------------|-----------------------|------------|
|                          |                         | Total      | Umuugudu (Planned rural settlement) | Integrated model village | Old settlement | Dispersed/isolated housing | Modern planned | Spontaneous/squatter housing | Other type of housing | Not stated |
| <b>Rwanda</b>            | <b>3,312,743</b>        | <b>100</b> | <b>65.4</b>                         | <b>0.8</b>               | <b>2.3</b>     | <b>14.9</b>                | <b>6.9</b>     | <b>8.9</b>                   | <b>0.8</b>            | <b>0.0</b> |
| <b>Northern Province</b> | <b>506,064</b>          | <b>100</b> | <b>70.5</b>                         | <b>0.6</b>               | <b>1.7</b>     | <b>22.3</b>                | <b>0.5</b>     | <b>4.1</b>                   | <b>0.3</b>            | <b>0.0</b> |
| <b>Gicumbi District</b>  | <b>109,373</b>          | <b>100</b> | <b>54.8</b>                         | <b>0.4</b>               | <b>0.5</b>     | <b>39.6</b>                | <b>0.3</b>     | <b>4.0</b>                   | <b>0.4</b>            | <b>0.0</b> |
| Bukure                   | 4,774                   | 100        | 76.0                                | 0.5                      | 0.4            | 20.2                       | 0.0            | 2.7                          | 0.2                   | 0.0        |
| Bwisige                  | 4,328                   | 100        | 68.4                                | 0.3                      | 0.5            | 29.6                       | 0.0            | 1.0                          | 0.2                   | 0.0        |
| Byumba                   | 10,762                  | 100        | 61.9                                | 1.5                      | 2.1            | 28.4                       | 2.2            | 3.7                          | 0.2                   | 0.0        |
| Cyumba                   | 4,203                   | 100        | 77.2                                | 0.0                      | 0.6            | 10.6                       | 0.0            | 11.5                         | 0.0                   | 0.0        |
| Giti                     | 4,164                   | 100        | 75.9                                | 1.1                      | 0.1            | 22.2                       | 0.0            | 0.5                          | 0.1                   | 0.0        |
| Kageyo                   | 4,994                   | 100        | 42.1                                | 0.1                      | 0.3            | 51.3                       | 2.1            | 4.1                          | 0.0                   | 0.0        |
| Kaniga                   | 4,003                   | 100        | 27.5                                | 0.1                      | 1.3            | 64.6                       | 0.0            | 6.5                          | 0.0                   | 0.0        |
| Manyagiro                | 5,479                   | 100        | 61.0                                | 0.1                      | 0.7            | 35.6                       | 0.0            | 2.6                          | 0.0                   | 0.0        |
| Miyove                   | 5,138                   | 100        | 73.9                                | 0.0                      | 0.2            | 25.7                       | 0.0            | 0.2                          | 0.0                   | 0.0        |
| Mukarange                | 4,431                   | 100        | 61.7                                | 0.1                      | 0.0            | 37.0                       | 0.0            | 0.9                          | 0.3                   | 0.0        |
| Muko                     | 5,054                   | 100        | 52.5                                | 0.0                      | 0.5            | 33.0                       | 0.0            | 13.3                         | 0.7                   | 0.0        |
| Mutete                   | 6,990                   | 100        | 43.6                                | 0.1                      | 0.6            | 49.8                       | 0.0            | 4.2                          | 1.7                   | 0.0        |
| Nyamiyaga                | 5,056                   | 100        | 74.4                                | 0.1                      | 0.1            | 24.4                       | 0.0            | 0.9                          | 0.1                   | 0.0        |
| Nyankenke                | 5,846                   | 100        | 13.7                                | 0.1                      | 0.0            | 86.2                       | 0.0            | 0.0                          | 0.0                   | 0.0        |
| Rubaya                   | 2,954                   | 100        | 91.6                                | 1.8                      | 0.0            | 5.4                        | 0.0            | 1.2                          | 0.1                   | 0.0        |
| Rukomo                   | 6,921                   | 100        | 45.0                                | 0.0                      | 0.2            | 52.4                       | 0.0            | 2.2                          | 0.1                   | 0.0        |
| Rushaki                  | 3,644                   | 100        | 14.2                                | 0.1                      | 0.0            | 76.9                       | 0.0            | 8.6                          | 0.1                   | 0.0        |
| Rutare                   | 6,904                   | 100        | 54.8                                | 0.3                      | 0.2            | 34.4                       | 0.0            | 9.9                          | 0.5                   | 0.0        |
| Ruvune                   | 5,583                   | 100        | 50.6                                | 0.3                      | 0.3            | 43.4                       | 0.0            | 4.8                          | 0.5                   | 0.0        |
| Rwamiko                  | 3,623                   | 100        | 48.0                                | 0.4                      | 0.8            | 46.7                       | 0.0            | 1.2                          | 2.9                   | 0.0        |
| Shangasha                | 4,522                   | 100        | 51.1                                | 0.4                      | 0.1            | 46.1                       | 0.0            | 2.3                          | 0.0                   | 0.0        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The type of habitat in Gicumbi district varies according to the area of residence. In both urban and rural areas, the

predominant types are planned rural settlement and dispersed/isolated housing, but with disproportionate shares. In urban areas, planned rural settlements represent 65.4% while in rural areas, they represent 54.1%. Dispersed/isolated housing represent 23.5% in urban areas while they represent 40.7% in rural areas. Spontaneous/squatter housing represent 4.5% in urban areas and 3.9% in rural areas. No modern planned urban housing is observed in rural areas while in urban areas, it represents 4.7%.

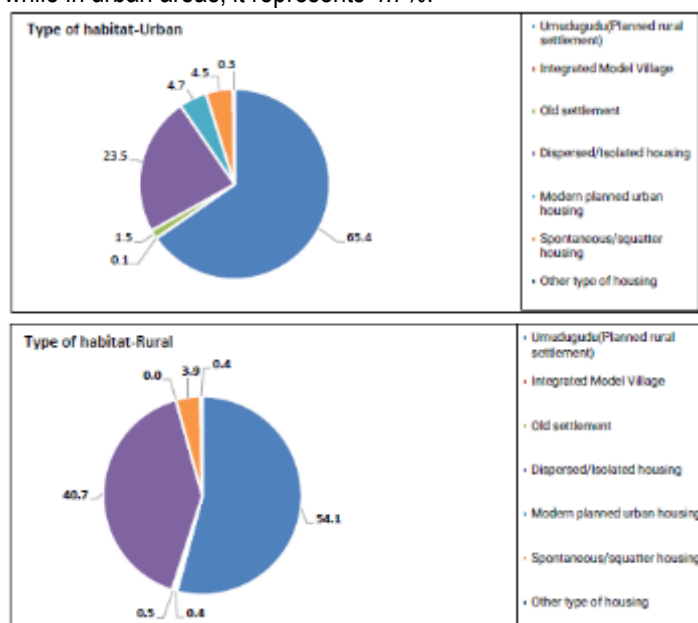


**Table 47: Distribution of households in Gicumbi District by type of habitat and by area of residence.**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### d) Education

In Gicumbi District, 17.7% of the population has never attended school, while 2.5% have attended nursery, and 61.4% have attended primary school. Other education levels include 0.9% for INGOBOKA/Vocational, 9.8% for lower secondary, 5.6% for upper secondary, and 2.1% for university. The distribution of the highest level of education attended varies among sectors, with differences in the percentage of individuals at each education level. For example, Miyove sector has a higher percentage (21.5%) of individuals who have never attended school compared to other sectors, while Byumba has a higher percentage (9.2%) of individuals attended upper secondary school. Each sector has its own unique distribution of education levels attended by the population.

**Table 48: Distribution (of the resident population of Gicumbi district by highest level of school attended**

| Sectors                  | Count         | Percentage |                       |         |         |                     |                 |                 |            |            |
|--------------------------|---------------|------------|-----------------------|---------|---------|---------------------|-----------------|-----------------|------------|------------|
|                          | Total(counts) | Total      | Never attended school | Nursery | Primary | INGOBOKA/Vocational | Lower secondary | Upper secondary | University | Not stated |
| <b>RWANDA</b>            | 11,999,691    | 100        | 16.7                  | 2.7     | 59.5    | 0.8                 | 9.6             | 7.1             | 3.6        | 0.0        |
| <b>Northern Province</b> | 1,847,684     | 100        | 16.0                  | 2.7     | 61.9    | 0.7                 | 9.6             | 6.4             | 2.6        | 0.0        |
| <b>Gicumbi District</b>  | 409,519       | 100        | 17.7                  | 2.5     | 61.4    | 0.9                 | 9.8             | 5.6             | 2.1        | 0.0        |
| Bukure                   | 18,684        | 100        | 18.9                  | 1.9     | 61.3    | 1.4                 | 9.7             | 5.4             | 1.4        | 0.0        |
| Bwisige                  | 15,709        | 100        | 19.2                  | 2.6     | 59.9    | 0.8                 | 11.9            | 4.6             | 1.1        | 0.0        |
| Byumba                   | 39,606        | 100        | 14.1                  | 3.7     | 53.8    | 1.7                 | 11.1            | 9.2             | 6.4        | 0.0        |
| Cyumba                   | 15,651        | 100        | 18.3                  | 2.8     | 60.5    | 0.6                 | 9.6             | 6.1             | 2.0        | 0.0        |
| Giti                     | 15,838        | 100        | 20.5                  | 1.9     | 62.7    | 1.0                 | 8.7             | 4.1             | 1.1        | 0.0        |
| Kageyo                   | 18,770        | 100        | 14.4                  | 2.8     | 62.7    | 1.1                 | 9.5             | 6.5             | 3.0        | 0.0        |
| Kaniga                   | 15,219        | 100        | 17.8                  | 3.6     | 57.9    | 0.6                 | 10.1            | 7.7             | 2.4        | 0.0        |
| Manyagiro                | 20,469        | 100        | 19.6                  | 2.5     | 64.6    | 0.4                 | 7.4             | 4.0             | 1.4        | 0.0        |
| Miyove                   | 18,179        | 100        | 21.5                  | 2.6     | 64.1    | 0.4                 | 6.7             | 3.6             | 0.9        | 0.0        |
| Mukarange                | 16,973        | 100        | 17.6                  | 3.2     | 59.8    | 1.2                 | 10.8            | 6.2             | 1.2        | 0.0        |
| Muko                     | 18,393        | 100        | 19.2                  | 1.2     | 63.7    | 0.7                 | 8.9             | 5.0             | 1.3        | 0.0        |
| Mutete                   | 25,121        | 100        | 16.3                  | 2.4     | 62.7    | 0.9                 | 10.0            | 5.9             | 1.8        | 0.0        |
| Nyamiyaga                | 19,219        | 100        | 18.9                  | 2.1     | 64.6    | 0.4                 | 8.5             | 4.4             | 1.1        | 0.0        |
| Nyankenke                | 25,145        | 100        | 20.5                  | 2.2     | 64.0    | 0.5                 | 7.3             | 3.3             | 2.1        | 0.0        |
| Rukomo                   | 25,528        | 100        | 15.0                  | 2.7     | 60.1    | 1.2                 | 12.2            | 7.0             | 1.7        | 0.0        |
| Rushaki                  | 13,822        | 100        | 18.1                  | 3.1     | 58.9    | 1.1                 | 11.5            | 5.2             | 2.1        | 0.0        |
| Rutare                   | 25,523        | 100        | 18.2                  | 1.9     | 62.0    | 1.0                 | 9.2             | 6.0             | 1.7        | 0.0        |

| Sectors   | Count         | Percentage |                       |         |         |                      |                 |                 |            |            |
|-----------|---------------|------------|-----------------------|---------|---------|----------------------|-----------------|-----------------|------------|------------|
|           | Total(counts) | Total      | Never attended school | Nursery | Primary | INGOBOKA/ Vocational | Lower secondary | Upper secondary | University | Not stated |
| Ruvune    | 20,327        | 100        | 16.5                  | 2.6     | 66.6    | 0.9                  | 8.5             | 3.8             | 1.2        | 0.0        |
| Rwamiko   | 13,426        | 100        | 15.6                  | 1.6     | 63.9    | 1.4                  | 10.2            | 5.2             | 2.2        | 0.0        |
| Shangasha | 16,937        | 100        | 17.3                  | 2.4     | 58.9    | 0.6                  | 13.4            | 6.0             | 1.5        | 0.0        |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### e) Means of livelihoods

. In Gicumbi district, Agricultural households occupy 88.1% with 82.6% of households engaged in crop farming and, 72.3% of households engaged in Livestock husbandry. Most of sectors of Gicumbi district are located in rural areas where the agriculture activities are applied, Muko sector has a high proportion of Households engaged in crop farming (91.6%). Big proportion Households engaged in Livestock husbandry is observed in Ruvune and Muko sectors (83.3% and 82.5%, respectively). Low proportions of households engaged in crop farming and livestock husbandry are observed in Byumba sector (60.5% and 51.8%, respectively).

In Gicumbi district, employment to population ratio is 40.7% and is high in urban areas of the district (45.7%) compared to rural areas (40.4%). The employment to population ratio among males as well as females increases from age group 16-19 to 35-44 and starts decreasing from age group 45-49 to 85 years and above as people starts getting very older and retire. It was observed that in Gicumbi district, the highest employment to population ratio among males stands at 60.6% and was observed in age group 30-34. On the other side, the highest employment to population among females is 45.0% and was observed in the age group of 30-34. The lowest employment to population ratios for both males and females is observed in the oldest age range (85+) with 6.4% and 5.5% for males and females, respectively.

**Table 49: Distribution of household engaged in livestock husbandry in Gicumbi district**

| Sector            | Agricultural households |         |           |      | Households engaged in crop farming |      | Households engaged in Livestock husbandry |      |
|-------------------|-------------------------|---------|-----------|------|------------------------------------|------|-------------------------------------------|------|
|                   | Total Households        | Private | Counts    | %    | Counts                             | %    | Counts                                    | %    |
| Rwanda            | 3,312,743               |         | 2,280,854 | 68.9 | 2,074,928                          | 62.6 | 1,669,273                                 | 50.4 |
| Northern Province | 506,064                 |         | 417,503   | 82.5 | 389,305                            | 76.9 | 327,842                                   | 64.8 |
| Gicumbi District  | 109,373                 |         | 96,339    | 88.1 | 90,295                             | 82.6 | 79,118                                    | 72.3 |
| Bukure            | 4,774                   |         | 4,292     | 89.9 | 3,992                              | 83.6 | 3,608                                     | 75.6 |
| Bwisige           | 4,328                   |         | 3,984     | 92.1 | 3,813                              | 88.1 | 3,413                                     | 78.9 |
| Byumba            | 10,762                  |         | 7,636     | 71.0 | 6,516                              | 60.5 | 5,577                                     | 51.8 |
| Cyumba            | 4,203                   |         | 3,543     | 84.3 | 3,244                              | 77.2 | 2,921                                     | 69.5 |
| Giti              | 4,164                   |         | 3,843     | 92.3 | 3,692                              | 88.7 | 3,310                                     | 79.5 |
| Kageyo            | 4,994                   |         | 4,428     | 88.7 | 4,094                              | 82.0 | 3,598                                     | 72.0 |
| Kaniga            | 4,003                   |         | 3,515     | 87.8 | 3,261                              | 81.5 | 2,720                                     | 67.9 |
| Manyagiro         | 5,479                   |         | 4,850     | 88.5 | 4,499                              | 82.1 | 3,980                                     | 72.6 |
| Miyove            | 5,138                   |         | 4,463     | 86.9 | 4,148                              | 80.7 | 3,446                                     | 67.1 |
| Mukarange         | 4,431                   |         | 4,071     | 91.9 | 3,924                              | 88.6 | 3,261                                     | 73.6 |
| Muko              | 5,054                   |         | 4,785     | 94.7 | 4,629                              | 91.6 | 4,169                                     | 82.5 |
| Mutete            | 6,990                   |         | 6,062     | 86.7 | 5,732                              | 82.0 | 5,043                                     | 72.1 |
| Nyamiyaga         | 5,056                   |         | 4,618     | 91.3 | 4,408                              | 87.2 | 3,829                                     | 75.7 |
| Nyankenke         | 5,846                   |         | 5,352     | 91.5 | 5,051                              | 86.4 | 4,377                                     | 74.9 |
| Rubaya            | 2,954                   |         | 2,572     | 87.1 | 2,295                              | 77.7 | 1,995                                     | 67.5 |
| Rukomo            | 6,921                   |         | 6,286     | 90.8 | 6,001                              | 86.7 | 5,327                                     | 77.0 |
| Rushaki           | 3,644                   |         | 3,334     | 91.5 | 3,239                              | 88.9 | 2,688                                     | 73.8 |
| Rutare            | 6,904                   |         | 6,123     | 88.7 | 5,844                              | 84.6 | 5,027                                     | 72.8 |
| Ruvune            | 5,583                   |         | 5,199     | 93.1 | 4,964                              | 88.9 | 4,650                                     | 83.3 |
| Rwamiko           | 3,623                   |         | 3,242     | 89.5 | 2,961                              | 81.7 | 2,833                                     | 78.2 |
| Shangasha         | 4,522                   |         | 4,141     | 91.6 | 3,988                              | 88.2 | 3,346                                     | 74.0 |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

#### f) Health, Water supply and Sanitation facilities

In Gicumbi District 95.4% are using Mutuelle as main health insurance, 3.5% using RSSB or RAMA, 0.2% using private insurance, 0.0% using school insurance, 0.0% using NGOs insurance and 0.8% using employer insurance.



**Figure 19: Population who have a medical insurance by main type of insurance in Gicumbi District**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In Gicumbi district, 88.4% of private households use improved water sources. At the sector level, the percentage of the private households using water from improved sources is highest in Bukure (96.6%) and Byumba (95.0%), and the lowest is observed in Ruvune (73.4%) and Mukarange (76.3%)

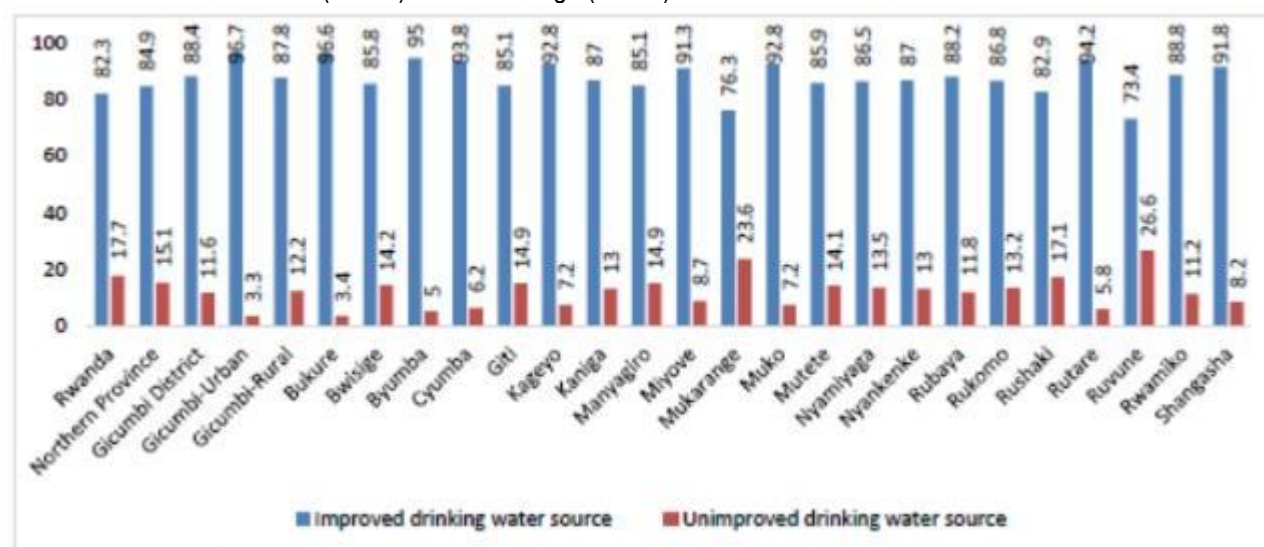


**Figure 20: Percentage of households of Gicumbi District by main source of drinking water**

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

In both urban and rural areas, private households mainly use improved sources of water (96.7% in urban areas and 87.8% in rural). The percentage of private households using unimproved source of water is higher in rural (12.2%) than in urban (3.3%).

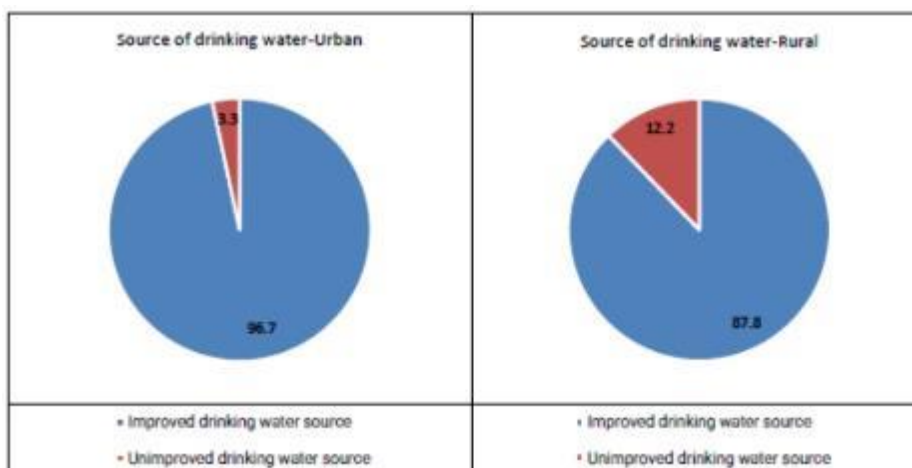


**Figure 21: Distribution of the private households of Gicumbi District by main source of water and by area of**

## residence

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

### g) Appliance and assets ownership

At the district level, 79.6% of private households possess at least radio, 6.0% own at least one television and 1.7% own at least a computer. 59.0% of population aged 10 and above own a mobile phone while 8.1% own a smart phone. Across sector, the percentages of population aged 10 and above owning a mobile phone are high in Byumba and Cyumba sectors (70.9% and 70.1%, respectively) while such percentage is low in Giti sector (47.6%). Ownership of smart phone is high in Byumba (22.7%) and Kageyo (11.1%), and low in Bwisige and Nyamiyaga sectors (4.1%, each). Radio ownership within households is high in Byumba and Cyumba sectors (85.8% and 85.9%, respectively) and low in Giti sector (71.4%). The percentage of households owning at least a computer is high in Byumba sector (7.0%) and low in Bwisige sector (0.5%).

**Table 50: Percentage of private households and of Gicumbi District possessing electrical appliance**

| Sectors and area of residence | Total Number of Private Households | % of HHs owning the specified communication asserts |             |               |              |            |
|-------------------------------|------------------------------------|-----------------------------------------------------|-------------|---------------|--------------|------------|
|                               |                                    | Radio                                               | Television  | Mobile phone2 | Smart Mobile | Computer   |
| <b>Rwanda</b>                 | <b>3,312,743</b>                   | <b>81.5</b>                                         | <b>12.3</b> | <b>78.1</b>   | <b>20.8</b>  | <b>4.2</b> |
| <b>Northern Province</b>      | <b>506,064</b>                     | <b>82.1</b>                                         | <b>7.5</b>  | <b>77.6</b>   | <b>15.3</b>  | <b>2.3</b> |
| <b>Gicumbi District</b>       | <b>109,373</b>                     | <b>79.6</b>                                         | <b>6.0</b>  | <b>74.5</b>   | <b>12.7</b>  | <b>1.7</b> |
| Bukure                        | 4,774                              | 77.8                                                | 5.0         | 73.3          | 11.4         | 1.0        |
| Bwisige                       | 4,328                              | 75.8                                                | 2.9         | 68.7          | 7.1          | 0.5        |
| Byumba                        | 10,762                             | 85.8                                                | 17.6        | 82.8          | 29.8         | 7.0        |
| Cyumba                        | 4,203                              | 85.9                                                | 7.6         | 82.5          | 15.6         | 1.3        |
| Giti                          | 4,164                              | 71.4                                                | 3.4         | 65.6          | 8.0          | 0.9        |
| Kageyo                        | 4,994                              | 77.4                                                | 7.3         | 73.6          | 15.8         | 2.4        |
| Kaniga                        | 4,003                              | 83.3                                                | 6.5         | 79.6          | 15.0         | 1.5        |
| Manyagiro                     | 5,479                              | 78.4                                                | 4.0         | 72.8          | 8.4          | 0.7        |
| Miyove                        | 5,138                              | 77.7                                                | 4.7         | 72.2          | 9.2          | 0.9        |
| Mukarange                     | 4,431                              | 83.6                                                | 4.0         | 78.7          | 11.1         | 0.8        |
| Muko                          | 5,054                              | 77.9                                                | 3.3         | 72.6          | 8.8          | 0.8        |
| Mutete                        | 6,990                              | 81.7                                                | 6.0         | 76.9          | 14.1         | 1.8        |
| Nyamiyaga                     | 5,056                              | 76.3                                                | 3.0         | 68.1          | 7.8          | 0.7        |
| Nyankenke                     | 5,846                              | 82.0                                                | 2.5         | 75.8          | 8.3          | 0.6        |
| Rubaya                        | 2,954                              | 80.6                                                | 4.6         | 76.4          | 11.2         | 0.6        |
| Rukomo                        | 6,921                              | 75.2                                                | 4.8         | 70.1          | 11.1         | 1.3        |
| Rushaki                       | 3,644                              | 82.5                                                | 4.7         | 77.3          | 12.3         | 0.9        |
| Rutare                        | 6,904                              | 78.9                                                | 6.1         | 73.8          | 12.2         | 1.4        |
| Ruvune                        | 5,583                              | 75.6                                                | 3.1         | 68.9          | 8.4          | 0.9        |
| Rwamiko                       | 3,623                              | 78.9                                                | 5.9         | 71.5          | 12.2         | 1.4        |
| Shangasha                     | 4,522                              | 80.5                                                | 4.3         | 76.1          | 9.5          | 0.7        |

Source: Fifth Rwanda Population and Housing Census,2022(NISR)

### h) Access to energy for lighting and cooking

In Gicumbi district, the main source of energy for lighting used by households is electricity (49.1%), followed by flashlight/phone flashlight representing 41.3%. At the sector level, the percentage of households using electricity as the main source for lighting is high in Byumba (64.3) Kaniga (63.5%) and low in Rukomo (40.6%) and Miyove (40.9%). The percentage of households using flashlight/phone flashlight is high in Miyove (54.4%) and low in Byumba (24.1). The sources of energy for lighting in Gicumbi district are mainly electricity, flashlight/phone flashlight and candles. However, the percentages of households using them vary by area of residence. In both urban and rural areas, the most frequently used source of energy for lighting are electricity and flashlights, but with disproportionate shares. In urban areas, the percentage of households using electricity as the main source of lighting is 70.9% while households that use flashlights as the main source of lighting represent 19.6%. In rural areas, in main source of energy for lighting is electricity (93.2%), followed by candles (3.6%) and flashlight/phone flashlight (2.6%). In rural areas, 54.5% of private households use electricity as main source of energy for lighting while 31.8% use flashlight and 9.4% use candles.

**Table 51: Distribution of households of Gicumbi District by main source of energy for lighting**

| Sector and area of residence | Total number of private households | Total      | Electricity | Kerosene/Paraffin lamp | Biogas     | Candles    | Firewood   | Batteries/Bulb | Flashlight/Phone Flashlight | Rechargeable Batteries | Lantern    | Other source of energy |
|------------------------------|------------------------------------|------------|-------------|------------------------|------------|------------|------------|----------------|-----------------------------|------------------------|------------|------------------------|
| <b>Rwanda</b>                | <b>3,312,743</b>                   | <b>100</b> | <b>61.0</b> | <b>0.4</b>             | <b>0.0</b> | <b>2.9</b> | <b>4.2</b> | <b>1.1</b>     | <b>28.4</b>                 | <b>0.1</b>             | <b>1.2</b> | <b>0.5</b>             |
| <b>Northern Province</b>     | <b>506,064</b>                     | <b>100</b> | <b>54.1</b> | <b>0.3</b>             | <b>0.0</b> | <b>3.0</b> | <b>5.0</b> | <b>0.8</b>     | <b>35.3</b>                 | <b>0.1</b>             | <b>0.9</b> | <b>0.4</b>             |
| <b>Gicumbi District</b>      | <b>109,373</b>                     | <b>100</b> | <b>49.1</b> | <b>0.2</b>             | <b>0.0</b> | <b>2.9</b> | <b>3.7</b> | <b>1.4</b>     | <b>41.3</b>                 | <b>0.1</b>             | <b>0.7</b> | <b>0.5</b>             |
| Gicumbi-Urban                | 6,903                              | 100        | 70.9        | 0.2                    | 0.0        | 6.0        | 1.6        | 0.1            | 19.6                        | 0.1                    | 1.2        | 0.2                    |
| Gicumbi-Rural                | 102,470                            | 100        | 47.6        | 0.2                    | 0.0        | 2.7        | 3.8        | 1.5            | 42.8                        | 0.1                    | 0.7        | 0.6                    |
| Bukure                       | 4,774                              | 100        | 52.9        | 0.2                    | 0.0        | 3.0        | 0.7        | 2.8            | 39.3                        | 0.2                    | 0.4        | 0.4                    |
| Bwisige                      | 4,328                              | 100        | 42.8        | 0.2                    | 0.0        | 1.5        | 5.6        | 1.1            | 47.9                        | 0.1                    | 0.4        | 0.4                    |
| Byumba                       | 10,762                             | 100        | 64.3        | 0.3                    | 0.0        | 5.6        | 4.2        | 0.2            | 24.1                        | 0.1                    | 0.9        | 0.3                    |
| Cyumba                       | 4,203                              | 100        | 54.0        | 0.1                    | 0.0        | 2.9        | 4.8        | 0.4            | 36.8                        | 0.0                    | 0.5        | 0.4                    |
| Giti                         | 4,164                              | 100        | 46.1        | 0.1                    | 0.0        | 1.5        | 1.3        | 3.5            | 44.7                        | 0.1                    | 2.3        | 0.4                    |
| Kageyo                       | 4,994                              | 100        | 42.8        | 0.2                    | 0.0        | 5.7        | 5.4        | 1.3            | 42.6                        | 0.2                    | 1.2        | 0.5                    |
| Kaniga                       | 4,003                              | 100        | 63.5        | 0.0                    | 0.0        | 2.2        | 6.8        | 0.6            | 25.4                        | 0.3                    | 0.6        | 0.5                    |
| Manyagiro                    | 5,479                              | 100        | 43.6        | 0.1                    | 0.0        | 2.8        | 5.3        | 2.5            | 44.5                        | 0.1                    | 0.5        | 0.6                    |
| Miyove                       | 5,138                              | 100        | 40.9        | 0.0                    | 0.0        | 0.9        | 2.0        | 1.2            | 54.4                        | 0.1                    | 0.2        | 0.4                    |
| Mukarange                    | 4,431                              | 100        | 46.6        | 0.1                    | 0.0        | 1.8        | 4.4        | 1.3            | 44.5                        | 0.3                    | 0.7        | 0.4                    |
| Muko                         | 5,054                              | 100        | 47.3        | 0.3                    | 0.0        | 1.1        | 1.0        | 1.6            | 47.8                        | 0.1                    | 0.3        | 0.4                    |
| Mutete                       | 6,990                              | 100        | 51.1        | 0.4                    | 0.0        | 3.7        | 2.7        | 0.5            | 40.4                        | 0.2                    | 0.6        | 0.4                    |
| Nyamiyaga                    | 5,056                              | 100        | 48.2        | 0.1                    | 0.0        | 2.2        | 1.6        | 1.5            | 45.3                        | 0.1                    | 0.4        | 0.5                    |
| Nyankenke                    | 5,846                              | 100        | 49.6        | 0.2                    | 0.0        | 2.0        | 3.2        | 2.6            | 40.9                        | 0.1                    | 0.7        | 0.8                    |
| Rubaya                       | 2,954                              | 100        | 50.3        | 0.3                    | 0.0        | 1.4        | 10.7       | 0.9            | 33.4                        | 0.1                    | 0.7        | 2.1                    |
| Rukomo                       | 6,921                              | 100        | 40.6        | 0.1                    | 0.0        | 4.3        | 5.6        | 1.3            | 46.5                        | 0.1                    | 1.0        | 0.4                    |
| Rushaki                      | 3,644                              | 100        | 52.6        | 0.3                    | 0.0        | 1.5        | 2.1        | 0.9            | 41.9                        | 0.1                    | 0.3        | 0.4                    |
| Rutare                       | 6,904                              | 100        | 44.5        | 0.3                    | 0.0        | 2.5        | 1.3        | 1.8            | 48.2                        | 0.1                    | 0.7        | 0.7                    |
| Ruvune                       | 5,583                              | 100        | 43.1        | 0.2                    | 0.0        | 2.6        | 3.5        | 1.7            | 46.9                        | 0.1                    | 0.5        | 1.4                    |
| Rwamiko                      | 3,623                              | 100        | 54.2        | 0.2                    | 0.0        | 1.5        | 0.5        | 1.5            | 41.5                        | 0.1                    | 0.4        | 0.2                    |
| Shangasha                    | 4,522                              | 100        | 44.4        | 1.0                    | 0.0        | 4.0        | 7.6        | 1.3            | 40.1                        | 0.1                    | 1.0        | 0.5                    |

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

At the district level, the main sources of energy for cooking used by the private households is firewood representing 93.5% followed by charcoal (4.3%). Firewood is the main source of energy across all sectors of Gicumbi district where the lowest percentage of households using them as the main source of cooking energy is observed in Byumba (77.4%) and Mutete (89.9). Charcoals are mostly used in Byumba sector (16.8). The shares of other sources of energy for cooking is relatively small. The main sources of energy for cooking used by private households in Gicumbi district vary by area of residence. In Rural areas, private households use mostly firewood (95.3%). In urban areas, private households use mostly firewood (63.2%) and charcoal (28.2%).

#### i) Vulnerability

In Gicumbi district the vulnerability prevalence rate is 3.7%. At sector level, the highest prevalence rates of the resident population are observed in Byumba (5.4%) and Cyumba (4.5%) while the lowest are observed in Nyankenke (2.3%) and Miyove (2.7%).

**Table 52: Number and share of persons with vulnerability of Gicumbi District**

| Sectors of residence     | Total resident population | Person with vulnerability |                |                | Prevalence of vulnerability |
|--------------------------|---------------------------|---------------------------|----------------|----------------|-----------------------------|
|                          | Both sexes                | Both sexes                | Male           | Female         | Both sexes                  |
| <b>Rwanda</b>            | <b>11,537,934</b>         | <b>391,775</b>            | <b>174,949</b> | <b>216,826</b> | <b>3.4</b>                  |
| <b>Northern Province</b> | <b>1,788,683</b>          | <b>60,336</b>             | <b>26,348</b>  | <b>33,988</b>  | <b>3.4</b>                  |
| <b>Gicumbi district</b>  | <b>393,161</b>            | <b>14,397</b>             | <b>6,417</b>   | <b>7,980</b>   | <b>3.7</b>                  |
| Bukure                   | 17,864                    | 723                       | 325            | 398            | 4                           |
| Bwisige                  | 15,186                    | 595                       | 273            | 322            | 3.9                         |
| Byumba                   | 37,656                    | 2,017.00                  | 788            | 1,229.00       | 5.4                         |
| Cyumba                   | 14,953                    | 674                       | 277            | 397            | 4.5                         |
| Giti                     | 15,134                    | 456                       | 234            | 222            | 3                           |
| Kageyo                   | 18,225                    | 751                       | 322            | 429            | 4.1                         |
| Kaniga                   | 14,494                    | 545                       | 252            | 293            | 3.8                         |
| Manyagiro                | 19,647                    | 843                       | 362            | 481            | 4.3                         |

| Sectors of residence | Total resident population | Person with vulnerability |      |        | Prevalence of vulnerability |
|----------------------|---------------------------|---------------------------|------|--------|-----------------------------|
|                      | Both sexes                | Both sexes                | Male | Female | Both sexes                  |
| Miyove               | 17,348                    | 461                       | 202  | 259    | 2.7                         |
| Mukarange            | 16,152                    | 530                       | 235  | 295    | 3.3                         |
| Muko                 | 17,780                    | 524                       | 237  | 287    | 2.9                         |
| Mutete               | 24,073                    | 761                       | 332  | 429    | 3.2                         |
| Nyamiyaga            | 18,482                    | 667                       | 289  | 378    | 3.6                         |
| Nyankenke            | 24,278                    | 552                       | 318  | 234    | 2.3                         |
| Rubaya               | 10,557                    | 446                       | 195  | 251    | 4.2                         |
| Rukomo               | 24,821                    | 861                       | 441  | 420    | 3.5                         |
| Rushaki              | 13,112                    | 379                       | 156  | 223    | 2.9                         |
| Rutare               | 24,439                    | 939                       | 414  | 525    | 3.8                         |
| Ruvune               | 19,544                    | 633                       | 285  | 348    | 3.2                         |
| Rwamiko              | 13,055                    | 562                       | 257  | 305    | 4.3                         |
| Shangasha            | 16,361                    | 478                       | 223  | 255    | 2.9                         |

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

## 5. PUBLIC CONSULTATION AND PARTICIPATION

### 5.1. Overview

Public consultation and stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. Stakeholder engagement is an on-going process that involves the following elements; stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism and on-going reporting to affected communities. Public and stakeholders' consultation and involvement are principal for the successful implementation and management of a project's environmental and social impacts. The stakeholder engagement is conducted with the objective to build a trusting relationship with the affected communities and other interested stakeholders based on a transparent and timely supply of information and open dialogue. The consultation helps also to actively build and maintain productive working relationships, based on principles of transparency, accountability, accuracy, trust, respect and mutual interests with affected communities. In our case consultations were held at the project sites in all districts covering the project area. The purposes of conducting the consultation were :

- To inform local community about the project implementation and prepare them on potential impacts that could be caused by the project and that can affect them;
- To identify alternatives related to the project implementation and build a trusting relationship with the project activities and affected personnel;
- To ensure effective engagement with local communities and key stakeholders throughout all phases of the project;
- To collect relevant and trustworthy information that shall be based on to formulate project impacts and their mitigation measures;
- To actively build and maintain productive working relationships, based on principles of transparency, accountability, accuracy, trust, respect and mutual interests with affected communities and other stakeholders.

### 5.1 Purpose

- To prepare communities on potential impacts that could be caused by the project and can affect the community.
- To build a trusting relationship with the affected communities and other interested stakeholders based on a transparent and timely supply of information and open dialogue.
- To ensure effective engagement with local communities and other key stakeholders throughout all phases of the project.
- To actively build and maintain productive working relationships, based on principles of transparency, accountability, accuracy, trust, respect and mutual interests with affected communities and other stakeholders.

### 5.2 Public participation – methods and process

In compliance with National regulations and international standards, Stakeholder engagement was the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. Stakeholder engagement involved varying degrees, and the following elements were considered: stakeholder analysis and planning, disclosure and dissemination of information, consultation with stakeholders and participation, grievance mechanism, and ongoing reporting to beneficiaries or project Affected Persons.

The combination of both structured and unstructured interviews was used to consult different actors and stakeholders. From the scoping exercise, stakeholders were identified in three categories. (1) First category include project implementing entities, 2) Secondary category of Regulatory agencies, Government Institutions and local authorities, (3) Third category of Potential project beneficiaries. During the Public consultation, the consultant applied different participatory methods, namely; interviews, one-to-one discussions and community meeting and official meetings with stakeholders. Stakeholders meeting was informed on the proposed project and by using the key guiding questionnaires the consultant guided discussions and obtain relevant information on the likely impacts of the project activities. The next table summarizes categories of consulted stakeholders.

Discussions with decision making bodies, key stakeholders, sector institutions and specialist experts were made on the very concepts and nature of the proposed project, giving emphasis on levels of public participation, role of key

stakeholders and joint contributions of these actors to the success of the project. In addition, the scope of the proposed project and possible means of maximizing local communities' social, economic and environmental benefits from the project implementation were underlined. The project is designed as an EPC and affected people have not yet identified for consultation. Thus the consultant consulted sampled members of communities living in different areas where the project will be implemented. Key stakeholders and authorities with whom consultations made at the project study areas were:

Consultative meetings were held in different localities of the project areas of intervention and grouped local population susceptible to benefit or be affected by project implementation. Selection of the areas for interviews were based on the sites to be connected to the electricity and one to one or group interviews with local residents were used. Consultations with REG staff at branches (located in each district) and other authorities at district level were also consulted. the lists of consulted people are presented in Annexes of this report. Local communities of the project sites who will be positively or negatively were provided with relevant and sufficient information on the project prior to its start – up.

**Table 53: Categories of consulted stakeholders at institutional level**

| Category                                             | Institution/desired person                     | Relevance to the project                                                                                                                                                                                                                              | Issue to discuss                                                                                                                                                                                                   |
|------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>National regulatory and standards authorities</b> | Rwanda Environment Management Authority (REMA) | REMA ensures the environmental sustainability of the project. Their role is critical to assess and mitigate environmental impacts, protect biodiversity, and enforce environmental laws to prevent degradation of ecosystems.                         | Environmental and social requirements for the project implementation                                                                                                                                               |
|                                                      | Ministry of Environment (MoE)                  | The ministry sets overarching environmental policies and strategies. Their involvement ensures that the present project aligns with national environmental goals, such as water conservation, climate resilience, and sustainable land use.           | Environment requirements related to the project implementation.                                                                                                                                                    |
|                                                      | Rwanda Land use and Management Authority       | The authority ensures that the present project aligns with national land use plans. It prevents conflicts with existing land uses and ensure that the project supports proper land management and does not infringe on protected or restricted areas. | Land ownership and resettlement impacts.                                                                                                                                                                           |
|                                                      | Rwanda Development Board                       | RDB is responsible for investment promotion and economic development. However, the EIA process was transferred to the authority / One Stop Center- EIA department to fast tracking investments and project certification process.                     | This ESIA process and project clearance                                                                                                                                                                            |
| <b>Local government institutions</b>                 | REG branch managers in each district           | Engineer provides local expertise in terms of electricity supply and availability Their involvement ensures that the project addresses the specific needs of locals                                                                                   | Crop selection, farming practices                                                                                                                                                                                  |
|                                                      | District environment officers                  | The district environment officers ensure that the project complies with local environmental regulations and that any potential negative impacts are mitigated at the district level.                                                                  | Environmental and social monitoring at local level                                                                                                                                                                 |
|                                                      | Sector Land manger                             | At the sector level, the land manager oversees land use and can facilitate coordination between the project and local landholders, ensuring efficient project implementation and legally compliant.                                                   | Land registration, valuation and land ownership                                                                                                                                                                    |
|                                                      | Local community                                | Sampled community members and people living where the project will be implemented local people are the primary beneficiaries of the project .                                                                                                         | Information on the proposed project including scope, coverage, activities and potential environmental and Social impacts; Project appreciation, project proposed mitigation measures, project sustainability, etc. |

### 5.3 Consultations held during the preparation of this ESIA

#### 5.3.1 Consultation with technical, regulator and official at central and local level

In addition to the public consultation meeting, the consultant team conducted one to one interview with different official to discuss the projects and collect their views, concern and recommendation. Consultation conducted also allowed the team to collect different data and information related to the projects like existing laws, standards and policies helped. Below are the key stakeholders consulted.

- Ministry of infrastructure: Environmental and Social Safeguards Specialist for World Bank Funded Projects;
- Ministry of Environment, Water Pollution Control Expert
- Rwanda Environment Management Authority (REMA): In charge of pollution control and in charge of environmental monitoring
- Rwanda Development Board RDB: Environmental Review Specialist.
- EDCL: Project team involved in ESIA and feasibility study for substation upgrade project
- District land officers, District Environmental officers and Districts natural resources offices/directors.

• **Key issues identified during consultations include:**

- Site to store replaced electrical equipment during rehabilitation work.
- Management of electrical and other waste materials that can be generated during construction and operations activities.
- Noise pollution level during construction and operations activities.;
- Sewage system management at proposed sites site;
- Provision of short-term solutions while the project output will not yet achieve;
- Roles and responsibilities in implementation and monitoring of ESMP/RAP;
- Health and safety management during construction and operations activities.

#### 5.3.2 Consultation at community level

At community level, consultative meetings were held in different localities of the project areas of intervention and gathered local population susceptible to benefit or be affected by project activities. Selection of the areas for interviews were based on the sites to be connected. a total number of 156 people were contacted and among them 105 being male (67%) and 51 being female (33%). the lists of consulted people are presented in Annexes of this report. Local communities of the project sites who will be positively or negatively were provided with relevant and sufficient information on the project prior to its start – up. The figure below illustrates some of the consultation held on site during the conduct of the study. The figure below illustrates some of the consultation held on site during the conduct of the study.





**Figure 22: Consultations with local community**

Source: Field Consultation

#### 5.4 Outcomes of consultation

Based on the project extent, consultations were held at different centers making the area of project intervention and the key findings of the consultations are summarized in the table below:

**Table 54: Summary of discussions with stakeholders**

| Discussions/ information                                                                       | Outcomes                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Is the project going to cause physical resettlement                                            | No physical resettlement is expected to be caused by the project. The project aims to connected households to electricity and was designed to pass along the buffer zones of the existing roads located in the project areas. However, some of the properties especially trees and crops may be affected. In that case fair compensation will be provided as the law related to expropriation in public interests. |
| We are noting that the project is very important to us. When can we expect the project t start | The project is expected to start as soon as all approvals are in place including this ESIA study. It is planned that the project starts by mid-June of this year.                                                                                                                                                                                                                                                  |
| Are locals allowed to continue cultivating their land?                                         | People are allowed to continue using their land till they are informed by competent authorities about any new changes. Before construction of new houses in the grouped settlement construction permit must be requested from competent authority                                                                                                                                                                  |
| is there any jo opportunity that we aca expect from project implementation?                    | A number of temporally jobs will be available especially during construction period. Contractor will ensure that locals are prioritized when allocating jobs that don't require specific knowledge. Hover this is not guaranteeing that all local population will be employed by the project during construction works.                                                                                            |
| Will the project destroy houses?                                                               | The project designs were made to pass all along the buffer zones of existing feeder roads of the project areas. Where not possible the MV lines will be passing in agricultural lands and the best options to avoid damage and selecting the shortcut will be applied. no houses are expected to be destroyed due to the project activities. In any case this happens, fair compensation will be made accordingly. |
| Soil erosion and sedimentation.                                                                | In some areas of the project soil erosion may occur and is anticipated especially during rainy season. Maximum effort will be made to avoid soil erosion especially through the application of the developed mitigation measures to avoid soil erosion and degradation.                                                                                                                                            |
| Soil waste generated from the project                                                          | The excavation works will generate waste as construction debris. The soil excavated will be re-used for backfilling the excavated holes. EDCL is experienced in construction of such project. Maximum effort will be made to minimize waste during project implementation                                                                                                                                          |
| who is eligible to be connected?                                                               | Anyone wishing to be connected will have opportunity to have electricity. However, those living in remote areas could not be connected due to some constraints that shall be discussed during project implementation as by regulation only houses within 37m from wooden pole are connected.                                                                                                                       |
| Source of construction materials                                                               | Project don't require a lot of construction materials. However, those required will be outsourced within the project areas and from certified and approved quarries.                                                                                                                                                                                                                                               |
| Will be there any changes related to land use or/ and prohibitions due to the project?         | It is not planned that the project will change the land use of the project areas. However, some crops will not be allowed within the ROW of the electrical line. These are crops of more than 5m of height as per the RURA' s regulation related to the use of right of way.                                                                                                                                       |
| Will be there any land compensation?                                                           | The project will pass nearby the existing roads. For the upgrading the existing routes will be used. hence no compensation for land is expected. However, affected crops will                                                                                                                                                                                                                                      |

| Discussions/ information                                                            | Outcomes                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     | be compensated. An agreement of land lease between EDCL and landowners shall be completed before project starts and a fair compensation of crops and tress will be done.                                                                                                                               |
| Discussion on project impacts (both positive and negative) and mitigation measures. | Project impacts were discussed and are detailed in this report and mitigation measures for negative impacts were discussed. It was noted that positive impacts prime on negative impacts and locals wished the project to speed up and be implemented at least before end of the 2023-2024fiscal year. |

To conclude, most of the people in living in the project areas are very happy to hear about the upcoming project as this will contribute to the development of their living standards. Most of houses of the project area are not connected to the national grid and have been living around neighbours who are connected for long (these are located in neighbouring villages). The positive impacts of the project outweigh the negative impacts and locals wished the project to be implemented as soon as possible while appreciating it.

## 6. PROJECT ALTERNATIVES ANALYSIS

The identification, consideration and analysis of alternatives is an essential component of the impact assessment process, with the primary objective being to determine the best environmental and social option. This section elaborates on the alternatives that have been identified, analyses each, eliminates non-viable alternatives and determines those that can be carried forward into the comparative impact assessment.

### 6.1. Identification of Alternatives

The identification of project alternatives includes the consideration of the proponent's 'preferred option', as detailed in the preliminary route design drawings provided on the maps in annexes of this report. The proposed line routes and ROWs were selected among the various options, based on the softness to satisfy the set criteria. No need to mention that environmental soundness was also equally considered than any other technical or financial considerations when selecting the line routings and ROWs. In selecting the proposed route, the over-riding considerations were:

- the avoidance of environmentally sensitive areas and avoiding passing over houses which shall necessitate houses demolition and hence physical displacement,
- the minimization of the destruction of property,
- easy accesses to construction and operation sites,
- low pollution level by avoiding water sources and marshland's locations
- closer to the settlements to be supplied.

The above aspects are considered, and the alternatives identified for the project are listed and described in Table below:

**Table 55: Description of identified alternatives.**

| No | Alternative considered                 | Description                                                                                                                                                                                                                                                                                                                |
|----|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Preferred Option: Overhead Power Lines | This alternative is as proposed by EDCL, detailed in the preliminary route designs received for the project, involving overhead power lines.                                                                                                                                                                               |
| 2  | No-Go Option                           | This alternative means that no distribution lines are constructed, and the situation remains as it is.                                                                                                                                                                                                                     |
| 3  | Underground Power Lines                | This alternative involves the construction and laying down of distribution lines in the ground.                                                                                                                                                                                                                            |
| 4  | Alternative land use                   | This alternative involves the use of land designated for agriculture to reduce the use of land for residential purpose, this will allow the landowner where the electrical work will pass to avoid disturbance of the construction and residential activities. The project will use the land dedicated to the agriculture. |
| 5  | Construction Methods                   | This alternative involves the implementation of alternative construction methods, as compared to those proposed in alternative 1 or the preferred option.                                                                                                                                                                  |

### 6.2. Analysis of alternatives

The alternatives that have been identified are analysed to determine which are viable alternatives to consider for the project. The analysis of alternatives is detailed in Table below:

**Table 56: Analysis of alternatives**

| No | Alternative                                   | Analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <b>Preferred Option: Overhead Power Lines</b> | EDCL has proposed the construction of overhead power lines as the preferred option. This option remains cost effective and is a well-established method of distributing electricity in rural areas in Rwanda. It is proposed that the specific routes to be used are mostly in the roads reserve, thus significantly reducing the impacts, as well as those resulting from maintaining the RoW when deemed necessary.                                                                                                                                                                                                                                                        |
| 2  | <b>No-Go Option</b>                           | The No-Go option goes against the national development objectives of Rwanda, as related to the increase of access to electricity for citizens. This entails missing all the positive impacts or benefits anticipated from the project such as increased access to reliable and safe electricity network without interruption, temporary and permanent employment opportunity from project implementation etc.                                                                                                                                                                                                                                                                |
| 3  | <b>Underground Power Lines</b>                | In some urban areas, distribution and service lines are typically placed underground, for safety and aesthetic reasons and for smaller voltages. Moreover, the proposed length of the project will make the use of underground lines for the entire length very costly and result in extensive earthworks/trenching along the entire route proposed; this can be 3 times more expensive than overhead lines. Underground cables are also typically damaged through other future activities involving earthworks. The construction and maintenance cost of this alternative is simply too high, and it is thus considered unviable and eliminated from further consideration. |
| 4  | <b>Alternative land</b>                       | This alternative involves the use of land designated for agriculture to reduce the use of land for                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| No | Alternative                                | Analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | use                                        | residential purpose, this will allow the landowner where the electrical work will pass to avoid disturbance of the construction and residential activities. The project will use the land dedicated to the agriculture.                                                                                                                                                                                                                                      |
| 5  | <b>Construction Methods and Techniques</b> | The construction methods and techniques proposed in Alternative 1 involve hand work and have insignificant direct impacts that include but not limited to job opportunities, the use of roads buffers to limit vegetation clearance, income generation, consideration of the overhead line, the use of updated technology etc. The consideration of this separate option is thus unnecessary, as it already falls into the preferred option described above. |

Therefore, based on the proposed project nature, extend and location and based on the social and environmental assessment of the project site, EDCL's preferred alternative is overhead power lines and this option will be implemented with the application of mitigation measures of the anticipated negative issues as detailed in this report.

The project has identified more positive than negative environmental and social impacts. The identified potential impacts to both social and environment have been found to be at an extent that can be avoided, minimized, or compensated when applying the proposed mitigation measures in the Environmental Management Plan and monitoring plan as developed in this report.

## 7. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

This chapter describes the potential impacts that may occur as a result of the construction and operation of the proposed design, supply and installation of new MV and LV lines; design, supply, installation and distribution of transformers for distribution network reinforcement; and upgrading the single lines to three phase's lines. This chapter also contains the measures that will be implemented in order to mitigate these impacts. The assessment of impacts has been conducted against Rwandan requirements and applicable international police and standards especially the World Bank Standards and AIB policies and Standards and policies. The potential significant environmental and social impacts of the electrification project are presented and their level of significance evaluated.

### 7.1. Positive impacts

#### a) Value addition to the agricultural products and More reliable services and facilities

Grinding mills and other machinery which can process agricultural products will be set up, or operate at a cheaper cost. This will provide value addition to the agricultural products produced by the local farmers there by boosting the economy and the farmer's income.

More reliable services and facilities will be available at the Health Centres, Schools, Trading Centres and other related services along the project area. Currently most of these institutions incur a budget constraint for running generators, thereby limiting certain services, for example operating theatres in health centres. The costs of public administration will also significantly reduce. This will increase efficiency and effectiveness which currently to a certain is hampered due to electricity limitations.

##### ✓ Enhancement measures:

- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages;
- Consumers should ensure timely payment of electricity bills.

#### b) Improvement in the standards of living

Standards of living will generally improve within the project area: Positive impacts on health, water sector, education, security, communication and economic activities will be realized. Improved services will bring intrinsic benefits within the population and gradually improve on their quality of life.

#### c) Support to telecommunications infrastructure operations

Telecommunication booster stations in the project areas are mainly operated through diesel generators on 24-hour basis which makes the services they support to be expensive (Community radios, internet cafes as well as phone charging) in this fast growing sector and the generators also contribute to increased GHG emissions. With steady electrical power supply from the national grid, the costs of operations of telecom companies will significantly reduce, as well as availability of mobile communication. This as well impacts on businesses and social services positively.

##### ✓ Enhancement measures:

- Ensure that the distribution lines are maintained periodically to reduce on power shutdowns/shortages that would interfere with telecommunication
- Telecommunication base stations to be of priority as load centres to be connected;

#### d) Improved security

Improvement and extension of the electricity will lead to improved security through better street lighting in the urban areas and their environs which will contribute to security of residents and investments. The planned extension of power will provide security lighting in these establishments such as health centers, police posts, schools and trading centers hence improving the general safety in the areas. Improved security through better street lighting in the semi-urban areas and their environs will contribute to development.

#### e) Creation of employment and better economic livelihood

Creation of employment and better economic livelihood in the project area. During the construction period, employment will be created within the project area. Setting up of small-scale industries such as welding workshops, maize mills, carpentry workshops and other cottage activities will increase leading to further employment after completion of the project. On a short-term, the project will bring about creation of jobs during the construction phase (people in the project areas are likely provide labour force etc.). This impact will benefit the local retail business owners who would mainly benefit from secondary effects of increased incomes and the spending power of construction workers. Employment opportunities will arise and will benefit both the local community, regional and national community during construction, as well as during operations. Creation of job opportunities during project development, construction and operation will

provide a number of employment opportunities for skilled, semi-skilled and unskilled labor. Recruitment of unskilled manual labor should give preference to local people wherever feasible. This impact will be beneficial to both men and women, especially when selling merchandise to workers. From stakeholder comments, some of the benefit to be accrued included:

- Increased radio listening time on account of cheaper electricity as compared to batteries;
- Increased productive hours;
- Eliminate the costs of self- electricity generation by existing commercial and industrial enterprises;

There also positive environmental impacts highlighted by stakeholders. Those include:

- Improved lighting at a cheaper cost, electricity will replace the kerosene lamps that are not only more expensive but also environmentally hazardous;
- The global benefits associated with savings in green house gaseous emissions due to replacement of kerosene and diesel.

✓ **Enhancement measure**

- The community meetings revealed that people are optimistic that the proposed construction works will generate employment opportunities. To prevent conflicts and bad attitudes towards
- The contractors and their workers, it is therefore necessary that the contractors give priority for employment to the local people within the project area with respect to their skills. Workers employed to work at the construction site should be paid in time and issued with appointment letters or signing contracts.

**f) Increased number of households' connectivity**

The project aims to increase the number of households connected to electricity. However, the number of households to be connected is not exhaustive as new connections will be done from new houses being constructed in the project areas. Hence the implementation of the project will lead to the increased number of households connected to the electricity and hence contributing to the achievement of the fixed country's target to get 100% access to electricity to all resident.

**g) Increased public revenues and income**

Revenues shall be collected by both the national and local authorities from the procurement of project construction materials and equipment, new business opportunities emanating from project implementation, employees' salaries, VAT on materials and services, among others.

**7.2. Anticipated project negative impacts during planning and construction.**

The predicted negative impacts for the implementation of the present project were assessed by considering different planned activities and are presented in three main project phases: design and planning phase, construction phase and operation phase. For each negative impact identified, mitigation measures were proposed as described in the next paragraphs of this chapter. The adverse impact will occur later mainly during and after construction and operation phase. For instance, there will be a few activities that include but not limited to excavations, soil disturbance, increased traffic around project sites due to delivery of various project construction materials etc. All these are likely to pollute and degrade the local environment, through mudslides, noise, and dust and air pollution. Potential adverse impacts emanating from the project activities are described in detail here below together with the recommended mitigation measure to avoid or minimize their impacts.

**a) Lack of qualified environmental and social risks management personnel and Instruments**

This ESIA is prepared when the detail design is not yet conducted and there might be changes and addition information once the design is completed. Thus, it is important that resources are allocated for assessment site specific impacts, prepare and implement contractor management Plans. This requires recruitment of requires qualified people at contractor and supervising consultant to ensure that proposed mitigation measures are implemented and monitored.

✓ **Mitigation measures:**

- Recruitment of an environmental and social risk management expert (2) at EPC contractor and Environmental and Social Risk Management Expert in supervising engineer team;
- Preparation of Contractor - Environmental and Social Management Plans including at a minimum: Occupational Health and Safety Plan (a general plan is provided in this ESIA), Worker Code of Conduct, Waste Management Plan, Traffic Management Plan and Site Restoration Plan, waste management plan, traffic management plan

among others

**b) Loss of crops and trees along the Right of Way and at poles foundations**

During line route survey and electrical lines construction, there will be environmental degradation especially destruction of natural vegetation, food, and cash crops. Crops and trees in gardens and woodlots are also likely to be affected during pole installation. The vegetation along the lines is categorized as plantation forests. These are of economic value to the local community.

✓ **Mitigation measures**

- Prepare and implement a resettlement plan once the right of Way is identified;
- Project activities shall be implemented after harvest to avoid crops losses and damages;
- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;
- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.
- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.
- Remove as much vegetation as possible by handheld tools and avoid the use of heavy machinery, especially in sensitive areas.
- Where losses of vegetation/crops are inevitable, compensation measures be instituted;
- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.
- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations
- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sensitive areas.
- Establishment and operationalization of community Grievance Redress Mechanism.
- Reforestation where possible to offset loss of flora and fauna

**c) Disruption of agricultural activities and restriction under electrical Lines/RoW**

The community is mostly involved in crop cultivation and animal rearing at subsistence level. Crops that were observed along the power line routes include maize, cassava, soya beans, sunflower, Sim sim, sweet potatoes, and fruit trees like oranges among others. About 60% of the crops will be cleared to create the RoW, affecting local community food supply and incomes. The crops along the routes were mainly for subsistence use and with only sections of the power line route planted within the 10m RoW to be cleared. Some gardens were observed to be in the road reserve where the RoW has been planned.

❖ **Magnitude**

The magnitude of this impact is considered Moderate.

✓ **Mitigation measures**

- All crops and useful trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;
- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,
- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.

**d) Labor influx/ Labour issues and employee conduct**

A number of workers will be engaged by the contractor to ensure completion of works as per schedule. The workers could come from the project area, neighbouring districts or other areas in the country. Up to 20 personnel will be involved in erection of a single pole, with several others in conductor stringing and installation activities. Working conditions including wages, working hours, provision of PPE, use of child labor, provision of medical care, water and food, provision of sanitary facilities, sexual harassment among workers and to the community, and workers' grievances may arise. Further, cases of drunkenness, robbery and insecurity as well as pressure on existing social infrastructure.

❖ **Magnitude**

The sensitivity of receptors is rated high and magnitude of impact medium.

✓ **Mitigation measures**

- Maximum effort shall be made to recruit locals who return to their home after work;

- The contractor will be required to prepare and implement a code of conduct and each employee will sign it;
- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites
- Development and implementation of a Labor Management Plan
- Undertake training and awareness sessions for workers on SH, SEA, HIV/AIDS, STDs and communicable diseases.
- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;
- All workers to have contracts and time sheets for casual labourers;
- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement
- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;
- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.

#### **e) Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA)**

A number of workers will be engaged by the contractor to ensure completion of works as per schedule. The workers could come from the project area, neighbouring districts or other areas in the country. This might pose risks of sexual harassment among workers and to the community, and workers' grievances may arise. Further, cases of drunkenness, robbery, insecurity, Sexual exploitation, and Gender based violence and pressure on existing social infrastructure.

##### **❖ Magnitude**

The sensitivity of receptors is rated high and magnitude of impact medium.

##### **✓ Mitigation measures**

- Maximum effort shall be made to recruit locals who return to their home after work;
- The contractor will be required to prepare and implement a code of conduct and each employee will sign it;
- Undertake training and awareness sessions for workers on SH, SEA, HIV/AIDS, STDs and communicable diseases.
- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement
- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.
- Work with Existing GBV and **ISANGE ONE STOP CENTRES** program to address GBV and SEA complaints.
- All workers will sign and comply with code of conduct

#### **f) Injuries or fatalities from improper manual handling**

The most common injuries or illnesses connect to similar projects because of manual handling are musculoskeletal disorders in various parts of the body (back, neck, shoulders, or other) and include from sprains and strains to damage to muscles, joints, and vessels. Other injuries include cuts, bruises, lacerations, and fractures due to unexpected events such as accidents caused by manual handling.

##### **❖ Magnitude**

The impact is rated as moderate impacts given that most of the work will be done manually and it can be mitigated if appropriate mitigation measures are implemented.

##### **✓ Mitigation measures:**

- The entire project should be insured;
- The contractor will establish health and safety measures that must be implemented at the project site by all workers;
- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;
- Provide and avail permanent First aid kit at the work site;
- Provide health insurance for all workers as means of health affordability;
- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;
- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;
- The safety plan and measure must be prepared and enforced at the project site;

- Provide sign boards at the project site to prevent accidents and troubles involving site workers.

**g) Possible increases of HIV/AIDS and other communicable diseases**

Risk of increase of HIV/AIDS and other Sexually Transmitted Diseases (STD) due to the increase of people from outside of the project zone may arise among workers. Though there is no workers camp site planned for this project communicable diseases may be anticipated among workers.

❖ **Magnitude:**

The impact is moderate given that contractors will use mainly local workers and no workers camp is planned.

✓ **Mitigation measures**

- Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;
- All project workers shall be regular sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;
- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.
- Contractor to have in place an HIV/AIDS Prevention and Management Policy.
- Sensitize community and schools about construction hazards as well as HIV/AIDS.
- Provide workers with condoms. Free of charge as means of HIV prevention
- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.
- All workers to have access to medical care

**h) Child labor, forced labour and discrimination.**

The present project is planned to be done in compliance with national and international standards in terms of child labor forced labor and discrimination. Therefore, recruitment procedures and minimum working age should be included in Contractor's Environmental and Social Management Plan.

❖ **Magnitude**

The impact is rated as low give national policies especially free education and school feeding which have been proved to be a good way to prevent school dropout and subsequently child labour in recent years. Further its very easy to verify age of workers and only recruit those who are legal age only.

✓ **Mitigation measures**

- Avoid any form of discrimination or exclusion during project activities;
- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;
- Protect workers' rights by providing work contract to every project employee;
- Recruitment of project workers shall be done based on the working age.

**i) Vandalism of construction material**

With the coming of the project, a few infrastructures will be made from metal, steel and concrete. Some people may be involved in vandalism of such equipment's.

✓ **Magnitude:**

The impacts is moderate given that during construction material will be stored in protected areas

✓ **Mitigation measures**

- Sensitization of local communities on the project ownership and protection;
- Use community policing as a means of ascertaining security to avoid vandalism;
- Regulations on penalties to perpetrators convicted of vandalism are necessary;
- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism.

**j) Health and Safety issues**

Accidents including cuts, pricks and bruises; electrocution from naked electrical cables; falling in uncovered manholes and trenches, from raised places and on slippery could occur; Falls when working at heights accidents; could result from lack of supervision and job training, improper handling of machinery and hand tools and inappropriate carrying out of tasks.

✓ **Mitigation measures**

- Additional mitigation measures to the above detailed are:
- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;
- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;
- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;
- Provide workers with appropriate PPE including boots and overalls, safety belts, climbing equipment, insulated gloves etc. call the attention of the operator on the ground before starting the movement; proper locking of the support/implementation of the vehicle with ropes; appropriate locking and stability of the hold of the supports on the ground;
- The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.
- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;
- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;
- Clearly display emergency contacts such as ambulance and police at the construction site;
- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;
- Apply established precautions to prevent electrocution.
- All litter and debris will be picked up and disposed in a designated disposal site to avoid subsequent injuries during and after the construction work is complete;
- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules.

**k) Loss of on Physical and Cultural Resources**

During the consultations with the local community and local leaders, and from high spot surveys, no PCR or sites of cultural or religious importance were identified to fall within the road reserves. However, PCRs above may be encountered in the region or as the distribution line route is surveyed and constructed. Impacts on physic-cultural resources are likely to occur during clearance of right of way and excavations and access to pole sites, and during pole installations and conductor stringing. Maintanace works may have limited impact if any, and will result from clearing of the right of way. These activities may lead to exposure and destruction of cultural artefacts such as pottery, lithic, bones and iron slag among others. An abbreviated chance find procedures was provided in annex 10 of this report to serve as guiding procedures in any case such findings are discovered.

❖ **Magnitude:**

The magnitude of impact is considered minor since excavations will be limited to the pole sites but sensitivity high considering the sacred nature and attachment of communities to PCRs.

✓ **Mitigation measures**

- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.
- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.
- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;
- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district
- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure. A template is attached in annex 10.
- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.
- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.

**l) Loss of vegetation in in the right of way and poles foundations.**

The alignment of the distribution lines will to the most extent be restricted to the road reserve, pathways and agriculture lands/residential lands. Clearance of vegetation will take place along the RoW, access roads to pole sites, at pole sites, and staging areas among others. Crops and trees in gardens and woodlots are also likely to be affected during pole installation. The vegetation along the lines is categorized as plantation forests, Riverine or streamline vegetation, Open grasslands and fallow vegetation. There are also cultivated areas within the road reserves. Vegetation likely to be disturbed during site clearance for RoW include private woodlots, crops, grass and fruit trees along the roads. These are of economic value to the local community.

Other than clearance of trees in the RoW within the road reserve and access to the pole installation and work sites, additional clearance will be required to avoid tall trees falling on the energized lines, that would cut off power supply, cause economic loss and put the public at risk. Similarly, sections through woodland and thickets have to take into account safety of the lines.. Uncontrolled disposal of construction waste may also impact upon vegetation.

#### ❖ **Significance**

The clearance and construction activities will result in a moderate negative impact on vegetation and habitats in the project areas given that sensitive and high value ecosystem will not be affected.

##### ✓ **Mitigation Measures:**

- Tree cutting is unavoidable but will be mitigated through compensation measures which include fair compensation of affected crops and trees;
- Ensure the RoW is restricted as much as possible to the road reserve.
- Ensure that pre-clearance survey is conducted by a qualified environmental officer or botanist.
- The power line RoW to be routed to avoid CFRs (Critical Forest Reserves) and species of conservation concern and commercial value where possible.
- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern
- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;
- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.
- The wetlands, rivers, streams and areas that have surface water should be protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.
- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.
- Reforestation where possible to offset loss of flora and fauna
- Where losses of vegetation/crops are inevitable, compensation measures be provided using full replacement cost.

#### **m) Loss of flora and fauna**

It is well known that transmission lines induce physical hazard to birds and climbing animals. This is likely to be of concern during the operation phase of the project. The impact of a transmission line on fauna is limited taking into consideration that most of the lines will be constructed along the existing roads. Except for birds, most animals are not disturbed by the distribution line.

#### ❖ **Magnitude:**

The magnitude of impacts is moderate given that sensitive and high value ecosystems are avoided and the distribution lines will be installed in either road reserve and in existing settlements.

##### ✓ **Mitigation measures**

- The sites clearance should be only done on an area demarcated for project activities and pre-clearance survey will be conducted.
- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.
- Pits for poles should be covered everyday
- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;
- Limit clearance for installation work and inspection to the necessary extent.
- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited
- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should

be relocated. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away

- Construction workers to be sensitized not to cause harm to wildlife
- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.
- Limit clearance for installation work and inspection to the necessary extent.
- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.
- Reforestation where possible to offset loss of flora and fauna

#### **n) Increased traffic in the project area**

The electrification project will be implemented in remote and rural areas where traffic is not intensive. In different areas only observed traffics are those temporarily from outside the project area transporting harvest, personnel, and other materials. However, during project implementation period, they will be increased of traffic due to moving vehicles transporting project materials and personnel. Therefore, young people may strike or run over by moving vehicles causing minor to major injuries (fractures, wounds) or death, falling from vehicles, causing injuries or death or vehicles may hit people especially children playing in roads.

#### **❖ Impact Magnitude**

The magnitude of the traffic flow impact is anticipated to be Moderate. Other power line routes with low traffic volumes are anticipated to have minor impact magnitude.

#### **✓ Mitigation measures**

- Local traffic police will be involved for traffic monitoring;
- Where possible speed limit and other traffic signs shall be installed especially in project working areas.
- Traffic guides will be employed (flagmen) to control traffic;
- Use of safety signage with labels such as “Men at Work” or “Work in Progress” or “trucks turning”.
- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;
- Project vehicles will give the right of way to the local vehicles in the project area.

#### **o) Impacts on Soil, hydrology, water and ground water**

The works will involve excavations of pole sites and later back filling and if poorly compacted, loose soils may be eroded leading to siltation of natural drainage systems and water courses. The electricity poles will be rammed into the soil a distance of 1.5m and will be held in place, where necessary with concrete. For this reason, impacts will only be limited to the top soils, without significant intrusion to underlying groundwater, bedrock or any geological features. Soils, surface waters and groundwater will be susceptible to contamination from various sources during the poles installation process. The main source of contamination will be from the treated electricity poles which if poorly handled can lead to soil and water contamination. Hazardous materials and wastes include fuels, lubricants, containers and sanitary waste especially at the staging areas along the RoW. The quantity of hazardous materials onsite will be very small so only minor accidental spills might occur. Soil erosion could occur as a result of the removal of vegetation and the disturbance of soils by vehicles or equipment in areas where the distribution lines will transverse, particularly the pole sites. Siting of poles also has to take into consideration local drainage patterns and climate variability, particularly changes in rainfall intensity and the impacts of climate. The poles and distribution networks could be damaged by extreme rainfall events and floods if poorly designed.

#### **❖ Impact magnitude:**

The quantity of hazardous materials onsite will be small so only minor accidental spills could occur, resulting in impacts of minor magnitude

#### **✓ Mitigation measures**

- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;
- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion
- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.
- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;
- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on

raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites. Furthermore, such storage areas should also have secondary containment adequate to hold the contents of any leaking or ruptured containers.

- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground
- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;
- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line
- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;
- Location of staging areas on steep gradients should be avoided to prevent increased erosion.
- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes.

#### **p) Soil erosion**

During the construction works which will also involve clearing of vegetation, excavation works for holes of poles etc. such activities may result in the increased erosion in areas where vegetation has been removed. This could lead to increased sediments deposition in the project areas.

##### **❖ Magnitude:**

The magnitude of impact is moderate given that only limited excavation will be conducted for distribution poles.

##### **✓ Mitigation measures**

- During project works, contractor shall only clear areas earmarked for construction;
- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.
- The excavated soil shall be re-used in backfilling.

#### **q) Poor Solid waste management**

During construction, different types of wastes will be generated at the work sites especially staging areas. There will be remains of conductors, conductor drums, left over insulators and other remains of the materials used in construction. Cardboards and other packaging are also expected. Solid and hazardous waste can cause a number of impacts on the surrounding environment and can cause a health hazard in the area. Except for the hazardous fraction of construction waste, the remaining material is likely to be mainly inert and does not pose a threat to human health or the environment. Proper management of inert wastes is required in order to reduce associated secondary impacts such as resource use and habitat destruction at stockpile areas, or at pole sites where concrete mixing will take place. Wastes will also be generated by workers, considering crews of up to 20 persons will be engaged at each pole site.

##### **❖ Magnitude**

The magnitude of the impact is anticipated to be minor.

##### **✓ Mitigation Measure**

- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;
- Avoid or minimize the generation of waste materials, as far as practicable;
- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;
- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;
- Use only waste handlers licensed by REMA to dispose of hazardous waste.
- Provide adequate sanitary facilities for workers especially at staging areas;
- Provide labelled waste bins at work sites for segregation of waste into biodegradable, non biodegradable and hazardous streams, and dispose appropriately;
- A waste management plan for proper solid waste management.

#### **r) Noise and Vibration pollution**

Noise and vibrations will result from construction works, including excavations, concrete mixing and compaction at pole spots, and from vehicles transporting materials, equipment and workers. The receptors of the noise and vibrations include project site workers, project nearby users and residential nearby areas in the vicinity of the proposed power

distribution line routes.

#### ❖ **Significance**

Noise and vibration can result in significant impacts of variable magnitude where excessive levels are generated that have the potential to result in impacts upon surrounding fauna and human receptors. However, construction activities typically result in temporary and short term duration increases in the noise levels, particularly during the daytime when construction activities tend to peak. Construction crews are likely to be below 20 per pole work station site, with one truck, and in some cases, an excavator may be required.

##### ✓ **Mitigation measures**

- No night-time works will be undertaken.
- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.
- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.
- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).
- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance.
- The noise limits in the World Bank General EHSg will be followed. 55 dB(a) daytime and 45 dB(a) nighttime in residential areas.

#### **s) Impact on Ambient air quality and air pollution**

During construction, the ambient air quality at local receptors may potentially be affected by increased dust, particularly during construction material haulage, vehicle movements on unpaved roads, dust from uncovered stockpiled powdery materials or truckloads, emissions (e.g. NO<sub>x</sub>, SO<sub>x</sub> and CO) and particulates from vehicles, diesel generators, heavy plant and other mechanical equipment. The existing air quality in the project areas is not affected by any forms of industrial pollution except by dust associated with vehicular movements on the unpaved road network. Furthermore, 70% of the unpaved roads in the project area are not so busy to add on the effect of project vehicles and cause significant dust emission. The significance of dust impacts from movement of project vehicles is largely based on the proximity of sensitive receptors to the access roads.

#### ❖ **Impact Magnitude**

Particulate Matter and dust are likely to be a temporary nuisance for the local sensitive receptors; thus the magnitude of the impact will be moderate.

##### ✓ **Mitigation measures**

- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;
- Personal protective equipment like dust masks will be availed to workers whenever needed;
- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;
- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties
- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;
- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;
- All idle equipment or machinery will be turned off to minimize on gaseous emission;
- Wherever possible, transport through densely populated areas should be avoided.

#### **t) Human waste disposal issues**

The construction of the proposed distribution lines will employ over 20 people at each working the construction phase. Sanitary waste will be an issue of concern since most of the workers will be carrying out various activities at the site throughout the day (8.00am-6.00pm). The sensitive receptors are the water sources from which the local community access water e.g. boreholes, unprotected springs, swamps, Lakes, Rivers and streams. Therefore, water sources are of a high value to the community members. If mitigation measures are not put in place indiscriminate disposal of human waste might occur which can culminate into health issues, including outbreak of diseases such as cholera. Poor human

waste disposal will affect the water sources and soil in the project area.

❖ **Magnitude:**

The magnitude of this impact is expected to be moderate since improper human waste disposal may affect water resources in the project area which the community depend on.

✓ **Mitigation measure:**

- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility
- Workers should be made aware of the available sanitary facilities and trained on their use.
- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.
- Ensure that separate toilets are availed for both men and women and they should be well labelled.

u) **Water and soil pollution due to oil spillage**

The expected liquid waste might result from leakages of oil from the transformers during its normal operation or defects. However, this impacts temporally and limited depending on the quality and standards of the transformers to be supplied during the project execution.

✓ **Mitigation measures**

- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;
- Proper maintenance of machinery and equipment is required to avoid leakages;
- Transformers to be supplied must comply with the approved standard;
- The refilling and maintenance should be done with qualified and experienced personnel;

v) **Fall and trip hazards for workers and passers-by during line stringing, mounting of strength electric equipment and Risk of poles failure**

Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure may result in occupational and safety hazards. Thus it is important to protect employees from safety hazards that maybe encountered during erection works and the use of heavy machinery like cranes. All employers involved in pole erection works have complete knowledge of pole election.

❖ **Magnitude**

The impact is rated as substantial given that the project involves

✓ **Mitigation measures**

- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,
- PPE use and safety equipment;
- call the attention of the operator on the ground before starting the movement;
- proper locking of the support/implementation of the vehicle with ropes;
- appropriate locking and stability of the hold of the supports on the ground;
- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;
- Ban on driving under suspended loads;
- adequate stabilization of the crane;
- immediate application of the sling above the center of gravity;
- use of wooden beams to store backup elements or support sections preassembled;
- use of signs and red flags protruding loads into the ends of the poles
- Stringing activity around low- or high-tension wires and other electrical units could be a potential hazard

### 7.3. Negative impacts during Operational Phase and maintenance

a) **Theft of equipment and Vandalism of power distribution infrastructure**

During operation phase vandalism might lead to electrocution but the magnitude of the impact will be minor if the local community are sensitized on the negative effects of stealing and vandalizing electrical installations. Vandalism will also deny the local community the benefits of constant power supply due to the resulting disruptions.

✓ **Magnitude:**

The impact magnitude is rated as substantial given that such vandalism impacts on the benefits of constant electricity

supply, including improved social services and business productivity.

✓ **Mitigation measures:**

- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;
- Workers to be employed on site should be vetted or obtain reference letters by their respective village;
- Contractor to engage a reputable security firm to provide security at sites, storage site, staging areas, and during materials transportation;
- The security firms will be screened and references sought,

**b) Electric and magnetic field**

Electric overhead lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage, distance from the conductors to the ground and the lateral distance from the line to the receptor. Many studies published on occupational exposure to Electro-Magnetic Fields (EMF) have exhibited a few inconsistencies and no clear, convincing evidence exists to show that residential exposures to electric and magnetic fields are a threat to human health. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside the provided meters under the RURA guidelines on right of way.

✓ **Magnitude:**

The impact magnitude is rated substantial given that distribution lines are installed in existing settlement where people are leaving.

✓ **Mitigation Measures:**

- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;
- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;
- Liaise with local authorities to ensure developments are not approved or occur within the right of way.

**c) Risk of bird collision**

Once established, the transmission lines may cause increased risk of collision of birds in flight, however this risk is expected to be minimal as the lines don't pass through any documented important bird areas.

✓ **Mitigation measures**

- Conductors along bird's habitat and in bird's migration areas will run horizontal not vertical.
- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters

**d) Pollution from transformer oil spillages**

There is potential for accidental spillages from transformer oil at any stage of the project cycle that can be a source of concern i.e. during the preparation, construction stage at the equipment storage yard and during the operation phase when maintaining the transformers. This leakage can pollute soils and water sources. Transformers use oil which if not adequately handled might spill making soils, surface waters and groundwater susceptible to contamination during the installation process. Accidental spills can also be experienced when transporting oil to the sites for purposes of filling transformers that may have leaked their oil during transportation, storage, or installation.

❖ **Impact Magnitude**

The magnitude of the impact is considered moderate considering the extent of pollution given the number of transformers to be used, but the sensitivity of receptors medium.

✓ **Mitigation Measure**

- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.
- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.
- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.
- Oil spill kits to be provided for during repair and maintenance of transformers

**b) Fire risk**

The risk of fire outbreaks during bad weather e.g. storms, winds etc cannot be overruled especially if electrical faults occur in the "mini" substations. Also failure to maintain the ROW could cause the overgrowth of nearby trees that could end up crashing on the lines during poor weather and hence cause fire outbreaks of black outs.

✓ **Mitigation measures**

- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.
- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.
- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.
- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.

**a) Vandalism of the electrical cables and other structures**

With the coming of the project, a few infrastructures will be made from metal, steel and concrete. Some people may be involved in vandalism of such equipment's.

❖ **Magnitude**

The impacts is moderate given that during construction material will be stored in protected areas.

✓ **Mitigation measures**

- Sensitization of local communities on the project ownership and protection;
- Use community policing as a means of ascertaining security to avoid vandalism;
- Regulations on penalties to perpetrators convicted of vandalism are necessary;
- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism.

## **7.4. Negative impacts of the decommissioning works**

**a) Waste generation and inappropriate storage of electric equipment's**

The lifespan of the proposed transmission lines is expected to be long. At the end of its lifespan, decommissioning of the project would occur. This is because, as with any project, the facilities, such as poles and cables used in this project will have a lifetime after which they may no longer be cost effective to continue operation. During decommissioning, all transmission line structures, and equipment would be dismantled and removed. The physical removal of the line and poles will be the reversal of the construction process. All areas disturbed by the proposed project would be restored to pre-project conditions and/or to conditions acceptable for environmental protection. Potential environmental impacts caused during decommissioning which will be mitigated as per the provided environmental management and social plan are dust and noise to the surrounding environment and public safety.

✓ **Mitigation measures**

- A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.
- Provide protective equipment to site workers as means of impact prevention.
- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.
- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.
- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.
- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.
- The wooden poles shall be used as source of energy for cooking by local people.
- Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA).

**b) Water and Soil pollution from transformer oil spillages**

There is potential for accidental spillages from transformer oil at any stage of the project cycle that can be a source of concern i.e. during the preparation, construction stage at the equipment storage yard and during the operation phase when maintaining the transformers. This leakage can pollute soils and water sources. Transformers use oil which if not adequately handled might spill making soils, surface waters and groundwater susceptible to contamination during the

installation process. Accidental spills can also be experienced when transporting oil to the sites for purposes of filling transformers that may have leaked their oil during transportation, storage, or installation.

❖ **Impact Magnitude**

The magnitude of the impact is considered moderate considering the extent of pollution given the number of transformers to be used, but the sensitivity of receptors medium.

✓ **Mitigation Measure**

- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.
- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.
- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.
- Oil spill kits to be provided for during repair and maintenance of transformers

**c) Air pollution:**

Decommissioning impacts on air quality will be similar to construction impacts due to the presence of construction vehicles and trucks. This is considered to be a moderate negative impact as a result of localized dust.

❖ **Magnitude**

The impacts magnitude is rated as moderate given that no big demolitions are expected.

✓ **Mitigation measures**

- Personal protective equipment like dust masks will be availed to workers whenever needed;
- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;
- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.
- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties
- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles

## **8. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS**

### **8.1. Environmental and Social Management Plan**

The Environmental and Social Management Plan (ESMP) provides the conditions under which the project must be implemented, upon approval from the Rwanda Development Board (RDB). The provisions of the ESMP must be implemented in final design stages, as well as the construction and operational period of the project. It is thus critical that the provisions of the ESMP be fully implemented to promote positive impacts and avoid significant negative environmental and social impacts. Given that detailed design has not yet been conducted to provide more information, the contractor will be required to use this report and prepare contractor Environmental and Social Management Plan (C-CESMP) for each surveyed line

It is important to note that the provided ESMP is covering the entire project in Northern Province and considering that it will be implemented in the form of EPC Contract (Engineering, Procurement, and Construction) in each district whereby a contractual agreement between REG-EDCL and winning contractor will be made in a form of contractual framework, this will enable the owner to transfer the complete risk of design, procurement, and construction to the contractor. The contractor will be solely responsible for implementing the project and handing it over to the REG in a turnkey condition and covering all project sites in each district. Preliminary design specifications from an environmental and social point of view were taken into consideration in the assessment and compilation of the ESIA, providing input with regards to possible mitigation measures to reduce environmental and social impacts. Among other necessary and important plans that will be prepared by the contractor and approved by the supervising firm will include the Code of conduct for workers, Waste Management Plan, the Occupational Health and Safety plan, Traffic Management Plan, Labor Management Procedures as well as the Stakeholder's Engagement Plan.

The Environmental and Social Management Plan (ESMP) was developed for all project implementing districts as part

of the ESIA report. However, district-specific ESMPs were also prepared. These standalone ESMP for each district are annexed to this report and were developed based on specific bio-physical and socio-economic characteristics of each district project activities such as distance of the lines to be constructed, the estimated number of workers, cost of project materials and associated prices etc.

**Table 57: Environmental and Social Management Plan**

| Activities                                                                                                                   | Description of Potential Impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation                                   | Budget (USD)                                                         |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Design and Construction Phase</b>                                                                                         |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                                                  |                                                                      |
| Environmental and Social risk management                                                                                     | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor Supervising engineer Contractor &supervising firm | (4x800x12) = 38,400 <sup>1</sup><br>(2x800x12) = 19,200 <sup>2</sup> |
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops, crops and trees along the Right of Way and Poles foundations                                          | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works       | REG-EDCL/EPC Contractor and District, Districts                  | 790,800 <sup>3</sup>                                                 |
|                                                                                                                              | PAPs complaints about their crops and trees affected by survey team                                                  | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                  | 30,000                                                               |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW                                             | <ul style="list-style-type: none"> <li>- All crops, and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                  | RAP budget                                                           |

<sup>1</sup> One EPC contractor for two district was consider with two staff (800US\$ man month for 12 months' implementation period

<sup>2</sup> Two staffs are proposed for 12months period and 800US\$ man Month

<sup>3</sup> Estimated based on other projects in eastern province (to be updated and included in RAPs for each district) estimation is done at 2,000 US\$ per 1 km of MV in rural areas

| Activities                                                         | Description of Potential Impacts                                       | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Implementation schedule          | Responsible for implementation                                                             | Budget (USD)                            |
|--------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------|
| Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of vegetation cover in in the right of way and poles foundations. | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Clearing of trees and crops should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | During site clearance            | REG-EDCL/ /District REG-EDCL/ Contractor, Districts                                        | To be included in EPC contract's Budget |
|                                                                    | Loss of flora and fauna species                                        | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities and should be surveyed by a botanist or qualified environmental specialist before clearing to ensure species of conservation importance are protected.;</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The reptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul> | During design and Site clearance | EPC contractor                                                                             | Mobilization and Operational Budget     |
| Recruitment and employment                                         | Labor influx/ Labour issues and employee conduct                       | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 25,000                                  |

| Activities | Description of Potential Impacts                                             | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Implementation schedule | Responsible for implementation                                                                    | Budget (USD)       |
|------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------|--------------------|
|            |                                                                              | <ul style="list-style-type: none"> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;</li> <li>- All workers to have contracts and time sheets for casual labourers;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff</li> </ul>                                                        |                         |                                                                                                   |                    |
|            | Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | <ul style="list-style-type: none"> <li>- Undertake training and awareness sessions for workers on SH, SEA, and GBV</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.</li> <li>- Work with Existing GBV and isange one stop centers program to address GBV and SEA complaints</li> </ul>                                                                                                                                                                                                                             | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center | 10,000             |
|            | Possible increases of HIV/AIDS and other communicable                        | <ul style="list-style-type: none"> <li>- Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;</li> <li>- All project workers shall be regular sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;</li> <li>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.</li> <li>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.</li> <li>- Sensitize community and schools about construction hazards as well as HIV/AIDS.</li> <li>- Provide workers with condoms. Free of charge as means of HIV prevention</li> <li>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.</li> <li>- All workers to have access to medical care</li> </ul> | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,                        | 13,000             |
|            | Child labor, forced labour and discrimination.                               | <ul style="list-style-type: none"> <li>- Avoid any form of discrimination or exclusion during project activities;</li> <li>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;</li> <li>- Protect workers' rights by providing work contract to every project employee;</li> <li>- Recruitment of project workers shall be done based on the working age.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                                        | Operational Budget |

| Activities                                  | Description of Potential Impacts                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible for implementation                 | Budget (USD)                                           |
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| Foundation works, excavation, and trenching | Injuries or fatalities from improper manual handling | <ul style="list-style-type: none"> <li>- The entire project should be insured;</li> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ongoing                 | EPC contractor, Supervising engineer, REG-EDCL | 25,000( thousands five per district)                   |
|                                             | Vandalism of construction material                   | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget                                     |
|                                             | Health and Safety issues                             | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget<br><br>10,000 ( 2,000 per district) |

| Activities | Description of Potential Impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Implementation schedule | Responsible for implementation                 | Budget (USD)        |
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|            | Loss of on Physical and Cultural Resources         | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure";</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget  |
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning".</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ongoing                 | EPC contractor, Supervising engineer           | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces with adequate secondary containment to prevent leakage into the ground. The storage areas and the containers will</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer           | Constriction budget |

| Activities | Description of Potential Impacts | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Implementation schedule | Responsible for implementation       | Budget (USD)        |
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|            |                                  | <ul style="list-style-type: none"> <li>be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> <li>- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes</li> </ul>                                                                                 |                         |                                      |                     |
|            | Increased risks of soil erosion  | <ul style="list-style-type: none"> <li>- During project works, contractor shall only clear areas earmarked for construction;</li> <li>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.</li> <li>- The excavated soil shall be re-used in backfilling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Poor Solid waste management      | <ul style="list-style-type: none"> <li>- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;</li> <li>- Avoid or minimize the generation of waste materials, as far as practicable;</li> <li>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;</li> <li>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;</li> <li>- Use only waste handlers licensed by REMA to dispose of hazardous waste.</li> <li>- Provide adequate sanitary facilities for workers especially at staging areas;</li> <li>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;</li> <li>- Developing a waste management plan</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Noise and Vibration pollution    | <ul style="list-style-type: none"> <li>- No night-time works will be undertaken.</li> <li>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.</li> <li>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.</li> <li>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).</li> <li>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance</li> </ul>                                                                                                                                                                                            | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities                                                                        | Description of Potential Impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Implementation schedule | Responsible for implementation       | Budget (USD)        |
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|                                                                                   | Impact on Ambient air quality and air pollution                                                                           | <ul style="list-style-type: none"> <li>- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;</li> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;</li> <li>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;</li> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|                                                                                   | Human waste disposal issues                                                                                               | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | 5,000               |
|                                                                                   | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refiling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Apply established precautions to prevent electrocution.</li> </ul>                                                                                    | Ongoing                 | EPC contractor, Supervising engineer | Operational budget  |

| Activities                                                                                     | Description of Potential Impacts                                                                                       | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Implementation schedule | Responsible for implementation    | Budget (USD)        |
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|                                                                                                |                                                                                                                        | <ul style="list-style-type: none"> <li>-</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> <li>- More details are included in Occupational health and safety</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                                   |                     |
|                                                                                                | Risk of accidents during lifting equipment to position, erection of poles, stringing and wiring as well as connection. | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL/Contractor and Districts | Construction budget |
| <b>Operational &amp; Maintenance Phase</b>                                                     |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                                   |                     |
| Maintenance of electrical principal equipment and Power Distribution through the proposed line | Theft of equipment and Vandalism of power distribution infrastructure                                                  | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, , staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul>                                                                        | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Health and safety issues due to Electric and magnetic field                                                            | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                                                                                          | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Risk of bird collision                                                                                                 | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Pollution from transformer oil spillages                                                                               | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> </ul> | Ongoing                 | REG-EDCL, District                | Operational Budget  |

| Activities                                                        | Description of Potential Impacts                                                                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Implementation schedule | Responsible for implementation | Budget (USD)           |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|                                                                   |                                                                                                                    | - Oil spill kits to be provided for during repair and maintenance of transformers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                |                        |
|                                                                   | Fire accidents due to inappropriate power usage                                                                    | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul> | Ongoing                 | REG-EDCL, District             | Operational Budget     |
|                                                                   | Vandalism of the electrical cables and other structures                                                            | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL, District             | Operational Budget     |
|                                                                   | Disruption of electrical supply due to encroachment of the RoW and plantation of high trees under electrical lines | <ul style="list-style-type: none"> <li>- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines</li> <li>- Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ongoing                 | REG-EDCL, District             | Operational Budget     |
| <b>Decommissioning Phase</b>                                      |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |                                |                        |
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's                                                 | <ul style="list-style-type: none"> <li>- A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.</li> <li>- Provide protective equipment to site workers as means of impact prevention.</li> <li>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.</li> <li>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |

| Activities | Description of Potential Impacts                        | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Implementation schedule | Responsible for implementation | Budget (USD)           |
|------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|            |                                                         | <ul style="list-style-type: none"> <li>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.</li> <li>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.</li> <li>- The wooden poles shall be used as source of energy for cooking by local people.</li> <li>- Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA).</li> </ul>                                                          |                         |                                |                        |
|            | Water and soil pollution from transformer oil spillages | <ul style="list-style-type: none"> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage or disposal.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during decommissioning.</li> </ul>                                                                                                                                       | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|            | Ambient air pollution                                   | <ul style="list-style-type: none"> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.</li> <li>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles</li> </ul> | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|            | <b>Total budget</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |                                | <b>966,400</b>         |

## 8.2. Environmental and Social Monitoring Plan

The monitoring plan summarizes the surveillance and monitoring activities proposed in the Environmental and Social Management Plan for this project. It also identifies the roles and responsibilities of stakeholders in the implementation as well as the estimated cost of the activities. The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that are effective. Environmental and social monitoring will enable response to the new and developing issues of concern. For this project, the Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractors shall employ an E&S risk management responsible for implementation of social/environmental requirements.

Environmental monitoring is also an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measures, as they are required. It helps to anticipate possible environmental hazards and/or detect unpredicted impacts over time. This environmental monitoring plan will operate through all phases of the project implementation namely the pre-construction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment.

The following aspects will be subject to monitoring:

- Encroachment of sensitive areas
- Vegetation maintenance and rehabilitation around project work sites
- Safety measures at the working areas
- Waste management and handling
- Complaints resolution and safety elements

Monitoring of the plan should be undertaken firstly by the contractors at work sites during construction, under the direction and guidance of the supervisor. The monitoring tools include but are not limited to:

- Sampling and regular testing of selected parameters.
- Selection of environmental parameters at specific locations;
- Visual observations;
- Interviews

Periodic ongoing monitoring will be required during the life of the project and the level can be determined once the project is operational.

It is the responsibility of EDCL and the districts to conduct regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP. The districts through EDCL and MINECOFIN will be responsible for compensation activities of affected trees, and crops and will be responsible to undertake regular internal monitoring of the process.

The implementation of this monitoring plan should be based on direct or indirect indicators of emissions, effluents and resource use and the monitoring frequency should be sufficient enough to provide representative data for the parameter being monitored. The following are key parameters to be monitored during this project implementation:

### 1. Soil erosion monitoring

The excavation of earth for the establishment of poles, will be the responsibility of the Contractor to ensure the implementation and effectiveness of erosion control measures. Focus should be given to work sites where soil is disturbed and its immediate environ as well as along the ROW during and after vegetation clearing.

### 2. Monitoring of vegetation clearance

Unique stands of indigenous trees (if identified within the project areas) should not be removed for the establishment of poles. The Contractor's environmental inspectors should make sure that the unique tree stands if identified should not be removed. Where not possible, these should be relocated to another area referring to the chance findings procedures. In the other case the re-routing of the line should be conducted.

### 3. Monitoring of rehabilitation of work sites

The Contractor's environmental inspector should ensure that areas used as materials storage facilities are

progressively rehabilitated after use. Once a site is rehabilitated it should be “signed off”.

#### 4. Monitoring of accidents and incidents

The contractor will make sure that appropriate signs are posted at appropriate locations/positions to minimize/eliminate risk of work incident and accident. In addition, the contractor should make sure that:

- Measures to create awareness regarding sexually transmitted disease and other contaminating diseases are taken;
- Preventive measures to avoid work accidents in project areas are in place and followed appropriately
- All site workers are insured with mutuelle de sante as means of health affordability.
- Non authorized personnel is entering the working areas especially during the cable stringing works
- Maintain safety records and report incidents in accordance with ESCP.

All districts of the project areas will have overall responsibility to oversee that all environmental measures are put in place and that regulations are enforced. The following parameters could be used as indicators:

- Presence of posted visible signs on poles
- Presence of sanitary facilities at project sites;
- Level of awareness of communities pertaining to dangers/risks associated with power lines;
- Presence of first aid kit at the project working sites and;
- Records on actual accidents associated with the establishment of the transmission and distribution line

#### 5. Monitoring of waste management

The Contractor shall regularly monitor the management of project generated wastes focusing on:

- **Minimizing waste generation:** during site inspections, ensure that efforts are being made to minimize waste generation at all project sites. This includes assessing whether measures for reducing unnecessary material use and waste production are being implemented.
- **Waste segregation, reuse, and recycling:** monitor whether waste is being properly segregated at the source into categories such as biodegradable and non-biodegradable. Evaluate the extent to which materials are being reused or recycled wherever practical. This includes checking the availability and proper use of dedicated recycling facilities.
- **Adherence to the waste management hierarchy:** conduct regular checks to confirm that the waste management hierarchy is being followed. Ensure that waste prevention and minimization are prioritized, followed by reuse, recycling, and recovery before considering treatment and disposal.
- **Containment and appropriate waste management:** inspect construction sites to verify that all generated waste is adequately contained and managed in compliance with site-specific environmental management plans. Ensure no waste is left unattended or disposed of improperly.
- **Sewage disposal:** confirm that sewage from material storage sites is being disposed of appropriately into sealed pit latrines or other approved sanitation systems. Inspect the sanitation systems to ensure they meet regulatory standards and are maintained properly.
- **Availability of solid waste bins:** ensure that solid waste bins are available at all locations, with at least one bin for each category of waste (biodegradable and non-biodegradable). Check the bins for proper use and maintenance.
- **Avoidance of solid waste burning:** monitor sites to ensure that no solid wastes are being burned. Immediate corrective actions should be taken if waste burning is observed.
- **Ponding of water:** check for ponding of water near waste collection or storage areas.. Ensure that any pooling of water is promptly addressed to avoid environmental or health hazards.
- **Compliance with environmental standards:** ensure that all waste management activities comply with applicable environmental laws and regulations. Any non-compliance should be reported and rectified immediately.

**Table 58: Types of wastes to be monitored and their alternative destinations**

| Waste                         | Hazardous waste | Destination                    | Frequency of evacuation |
|-------------------------------|-----------------|--------------------------------|-------------------------|
| Soils and grass from clearing | No              | Will be reused for landscaping | NA                      |

| Waste                                                                                         | Hazardous waste | Destination                                                                                                                                                                                                                                                    | Frequency of evacuation                               |
|-----------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Soils & stones contaminated With dangerous substances such as fuel, engine oil and lubricants | Yes             | Temporarily disposed them to designated areathen or evacuated to the identified local disposal site.                                                                                                                                                           | Weekly                                                |
| Soils & stones not contaminated with dangerous substances                                     | No              | Reused for backfilling and landscaping where applicable                                                                                                                                                                                                        | NA                                                    |
| Mixed construction & clearing waste containing potentially dangerous substances               | Yes             | Temporarily disposed them to designated then or evacuated to the identified local disposal site (approved dumpsite), through an approved waste management company.                                                                                             | Weekly                                                |
| Mixed construction &clearing Waste not containing dangerous substances                        | No              | Reused for backfilling and landscaping where Possible and excess transported to approved dumping sites by the Engineer                                                                                                                                         | NA                                                    |
| Aggregate /concrete / masonry if any,                                                         | No              | Reused as hard core where possible and the excess stockpiled on suitable locations approved by the Engineer                                                                                                                                                    | NA                                                    |
| Timber                                                                                        | No              | Reuse suitable timber and wood for general use on Site or make available to local communities.                                                                                                                                                                 | NA                                                    |
| Metals                                                                                        | Yes             | Temporarily disposed them to designated area then latter given to an authorized person for recycling.                                                                                                                                                          | Before project close as part of general site cleaning |
| Paper / cardboard                                                                             | No              | Dispose to the local disposal or disposed of at licensed landfill facility (no recyclables). Site                                                                                                                                                              | Weekly                                                |
| Plastics including plastic Packaging                                                          | No              | Temporarily disposed them to designated area then r evacuated to the identified local disposal site.                                                                                                                                                           | Weekly                                                |
| Cables                                                                                        | No              | Temporarily disposed them to designated area then or evacuated to the identified local disposal site.                                                                                                                                                          | One at project completion                             |
| Insulation materials                                                                          | No              | Temporarily disposed them to designated area then or evacuated to the identified local disposal site.                                                                                                                                                          | One at project completion                             |
| Food waste                                                                                    | No              | Temporarily disposed them to designated area then or evacuated to the identified local disposal site.                                                                                                                                                          | Twice a week                                          |
| Plastic, glass and aluminium cans                                                             | Yes             | The recyclable material is collected weekly by a licensed contractor and transported to a licensed (authorized by REMA) recycling facility for sorting. Printer cartridges are collected for recycling by the supplier at the time of delivery of new supplies | Weekly                                                |
| Fuel, oil, grease and lubricants from spills.                                                 | Yes             | Any spills have avoided prior to preventing water pollution.<br>In any case of spill, release into a temporary pit far away from the site (away from the river) before being transported to the authorized landfill.                                           | As soon as it happens                                 |

The next table summarizes other item to be monitored as part of the implementation of the overall Environmental and Social Monitoring

**Table 59: Environmental and Social Monitoring Plan to be implemented in each district of the province**

| Environmental items                                                          | Monitoring item                                                                               | Parameter/Indicator                                                                                                 | Frequency                      | Responsible                                   | Budget (USD)                                            |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------|---------------------------------------------------------|
| <b>Pre-construction and project mobilization phase</b>                       |                                                                                               |                                                                                                                     |                                |                                               |                                                         |
| Securing of the RoW                                                          | Fair compensation for affected crops, and trees that will be affected by the project          | Reports for compensation of affected crops and trees                                                                | Once before project activities | Districts/ local Authorities/ property valuer | To be determined under A-RAP for each district          |
|                                                                              | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook<br>Project area                                                                                         | Regular                        | Districts local authorities/ PAPs             | 4,000<br>(for Estimated 50 complaints in each district) |
| <b>Construction phase</b>                                                    |                                                                                               |                                                                                                                     |                                |                                               |                                                         |
| Accidents and incidents                                                      | Number of accidents and incidents                                                             | Incidents and accidents logbook                                                                                     | When deemed necessary          | EDCL /Districts local traffic police          | no cost required for recording                          |
| Noise and vibrations                                                         | Noise and vibrations                                                                          | Noise level (in dB) and vibrations levels                                                                           | during project works           | Contractor/ supervisor                        | 300 for noise measurement in each district              |
| Labor influx                                                                 | Number of workers for the project                                                             | Workers logbook by sex and by area of origin                                                                        | Permanent                      | Contractor                                    | No budget required to register                          |
| Increased traffic in the project area                                        | Availability of traffic management plan                                                       | Availability of traffic management plan                                                                             | Before project start           | Contractor / supervisor                       | Budgeted for under ESMP                                 |
|                                                                              | Number of the traffic accidents                                                               | Report on traffic accidents                                                                                         | Monthly                        | Contractor / supervisor                       | No cost required for recording                          |
|                                                                              | Flagmen at the construction site                                                              | Presence of Flagmen and traffic signals at the site                                                                 | When necessary                 | Contractor / supervisor                       | Under construction budget                               |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                           | Training reports and awareness minutes of SH, SEA and GBV                                                           | During project works           | Contractor / supervisor                       | Under construction budget                               |
|                                                                              |                                                                                               | GBV complaints resolution reports                                                                                   | As appropriate                 | Contractor / supervisor                       | Under construction budget                               |
|                                                                              |                                                                                               | Availability of Code of conduct                                                                                     | Permanent                      | Contractor / supervisor                       | budgeted for under ESMP                                 |
| Air pollution                                                                | Equipment and automobiles in good conditions                                                  | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate                 | Contractor/ traffic police                    | 750 for automobile certification in each district       |
| Soil erosion                                                                 | Presence of soil erosion barriers at the project sites                                        | Soil erosion and Turbidity in storm water                                                                           | Daily                          | EDCL/ Districts                               | 200 for each district                                   |

| Environmental items                        | Monitoring item                                                                     | Parameter/Indicator                                                          | Frequency                    | Responsible                                                  | Budget (USD)                                                                    |
|--------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|
| Soil Waste                                 | Proper management of excavated soil and other soil waste generated from the project | Re- used excavated soil                                                      | regular                      | EDCL/ Districts                                              | No cost is required                                                             |
| Fauna and flora removal                    | Reforestation where possible to offset loss of flora and fauna                      | Restored area                                                                | After project implementation | Locals authorities /local /EDCL/ Districts                   | cost for restauration to be included in project construction budget             |
| Working conditions                         | Occupational health and Safety                                                      | Availability at site of OHS Plan                                             | Permanent                    | EDCL/ Districts                                              | Cost covered during the preparation of OHS plan                                 |
|                                            | Awareness on social, health and safety                                              | Number of awareness conducted                                                | Daily                        | EDCL/ districts                                              | 5,000 for MoU signed between each district hospital                             |
|                                            | Incidents and accidents at the project site                                         | Presence of warning and reminding signposts at the site                      | daily                        | Districts/ EDCL                                              | Cost for sign post covered under construction budget                            |
|                                            | Personal Protective Equipment (PPEs)                                                | Number of workers with PPEs                                                  | daily                        | EDCL/ Districts district / workers                           | 40 USD to cater for overall PPE for each staff in each district                 |
| HIV/ AIDS and other contaminating diseases | Health and sanitation plan for workers                                              | Presence of sanitation facilities at project sites such as toilets and water | regular                      | EDCL/ DISTRICTS District                                     | 300 to cater for sanitation facilities in each district                         |
| Child and forced labor                     | Minimum working age and working condition                                           | Employment record by age                                                     | regular                      | EDCL /Local authorities/ project workers/ local population   | No cost is required                                                             |
| Tree removal (deforestation)               | Areas of the project with cleared trees                                             | Number of trees removed at by district                                       | Once                         | EDCL / Contractor/ Districts                                 | 500                                                                             |
| <b>Operation phase</b>                     |                                                                                     |                                                                              |                              |                                                              |                                                                                 |
| Effects from electrocution                 | Presence of warning signs and anti-climbing barbed wire                             | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables        | Regular                      | EDCL/ Districts district/ local authorities/ local residents | Continuous: To be included under line RED-EDCL operation and Maintenance budget |
| Degraded sites by the project activities   | Rehabilitated areas after project activities                                        | Areas rehabilitated after project works                                      | Once                         | Contractors/ EDCL                                            | 2,000                                                                           |

| Environmental items | Monitoring item | Parameter/Indicator | Frequency | Responsible | Budget (USD) |
|---------------------|-----------------|---------------------|-----------|-------------|--------------|
| TOTAL               |                 |                     |           |             | 13,090       |

### **8.3. Implementation arrangement and responsibilities**

#### **8.3.1. Overall implementation responsibility**

The overall responsibility of implementation of this ESMP is under Contractor who will be in charge of the line's constructions in different districts of the northern Province. Districts will designate a staff in charge of Environmental and Social safeguard who will be responsible for addressing environmental and social issues on a routine basis. The staff will have an oversight of environmental aspects of the construction contracts, including the enforcement of monitoring provisions.

The contractor will also have an Environmental Health and Safety officer to oversee the implementation of project during construction phase. The main duties of the designated Environmental and social staffs will include but not limited to:

- Have an insight on the designs and ensure they adhere to the environmental and social specifications and the requirements of the Environmental and Social Management Plan (ESMP).
- Co-ordinate and liaise with government institutions on environmental and social issues and obtaining the necessary clearances from the regulatory authorities.
- Collect and dissemination of relevant environmental documents

#### **8.3.2. Roles and responsibilities of EDCL**

EDCL as the proponent of the project, is responsible for the effective implementation of the project, in compliance with all approvals. EDCL must ensure compliance with the conditions inherent to the ESMP approval by RDB. EDCL shall therefore be the entity responsible for monitoring the implementation of the ESMP and compliance with the RDB Certificate of approval. However, EDCL will appoint a construction Contractor, who will be responsible for implementing the proposed construction power lines and hence implement the proposed mitigation measures documented in this ESMP. EDCL should also appoint an Environmental Supervising Consultant to monitor and report on compliance with ESMP, as has been elaborated upon below.

EDCL's Environmental Specialist shall be the responsible for ensuring that the provisions of this ESMP, as well as the Certificate of Approval once/if issued by RDB, are complied with during the planning, construction and operation phase. The staff will be responsible for issuing instructions to the Contractor where environmental and social considerations call for action. The EDCL Environmental Specialist and/or appointed E&S Supervising Consultant/s will be responsible for the monitoring, reviewing and verifying of compliance with the ESMP and conditions of the Certificate of Approval by the Contractor. The EDCL Environmental Specialist and/or appointed E&S Supervising Consultant/s must be fully conversant with the ESMP and Certificate of Approval (once considered and issued) for the proposed construction of the distribution line and ensure compliance with all relevant national environmental legislation and international good practices.

#### **8.3.3. Roles of the project coordination Unit**

The project coordination Unit shall be responsible for oversight role and the implementation of mitigation measures in this ESMP and general compliance of the project with any permits, licenses and Approval Conditions and related regulations and standards on environment. The Unit will be responsible for ensuring that, the project facilities comply with the environmental and social requirements as shall be detailed in the contract documents as well as with other guiding contractual provisions and documentations.

#### **8.3.4. Roles of contractors**

Contractors will be responsible for complying with all relevant legislation and adhere to all mitigation measures specified in this ESIA and its ESMP. EDCL will therefore have to ensure enforcement of mitigation measures which will be enshrined under contractual obligations. The contractors will be obliged to have resources to ensure implementation of environmental and social management obligations in the contract (this ESMP shall be part of the Contract through hiring Environmental and Social Management Specialists to operationalize the environmental and social requirements in the ESMP and supporting documentation.

#### **8.3.5. Roles of supervising consultants**

The Supervising Consultants should have in their teams at least Environment and Social Management Specialist who will have overall responsibility of ensuring that, project implementation process complies with this ESMP, RDB's approval conditions as well as contract provisions. The Environmental and Social Risk Management Specialists shall work closely with EDCL Environmental and Social Risk Management Team in supervising the contractor. In addition,

the contractors will conduct scheduled site supervisions to monitor state of environmental compliance as documented or executed by the Contractors' Environmentalists. The Supervising Consultants will have obligation to also oversee compliance and observation of health and safety and labor requirements alongside other cross-cutting issues in the project, review contractors' plans: CESMP, OHP, Waste Management, Traffic Management, etc.

#### **8.3.6. Roles of MININFRA**

The Ministry of Infrastructures which is the ministry in charge of energy sector will be the project executing Ministry with the key role of developing and maintaining sustainable power generation and distribution facilities. It has also a big role in coordinating key stakeholders involved in electrical energy transmission and distribution and in general develop policies and guidelines and laws related to energy generation and distribution.

#### **8.3.7. Roles of MINALOC**

Under the framework of decentralization, MINALOC oversees the implementation of the decentralization process as well as relevant community and social protection programs. This Ministry is also responsible for environment governance and therefore for mobilizing the public to participate in the management and protection of natural resources. Via districts, MINALOC will oversee if and ensure that the project aims at the local development and that is implemented with zero or less harm to the local community

#### **8.3.8. Roles of REMA**

REMA as a lead agency responsible for the protection of the environment in Rwanda. REMA will undertake environmental audits to ensure that the project proponent enforces the ESMP and other environmental regulations. REMA will also conduct monitoring visits to verify if there are any emerging environmental issues arising from the projects activities that were not anticipated by the ESMP.

#### **8.3.9. Roles of districts and other local authorities**

During construction of the project, districts will be in position to undertake visits to assess compliance with the ESMP through a district environmental officer. The local authorities will also ensure that the development is in line with the proposed country development plan and the district's goals. They will also play a role of approving the valuation forms and ensuring that documentation in regard to the development are all in order. The district shall have a key in assisting the contractors through census, public consultation in relation to crops and trees inventory etc.

#### **8.3.10. Roles of local communities**

The local communities play an important role in the project implementation phases. During the ground-truthing of the final designs, Project Affected Persons (PAPs) can give further input into the specific placement of poles and the proposed route, where it affects them directly. Woodlots and crops that are damaged and/or lost due to the project must be dealt with. Local communities also have an important role to play in compliance monitoring, to make sure to report any non-compliance issues or concerns to the Local Grievance Redress Committee, E&S Supervising Consultant, EDCL, REMA and/or the WB.

#### **8.3.11. Roles of other key stakeholders**

Other key stakeholders relevant for the monitoring of health, welfare and education all play an important role of keeping watch on the project, to all contribute in meaningful ways to the monitoring of the impacts, as well as engaging fully with key issues, to better manage undesirable consequences resulting from infrastructure projects throughout Rwanda.

### **8.4. Grievance Redress Mechanism (GRM)**

The implementation the present project will involve limited land acquisition, recruitment of workers and will affect some crops and trees privately owned by local people. Both land acquisition and use of workers are associated with potential grievances for both the community, project affected people and workers. In compliance with ESS2, ESS5 and ESS 10 as well as the Rwanda Expropriation law and labour law, REG-EDCL is required to establish, implement and monitor Grievance Redress Mechanism (GRM) for this project implementation. The GRM will help the project implementing entity to manage all kind of grievances raised by all stakeholders including a workers' GRM under ESS 2 and a community GRM for PAPs under ESS5 as well as while GBV related complaints that will be managed through existing mechanism such as GBV taskforce and existing Isange one stop center establish in each district.

The GRM will enable REG-EDCL and both districts of the intervention to address any grievances against the Project. The establishment of project level Grievance Redress (GR) will integrate with existing GR structures in the respective communities and the implementing agencies; and maintained and strengthened throughout the project lifecycle. The

GRM will be closely monitored and reported throughout the project life cycle.

Grievances raised by stakeholders need to be managed through a transparent process, readily acceptable to all segments of affected communities and other stakeholders, at no cost and without retribution. The grievance mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both a proponent/operator and external stakeholders. The mechanism must not impede access to other judicial or administrative remedies.

#### 8.4.1. Objectives of GRM

The main objectives of establishment of GRM within the project implementation are:

- a) **Prompt and fair resolution:** the GRM aims to resolve complaints and concerns efficiently, fairly, and in a timely manner. This ensures that legitimate grievances are addressed and resolved during project implementation.
- b) **Accessibility and inclusiveness:** the mechanism is designed to be easily accessible to all stakeholders, ensuring that everyone affected by the project has an opportunity to raise concerns.
- c) **Minimization of project disruptions:** by addressing grievances early and effectively, the GRM helps prevent interruptions in the project timeline, such as work stoppages, protests, or legal battles, which could delay project completion.
- d) **Continuous improvement:** a well-functioning GRM provides feedback to project implementers, helping them identify areas where improvements are needed. This helps improve the overall quality of project management and implementation.
- e) **Compliance and monitoring:** It ensures that the project complies with national laws, donor requirements, and environmental and social standards. The GRM also helps in monitoring the project's impact on the community and its surroundings.

For the present project, it is proposed to have (i) community grievance redress mechanism that focuses on grievances associated with land acquisition and compensation process, (ii) worker's grievances redress mechanism, and (iii) Grievance redress mechanism for GBV and Sexual Exploitation that will be addressed through existing mechanism.

#### 8.4.2. Community level Grievance Redress Mechanism

The project grievance mechanism will not impede workers or project affected people's access to the legal system. Local communities have existing traditional and cultural grievance redress mechanisms (Abunzi committees) established and regulated by law no 37/2016 of 08/09/2016 determining organization, jurisdiction, and competence and functioning of Abunzi committee (adjudication/mediation committees). These are established at cell and sector levels to solve community-based conflicts and grievances their regulatory body being the ministry of Justice. This mechanism cannot be overlooked by the project. The population can choose to use this channel instead of the project grievance mechanism. The escalation at this level leads to the court process. At any time, the complainant may take the matter to the appropriate legal or judicial authority. The traditional and cultural grievance redress mechanisms can also be used to resolve some project related disputes at the community level, of course with some degree of involvement and support from local leaders, the contractor(s), and project representatives at local level. However, this method cannot handicap the establishment of the GRM at project level.

To support the existing structure and in compliance with expropriation law and the World Bank ESS5, and ESS10 it proposed to establish community grievance redress mechanism which will include a Grievance redress committee at cell level/ site level and an appeal committee at the Sector level. At these levels, potential members of GRC include but not limited to:

- The President of the committee, a community member of affected people residing in the concerned area and preferably, affected by the project,
- The Vice President, also a community member residing in the concerned area and preferably, affected by the project,
- A woman representative, also a community member residing in the concerned area and preferably, affected by the project,
- Vulnerable group representative (if any);
- Village leader for the cell level committee
- A representative of Village leaders (if it is at sector level) and the Executive Secretary of the Cell;
- A representative of the Executive Secretaries of Cells (at Sector level)
- One District official. Cell leaders and the Executive Secretary of the Sector (if it is at the Sector);
- Project representative
- Contractor and supervising firm representative;

Roles and responsibilities of these members are summarized in the next table below:

**Table 60: Proposed Members of GRC and their roles under project.**

| No | Member of GRC                       | Roles and responsibilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | PAPs representative                 | <ul style="list-style-type: none"> <li>- Chairing meetings;</li> <li>- Give direction on how received grievances will be processed;</li> <li>- Assign organizational responsibility for proposing a response;</li> <li>- Referring cases to next level;</li> <li>- Speaks on behalf of GRC and s/he is the one to report to the cell or the sector administration level;</li> <li>- Represents the interests of aggrieved parties;</li> <li>- Give feedback on the efficiency of GRM.</li> </ul>                                                                                                   |
| 2  | Local administration representative | <ul style="list-style-type: none"> <li>- Proposes responses to grievances and lead in resolving community grievance</li> <li>- Records and reports all grievances received from village leaders;</li> <li>- Chairs sensitization meeting at the cell level during public consultations meetings;</li> <li>- Assists and guides in identifying vulnerable and disadvantaged groups within the cell;</li> <li>- Signs the valuations sheets for compensation facilitate a proper Resettlement Plan.</li> </ul>                                                                                       |
| 3  | Women and youth representatives     | <ul style="list-style-type: none"> <li>- Represent the interests of women and youth;</li> <li>- Advocate for equity and equal opportunities;</li> <li>- Help in prevention of sexual harassment and promote wellbeing of the women and youth</li> <li>- Take part in resolution of any grievance related to sexual harassment and any gender domestic violence that may arise;</li> <li>- Mobilize women and youth to be active in income generating activities specifically for opportunities in the project's areas of intervention.</li> </ul>                                                  |
| 4  | Contractor representative           | <ul style="list-style-type: none"> <li>- Receive and log complaints/grievances, note date and time, contact details, nature of complaint and inform complainant of when to expect response;</li> <li>- Handle complaints revolved around nuisance resulted from construction and endeavour to handle them satisfactory;</li> <li>- Inform engineer (supervisor) and GRC of received complaints/grievances and outcomes and forward unresolved complaints/grievance to GRC;</li> <li>- Attend community meetings, respond and react to PAPs complaints raised concerning the contractor.</li> </ul> |
| 5  | Supervising firm representative     | <ul style="list-style-type: none"> <li>- Represent client (REG-EDCL);</li> <li>- Ensure that all grievances raised have been responded to, and that the contractor responds to the complaints raised concerning them;</li> <li>- Attend community meetings and respond to all concerns related to project from community;</li> <li>- Report on monthly basis the progress of GRM process.</li> </ul>                                                                                                                                                                                               |

It is expected that all grievance or dispute issues pertaining to the project will be resolved at cell and Sector level committees. Issues that will not be resolved at the level of these committees will be taken to the higher Project Coordination Unit and district management. However, the mechanism will not prevent unsatisfied complainants to resort to the Rwandan judiciary (mediators and courts).

The grievance redress committees will be recording all the grievances. They will be recording when and how they were resolved including cases that got referred to other levels. They will be including these in their regular reporting. The project coordination unit will lead and record all complaints and how they were addressed.

The community grievance redress system will work as follows:

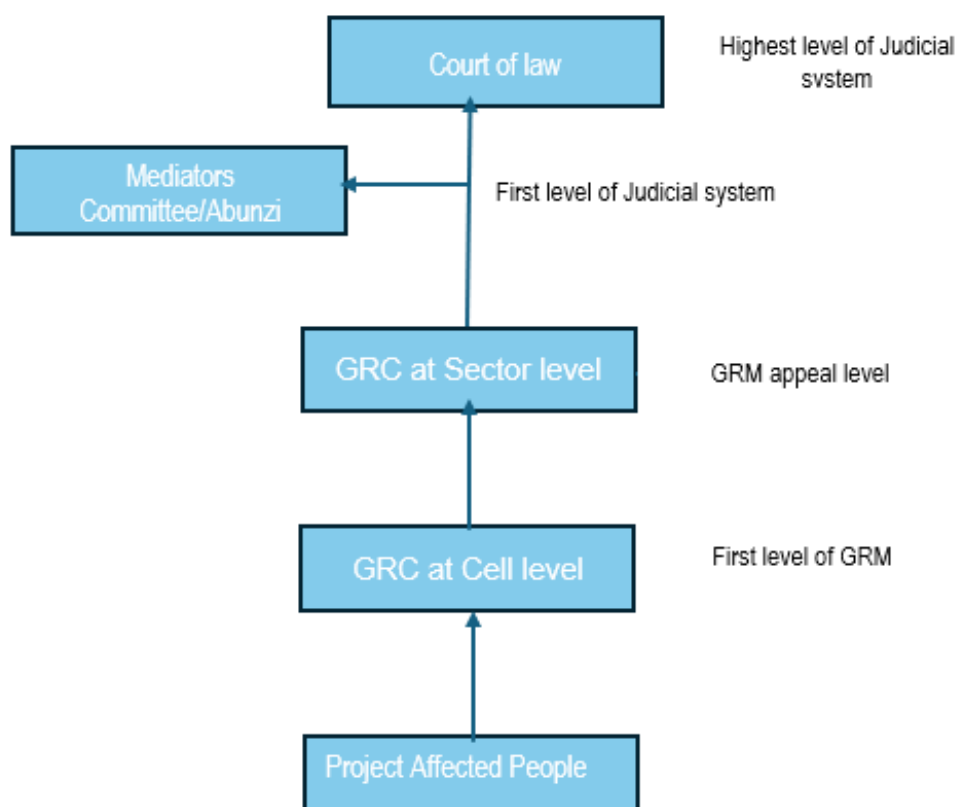


**Figure 23: Proposed community GRM flow chart**

**a) Project Affected Persons**

Project affected people (PAP) will be informed and made aware of grievance redress mechanism and encouraged to use these mechanisms. Any aggrieved person will forward his/her grievance to the nearest GRC which will operate at cell level. Papas will also participate in planning and implementing land acquisition and compensation process and provide information required to address grievances lodged by affected people.

**b) Grievance redress Committees at site cell level**

The GRC established at Cell level will be the first level of grievance redress mechanism. It is recommended to have GR committee at cell level that would comprise at the minimum the following:

- Representative of the cell
- Representative of women council
- Representative of youth
- Representative of affected Villages
- Representatives of PAP by cells (equal gender representation)
- Contractor representative

The Grievance committee would have responsibility for:

- Verifying PAPs.
- Validate inventories of PAPS and affected assets.
- Allocate land, where required, to permanently PAPS.
- Monitor the disbursement of compensations of affected assets/ land.
- Guide and monitor the implementation of relocation (if any)
- Coordinate activities between the various organizations involved in relocation.
- Facilitate conflict resolution and addressing grievances; and
- Provide support and assistance to vulnerable affected households including widows, orphans, and the old people among others (if any)

This committee should meet on a regular basis (as determined by the needs of the project) to ensure PAP grievances

are resolved timely. It would be good to have the representative of project Affected people as the president of the committee and the cell community development officer who is a permanent staff as secretary.

#### c) Sector Grievance Redress committee

An appeal grievance redress committee will be established at sector level and will receive and address all grievances that are not resolved at cell level. The district management will work closely with REG-EDCL in the establishment and training of Grievance redress committee at sector level. The grievance redress committee will include at minimum:

- Sector representative
- Representative of affected cells.
- PAPs representatives.
- Representative of women council at sector level
- Representative of youth council at sector level.
- Supervisor representative.

The committee will be also responsible to address any grievances which is not satisfactorily addressed by Cell level committee. The team will be supported by the project Social Safeguards team based at project headquarters.

At these levels, the aggrieved person should file his/ her grievance, relating to any issue associated with the project implementation, in writing to the subproject. The grievance should be signed and dated by the aggrieved person. REG-EDCL social safeguards officer and the Grievance Committee will consult to determine the validity of claims. If valid, the Committee will notify the complainant, and s/he will be assisted. The Grievance Committee will respond within 14 days during which time any meetings and discussions to be held with the aggrieved person will be conducted.

If the grievance is not resolved at these GRM levels, the relevant Local Administration will then attempt to resolve the problem (through dialogue and negotiation) within 30 days of the complaint being lodged.

#### d) Court of law

If administrative ways of grievance redress are not enough to address the complaint, then the aggrieved person may refer to judicial system. Based on the nature of complaints and value, the process will start from mediators for grievances estimated at a value below 3 million Rwandan francs and if the value is more than three million, the process will start from intermediate courts, High court and to Supreme Court. The next table summarizes the process for grievance redress mechanism at community level.

**Table 61: Grievance Redress Process at community level**

| Stage                             | Process                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Duration                                                                      |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| First level of                    | If the Aggrieved Party (AP) is not satisfied will take his/her grievance to Cell Grievance Committee which will endeavour to resolve it immediately. Where the AP is not satisfied, the Cell Grievance Committee will refer the AP to the Sector Grievance Committee. For complaints that were satisfactorily resolved by the Cell Committee, the committee will inform the higher level of project management, and they will log the grievance and the actions that were taken and close the grievances | As soon as possible but not exceeding four days after receiving the complaint |
| Appeal level                      | If the grievance is not resolve at cell GRC, the aggrieved Party will have the opportunity to appeal at GRC established at Sector level. On receipt of the complaint, the Sector Committee will endeavour to resolve it immediately. If unsuccessful, they will then notify the district and the project management which will attempt to resolve the grievances administratively committee before the case can go to the judicial system.                                                               | As soon as possible but not exceeding one week after receiving the complaint  |
| Final stage of grievances redress | Unsatisfied complainants who is not satisfied after all attempts conducted through Grievances committee and administrative channels, will be allowed to take their complaints to the existing courts.                                                                                                                                                                                                                                                                                                    | Any time depending on court schedule                                          |

#### 8.4.3. Workers Grievance Redress Mechanism

Workplace concerns are usually different from issues raised by project-affected parties and other stakeholders and therefore call for a separate mechanism to address them. The design of a workplace grievance mechanism includes elements of a grievance mechanism at community level but include features specifically designed to address workplace concerns. The ESS2 and law N° 66/2018 of 30/08/2018 and its amendment of 18/05/2023 regulating labour in Rwanda provisions will be applied for Grievance Redress Mechanism (GRM) for workers. A GRM shall be established at site level by the contractor to address complaints arising during the project implementation Project direct

workers will be informed about the grievance redress mechanism during meetings at the time of the induction and where training will be provided where required, this will follow the same procedure for grievance management. Contracted workers will be informed about grievance redress mechanism through meetings at workplaces as well as notices to be made available at the workplace. The Grievance Redress Committees (GRCs) to be established as mentioned earlier will also handle the arising grievances. The process pertaining to how to go about grievances handling are documented for further reference.

The workers GRC shall be composed at Site level by the contractor representative, the supervising firm representative, and the workers representative at site level while the GRM at District level shall be composed of Labour inspector at District level as advisor, Workers representative, contractor representative, the supervising firm representative, and at SPIU Level, the committee will be composed of the Social and Environmental safeguards Specialists, Project Coordinator, Human Resource Specialist under SPIU (REG-EDCL), and contractor representative, the supervising firm representative and workers representative.

REG-EDCL will require contractors to develop and implement a grievance mechanism for their workforce including sub-contractors, prior to the start of onsite works. Contractors will prepare their labour management Plans before the start of civil works, which will also include detailed description of the worker's grievance mechanism.

The worker's grievance mechanism will include:

- A procedure to receive grievances such as comment/complaint form, suggestion boxes, email, a telephone hotline;
- stipulated timeframes to respond to grievances;
- A register to record and track the timely resolution of grievances;
- A responsible department to receive, record and track resolution of grievances.

The Supervision firm's safeguards staff will monitor the contractors' recording and resolution of grievances, and report these to the project in their monthly progress reports. The process will be monitored by the GRM Focal Point; the safeguards specialists will be responsible for the project GRM. The direct worker's grievance mechanism will be described in staff induction trainings, which will be provided to the new recruited project workers. The mechanism will be based on the following principles:

- The process will be transparent and allow workers to express their concerns and file grievances;
- There will be no discrimination against those who express grievances, and any grievances will be treated confidentially;
- Anonymous grievances will be treated equally as other grievances, whose origin is known;
- Management will treat grievances seriously and take timely and appropriate action in response.

Information about the existence of the grievance mechanism will be readily available to all project workers (direct and contracted) through notice displaying boards, the presence of "suggestion boxes", and other means of communication as required.

#### **For Worker and Labor contracting issues**

- **Individual labour disputes: Article 102 of law n° 66/2018 of 30/08/2018 regulating labour in Rwanda.**

Workers will elect representatives who will form a committee that will act as the Workers Grievance Redress Committee. As mandated by article 102 of the law regulating labour in Rwanda, the employees' representatives amicably settle individual labour disputes between employers and employees. If employees' representatives fail to settle the disputes amicably, the concerned party refers the matter to the labour inspector of the area where the contractor is located (district of the project area of intervention).

If the Labor Inspector at the District fails to settle the dispute due to the nature of the case or the conflict of interests, he/she refers the dispute to the Labor Inspector at the national level stating grounds to refer such a dispute. If amicable settlement fails at the national level, the case is referred to the competent court. In any case, the Project Implementation Unit (PIU) will be informed from the beginning of any worker's grievances and provide insight and mediation if possible. The matter will be referred to the labour inspector only if the PIU fails to do the mediation.

- **Collective labour disputes: LAW N° 66/2018 OF 30/08/2018 regulating labour in Rwanda**

The law requires that collective labour disputes be directly notified to the labour inspector of the area by the worker's representatives. Within this framework, any collective labour disputes that will arise under Project, will be addressed to labour inspector at District level for assessment and settlement. In case of escalation, the matter will be referred to

the national level. Before escalating the collective labour dispute, the PIU through the Social Safeguards Unit will be alerted. Necessary investigations will be conducted, and the contractor will be duly approached. The matter will be referred to the labour inspector only if the PIUs and worker's representatives fail at amicable settlement.

#### **For worker's safety issues**

All grievances related to worker's safety will be addressed through the Occupational Health and Safety committee as required by Article 78 of the labour law.

#### **Grievance process for non-labour related issues involving project workers**

In the project area there might be other conflicts related to relationships between the workers and the local community. Depending on who is the aggrieved party, the following mechanism will be used:

- **Worker- Against Other Worker:** These grievances will be handled through the Workers Grievance Committee/representatives.
- **Community Member – Against a Worker:** If there is any grievance from a community member against a worker, it will be handled through the Workers Grievance Committees/representatives.
- **Worker - Against a Community Member:** The project will establish a project grievance committee at various levels of the local administration scheme in Rwanda from the Cell, Sector up to the district government. This grievance Mechanism as described in the SEP and ESMF, will have the mandate of solving all complaints and grievances related to project activities and impacting local communities. Any grievance from a worker against a community member will be handled through this committee.

The project grievance mechanism will not impede workers or project affected people's access to the legal system. Local communities have existing traditional and cultural grievance redress mechanisms (Abunzi committees) established and regulated by law no 37/2016 of 08/09/2016 determining organization, jurisdiction, and competence and functioning of Abunzi committee (adjudication/mediation committees). These are established at cell and sector levels to solve community-based conflicts and grievances their regulatory body being the ministry of Justice. This mechanism cannot be overlooked by the project. The population can choose to use this channel instead of the project grievance mechanism. The escalation at this level leads to the court process. At any time, the complainant may take the matter to the appropriate legal or judicial authority.

#### **8.4.4. Gender-Based violence related complaints**

Due to sensitivity and skills required to address gender based violence, the project will rely on existing structure including GBV task force and Isange one stop center. Thus, when GBV related complaint is received at the first or second tier of GRM, the complaint should be kept confidential by the person/persons receiving the complaint. The complaint should be reported to the relevant committee and immediate actions should be taken that is consistent with the wishes and choices, rights and dignity of the complainant. The complainant should be given information in simple and clear terms on the steps for filing complaints and the possible outcomes, the timelines and the types of supports available to be able to make informed decision.

For GBV cases, it is important to ensure that access to the complaints processes is as easy and as safe as possible for the complainant survivor. The recording of incidence should be limited to the nature of complaint put exactly in the words of the complainant, the age of the survivor and if to the best of their knowledge, the perpetrator was associated with the project. The complainant should decide on whether they would like to be referred to the above committees and the complainant should give consent to share basic monitoring data. In handling GBV related complaints at all levels the following principles should be observed:

- **Safety & Well-Being:** The safety of the survivor shall be always ensured, including during reporting, investigation, and the provision of victim assistance. Those involved in the management of complaints will need to consider potential dangers and risks to all parties (including the survivor, the complainant if different, the subject of the complaint, and the organizations involved), and streamline ways to prevent additional harm in all the complaint handling process. The survivor is never to blame for reporting an act of GBV and should never be made to feel investigated. On the contrary, it is important that she/he feels that her/his story is heard, believed and valued. The actions and responses of the complaint mechanism will be guided by respect for the choices, needs, rights, and the dignity of the survivor.
- **Confidentiality:** The confidentiality of complainants, survivors, and other relevant parties must be always respected. All GBV-related information must be kept confidential, identities must be protected, and the personal

information on survivors should be collected and shared only with the informed consent of the person concerned and on a strict need-to-know basis.

- **Survivor-Centered Approach:** All prevention and responses action will need to balance the respect for due process with the requirements of a survivor-centred approach in which the survivor's choices, needs, safety, and wellbeing remain at the centre in all matters and procedures. As such, all actions taken should be guided by respect for choices, needs, rights and dignity of the survivor, whose agency and resilience must be fostered through the complaint process.
- **Accessibility and non-discrimination:** The mechanism must be accessible to all potential complainants and sufficient information must be given on how to access it, making the complaints process accessible to the largest possible number of people. This includes identifying and instituting various entry points that are both gender and context sensitive. To facilitate incidents reporting and avoid stigmatization, reports from third parties (witnesses, people suspicious or aware of an incident, etc.) must also follow accountability protocols in case of occurrence, the sanctions stipulated by Rwanda labour law will be applied.

#### 8.4.5. Grievance Logbook

At each level Grievance redress mechanism, the committee should ensure that each complaint has an individual reference number and is appropriately tracked and recorded actions are completed. The log will contain record of the person responsible for an individual complaint, and records dates for the following events:

- Date the complaint was reported;
- Date the Grievance Log was added into the project database;
- Date information on proposed corrective action sent to complainant (if appropriate);
- The date the complaint was closed out; and
- Date response was sent to complainant.
- Any outstanding issues to be addressed; and
- A Monthly report, including analysis of the type of complaints, levels of complaints, actions to reduce complaints and initiator of such action.

### 8.5. Environmental and social safeguards training and capacity building

#### 8.5.1. Environmental and Social training

The Project's environmental and social training programs will include several levels of competency, depending on everyone's level of involvement and responsibility:

- **ESMP induction training and awareness:** this training will be for visitors or individuals who do not have direct roles or responsibilities for implementing the ESMP and will cover basic project environmental and social commitments.
- **ESMP Management Training and Awareness:** this training focuses attention on management, covering key aspects of the ESMP and providing an overview of the Project's environmental and social impact management expectations and the supporting processes and procedures prescribed in the ESMP to meet performance expectations.
- **ESMP Job-specific training and awareness:** job-specific training will be provided to all personnel who have direct roles and responsibilities for implementing or managing components of the ESMP including EPC contractor workers. This training will also include all people whose specific work activities may have an environmental or social impact.
- **Onsite,** these provisions and responsibilities will apply to all contractors and subcontractors. Those responsible for performing site inspections will receive training by drawing on external resources as necessary. Upon completion of training and once deemed competent by management, staff will be ready to train other people. The Project will require a contractor to institute training programmes for their personnel. The contractor and subcontractors will be responsible for implementing relevant and adequate training programmes to maintain the required competency levels. Contractor training programmes will be subject to approval by Project Management and will be assessed to confirm that:
  - Training programmes are adequate;
  - All relevant personnel have been trained; and
  - Competency is achieved.

Contractors will be required to report on their training activities, and the Project will maintain records of all training delivered. The table below provides key training to be provided through the project implementation.

**Table 62: ES training plan**

| Training course                      | Unskilled labour | Skilled labour | Supervisors | Drivers | Safety men | Timeframe                                     | Responsible |
|--------------------------------------|------------------|----------------|-------------|---------|------------|-----------------------------------------------|-------------|
| Introduction to the OHS              | x                | x              | X           | X       | x          | After each recruitment and at each site visit | Contractor  |
| Induction training and awareness     | x                | x              | X           | X       | x          | After each recruitment and at each site visit | Contractor  |
| Emergency response                   | x                | x              | X           | X       | x          | After each recruitment                        | Contractor  |
| Hazards& controls                    |                  |                | X           |         |            | After each recruitment                        | Contractor  |
| Foreman responsibilities             |                  |                | *           |         |            | After recruitment                             | Contractor  |
| Managing safely                      |                  |                | X           |         |            | After each recruitment                        | Contractor  |
| Managing rule breaking               |                  |                |             | X       |            | After each recruitment                        | Contractor  |
| Fire prevention                      | *                | *              | X           |         | x          | After each recruitment                        | Contractor  |
| First aid                            | *                | *              | *           |         |            | After each recruitment                        | Contractor  |
| Back safety/ lifting safety          | x                | x              | X           |         |            | After each recruitment                        | Contractor  |
| PPE                                  | x                | x              | X           | X       | x          | After each recruitment                        | Contractor  |
| Fall protection                      |                  | *              | *           |         |            | After each recruitment                        | Contractor  |
| Hand safety                          | x                | x              | X           | x       | x          | After each recruitment                        | Contractor  |
| Hazard recognition                   | x                | x              | x           | x       | x          | After each recruitment                        | Contractor  |
| Health & hygiene                     | *                | *              | x           |         | x          | On quarterly basis                            | Contractor  |
| HIV/AIDS and Communicable disease    | *                | *              | x           |         | x          | On quarterly basis                            | Contractor  |
| Environmental awareness              | x                | x              | x           |         | x          | On quarterly basis                            | Contractor  |
| Excavation safety                    | x                | x              | x           |         | x          | Before excavation work                        | Contractor  |
| Risk assessment                      |                  | x              | x           |         | *          | After each recruitment                        | Contractor  |
| Safe use of chemicals                | x                | x              | x           | x       | x          | Before commissioning                          | Contractor  |
| Accident prevention                  | x                | x              | x           | x       | x          | After each recruitment                        | Contractor  |
| Sexual abuse and sexual exploitation | x                | x              | X           | x       | x          | On quarterly basis                            | Contractor  |
| Chance finds procedures              | x                | x              | X           | x       | x          | Before excavations                            | Contractor  |

**Key: x= compulsory**

**\*=selected personnel**

Training will be provided by ESHS officer in contractor team and outsource qualified expert and sub consultant hired by the contractor. The number of people to be trained for each topic will be known after recruitment of labours and screen them to define the training appropriate for each category depending on the expertise and knowledge.

### 8.5.2. Community awareness, outreach, and training

In addition to the ESHS training provided by the contractor, the project will provide training, awareness, and outreach programs to the local communities. Training will be provided to different committees established including the Water users' association and Grievance Redress Committees on conflict resolution and grievances management. Local communities will be also trained on different topics including HIV/AIDS, Sexual Exploitation; Gender Based Violence, water borne diseases etc.

**Table 63: Community outreach and training**

| Training                                      | Targeted group                | Estimated budget (\$) |
|-----------------------------------------------|-------------------------------|-----------------------|
| Conflict resolution and Grievances management | Grievances redress committees | 30,000                |

| Training                                                                   | Targeted group                    | Estimated budget (\$) |
|----------------------------------------------------------------------------|-----------------------------------|-----------------------|
|                                                                            | Water users' association          |                       |
| HIV/AIDS, Sexual Exploitation; Gender Based Violence, water borne diseases | Local community in three projects | 25,000                |
| <b>Total</b>                                                               |                                   | <b>55,000</b>         |

## **9. CONCLUSIONS AND RECOMMENDATIONS**

### **9.1. Conclusions**

Access to electricity is one of the primary constraints to the Rwanda economy; providing such access unlocks economic opportunity. In the context of this project, such opportunity would most likely be taken up by the service and processing industries, which can then rely on stable electricity to build a business on. The positive impacts from this project will result in local economic growth along the transport and trading routes in the concerned Districts. The general findings of this EIA have revealed that most of the potential negative impacts to be generated by the development of the present project are minimal and can be avoided if the recommended mitigation measures are implemented. The sustainability of the proposed electrification project will be ensured by compliance with regulatory legislation regarding the proposed development. Thus, the project will be beneficial to the community and with implementation of proposed Environmental and Social Monitoring Plan, the project will be sustainable.

Social services, including health facilities, schools and other services, like the provision of water, will certainly benefit from improved access to reliable electricity. Care should be taken when determining specific pole locations, during the final design stage, to avoid impacts to specific environmental and social features. It is necessary to make sure mitigation measures are implemented continuously through on-site monitoring, reporting and intervention.

The pertaining impacts of the project have been assessed and described in detail to gain an adequate understanding of possible socio and environmental effects of the proposed project in all its implementation phases. When the mitigation measures listed in this document are fully implemented, it is no doubt that the project will benefit to both people and the environment. Projects benefits are outweighed than the negative impacts which mitigation plan has been prepared. Furthermore, project developer will carefully consider and apply all acceptable local and international standard/regulations at all stage through the implementation of the project.

In terms of resettlement implications, there is no physical resettlement expected from project implementation. However, land easement will be required at the pole's locations Further, income loss is expected during project works with loss of trees and crops. A proper planning is recommended to minimize such impacts. In any case potential disputed among workers arise, a project consultation with local leaders is proposed as a dispute resolution mechanism option available to redress grievances and disputes emanating from project activities. Therefore, based on the study findings, the Consultant is of the opinion that most of the potential environmental impacts identified can be mitigated. The proposed Environmental Management Plan and Environmental Monitoring Plan if implemented will safeguard the integrity of the environment. the potential impacts associated with the proposed development are of a nature and extent that can be reduced, limited, and eliminated by the application of appropriate mitigation measures.

### **9.2. Recommendations**

Based on the nature of the project activities, biophysical conditions of the project area and the potential negative impacts, it is imperative that the following be given serious consideration and attention in order to preserve the environment:

- ✓ Before commencing any physical or on-site work, the contractor must prepare the C-ESMPs, which must be approved by both the client and the donor. The contractor's Environmental and Social Management Plan shall be site-specific and include detailed information aligned with the project design reports.
- ✓ Before the implementation of the project, EDCL shall secure in full the locations of poles and project facilities such as transformer locations, temporally materials storages sites etc. and this to be accomplished via fair compensation and land easement via negotiations with land owners.
- ✓ The proposed teams for both contractor and supervising engineer should include environmental and Social risk management Experts for the entire duration of the project implementation;
- ✓ A resettlement Plan should be prepared for each districts to provide framework for compensation of affected crops, in the right of way;
- ✓ Environmental monitoring programs for this project should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during construction, operation and decommissioning phases. Speedy and appropriate actions must be taken on any issues arising through the monitoring results.
- ✓ An occupational Health and Safety Plan is proposed as annex and should be updated and used by contractor.

- ✓ Prior to the project implementation, EDCL is required to involve local authorities especially districts and establish a joint monitoring team including, Sectors and cell representatives in order to regularly monitor the implementation of the proposed ESMP.
- ✓ The developer of this project is recommended to implement the environmental and social management plan proposed in this report, that will ensure environmental compliance of the operations and also to maintain high quality standards.
- ✓ The working environment should be monitored for occupational hazards relevant to this project.

The negative socio-cultural impacts associated to the project are very low as there is no involuntary settlement that may be associated to the project implementation. Hence, the project developer (EDCL) should work closely with local authorities in raising awareness among local communities for the protection and maintenance of the project infrastructures.

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## **Annex 1: Terms of references for ESIA for North**

### **TERMS OF REFERENCE FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROJECT OF DESIGN, SUPPLY, AND INSTALLATION OF LOW VOLTAGE AND MEDIUM VOLTAGE LINES AND SERVICE CONNECTIONS IN THE NORTHERN PROVINCE- EPC NORTH**

#### **1. BACKGROUND**

The Government of Rwanda (GoR) envisages transforming the country from a developing country to a middle-income country and it believes that universal access to electricity constitutes a determinant factor to achieve this goal by 2024. Successive documents set out this strategy in increasing levels of detail, running from Vision 2050, the National Strategy for Transformation (NST1), the Energy Sector Strategic Plan, the Rural Electrification Strategy, and the National Electrification Plan 2018- 2024 (NEP) developed by EDCL /REG to guide the investments in electrification and how to achieve the access targets within the framework defined by NST1 and ESSP.

In the implementation of these strategic plans, the Government of Rwanda (GoR) through the Ministry of Infrastructure (MININFRA), with the funding from the World Bank/International Development Association (IDA) and other Development Partners (DP) namely African Development Bank (AfDB), European Investment Bank (EIB), OPEC Fund for International Development (OFID) and Saudi Fund for Development, Korean Economic Development Cooperation Fund (EDCF) and Agence Française de Développement (AFD) , is developing a program titled “Rwanda Universal Energy Access Program which comprises two projects namely Rwanda Energy Access and Quality Improvement Project (EAQIP)” financed by World Bank and is expected to be co-financed by AFD (joint co-financing), the OFID (parallel co-financing), SFD (parallel), and the Korean Fund for International Development (parallel); Rwanda Transmission System Reinforcement and Last Mile Connectivity to be financed by AfDB and which will be financed by EIB under parallel financing.

Electrification projects (Power plants for power generation, Transmission and Distribution lines fall under the activities which require full Environment and Social Impact Assessment (ESIA) prior to implementation. Thus, Rwanda Energy Development Corporation Limited which is implementing Rwanda Access Rwanda Universal Energy Access Program wants to conduct Environmental and Social Impact Assessment for the proposed subproject of design, Supply, and Installation of Low Voltage and Medium Voltage Lines and Service Connections in the following Northern Province- EPC North.

#### **2. DESCRIPTION OF PROJECT AND ACTIVITIES**

The project of design, Supply, and Installation of Low Voltage and Medium Voltage Lines and Service Connections in the following Northern Province- EPCs North will be implemented across all five Districts in Northern Province namely Musanze, Gakenke, Burera, Gicumbi and Rulindo. The project objective is to improve access to energy and efficiency of energy service delivery to households, businesses, and public institutions in Rwanda. This objective will be achieved through upgrading and extension of different MV and LV lines for improved supply, improving Quality of Power Supply in Distribution System and upgrade of single to three phase lines in these districts.

During design phase and planning phase planned activities will consist of surveying and mapping new transmission and distribution routes and site selection to minimize Environmental and Social Risks and Impacts to avoid harming sensitive ecosystems. During the implementation phase key activities will include clearing of the Right of Way (ROW) equivalent to 12m wide, foundation excavations and erection of poles, installation of transformers along the transmission path for stepping down the electricity from MV to LV before distributing to consumers. This electrification project will involve the construction and rehabilitation of aerial MV electrical lines three phase that can be transformable for future industrial zones and three phase for reinforcement of already electrified zones.

#### **3. SCOPE OF THE ASSIGNMENT**

This assessment will cover all project phases from design, supply, and installation of MV and LV line and associated distributions structures and will cover all districts in Northern Province. The present study will consist of collecting and analysing available data using appropriate techniques to achieve the goals of this consultancy. It will come up with realistic proposals and recommendations after consultations with Ministry of Environment (MoE) and its agencies, Rwanda Development Board (RDB), REMA, REG/EDCL SPIU, District authorities and local communities.

The ESIA study team will also provide a site specific environmental and social management plan including, health and Safety plan that:

- Prescribes mitigation measures needed to ensure long-term project sustainability, including institutional capacity building for environmental management at all levels, public safety measures during construction and operational phases, and,
- Outlines indicators and sets up a monitoring program to track agricultural and environmental and social performance of the target watersheds and implementation of the mitigation measures for the refinement of future management action as required.

#### **4. REPORTING REQUIREMENT AND ESIA CONTENTS**

The terms of reference discussed here are set for developer and the funder satisfaction and should not hinder the firm of experts to follow the recommendation provided by RDB after scoping. These ToRs given by RDB should be strictly followed to get the certificate and comply with ESIA regulations in Rwanda. The firm of experts should make sure that every point in this content is tackled at its fullest satisfaction to the client (EDCL), RDB, development partners and other stakeholders. The following format is suggested, and the ESIA report should contain but not limited to the following key points:

##### **Executive Summary:**

- Name and location of the project,
- Name of the developer,
- Name of agency preparing the report,
- Main impacts identified,
- Mitigation recommendations,

##### **Environmental and social monitoring plan.**

##### **Introduction:**

- Author presentation,
- Developer presentation.
- Objectives of the project.
- Objective of the study.
- Methodology used for the study.

##### **Legislative and Regulatory Consideration:**

The firm of experts shall describe the relevant regulations and standards of international, national, regional and local levels that govern environmental and social quality including but not limited to : workers and population health and safety, solid and liquid wastes management, protection of sensitive areas and endangered species, biodiversity conservation, land use control, construction of electrical infrastructure standards or guidelines, resettlement and expropriation, public consultation and information disclosure, etc. The firm of experts will then determine their relevance to the project and identify associated compliance issues. The firm of experts will identify and assess the environmental and social requirements of the funding institution taking into consideration their relevance to the project.

##### **Baseline data: Summary of information on the status of the location**

- Project description,
- Location, description of the current use of the location, project size,
- Detailed description of the project, extend in time and space,
- The firm of experts shall document the existing conditions before the project comes into being. These include (i) Physical conditions of topography (soil, climate, hydrology, etc.), (ii) Biological conditions on the status of the flora and fauna, (iii) Chemical state such as the pollution status of the area for air, soil, water bodies, and (iv) socio-economic status of the project locality, including population size, structure and distribution, income, health status, and infrastructure.

Description of prevention and security measures during the site preparation and exploitation phases.

##### **e) Identification and analysis of potential environmental and social impacts of the project and corresponding mitigation measures**

The firm of experts will assess the potential significant impacts or changes expected due to the proposed projects during construction and operation phases. These would entail environmental, ecological, and social impacts, both positive and negative which would result from interaction between the project activities and the environment that are

likely to bring about changes in the baseline environmental, ecological, and social conditions discussed.

The firm of experts will perform the tasks below to identify and concisely present the significant environmental and social impacts:

- Explain and justify the methods used to predict potential impacts of the proposed projects on the environment, and on interactions among the project's components.
- Nominate and classify issues that are potentially important in the assessment of impacts and for decision-making in relation to the proposed projects'
- Identify and quantify potential impacts in the construction and operation phases by conducting an impact analysis on the physical, biological, land-use and socio-economic environments, and the interactions among them.
- Assess occupational health and safety risks and impacts during construction and operation phases and propose recommendations on corrective and remedial measures to be implemented.
- Evaluate the impact significance of the project components and activities on the environment and local community.
- Establish that criteria on which the assessment of the impacts will be based on
- Develop a matrix as a means to present assessment of the significant impacts graphically, and specify and discuss positive or negative impacts, direct or indirect impacts, reversible or irreversible impacts, short-term and long-term, and cumulative impacts on the environment and community.
- The firm of experts shall propose mitigation measures and realistic associated implementation costs for each of the identified impact. They will have to justify the basis of the proposed mitigation measures costs. This will serve as a useful reference and basis of the project Environmental and Social Management Plan (ESMP) during construction and operation phases.

#### **Analysis of alternatives:**

The firm of experts will systematically compare feasible alternatives to the proposed project site, technology, design, and operation including the "without project" situation in terms of their potential environmental and social impacts.

Assesses the alternatives' feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of alternative mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the alternative mitigation measures. When describing the impacts, the firm of experts will indicate which are irreversible or unavoidable and which can be mitigated. Try to quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures.

For each of the alternatives, quantifies the environmental and social impacts to the extent possible, and attaches socio-economic values where feasible.

#### **Mitigation plan:**

- Identification and description of environmental adverse impacts and effects of the project,
- Detailed description mitigation and compensation measures proposed
- Plans, equipment, and operational procedures appropriate to respond to these impacts.

#### **(a) Environmental and Social Management Plan (ESMP):**

- Detailed description of the modalities provided in the project for the implementation of the proposed mitigation measures to its potential negative impacts including a tentative implementation budget and responsible stakeholders.
- The firm of experts shall propose a plan of actions and indicators to monitor the implementation of the proposed mitigation measures during the construction and operation phases of the project. The firm of experts is required to give specific descriptions and technical details of monitoring measures including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, definition of thresholds that will signal the need for corrective actions, and monitoring and reporting procedures. The firm of experts will provide time frames and implementation mechanisms, staffing requirements and cost outlays for successful implementation of the plan.

#### **(b) Conclusions and Recommendations:**

The report should also include all information necessary to the project review such as lists of data sources, project background reports and studies, and any other relevant information to which the firm of experts' attention should be directed.

#### **(c) Appendices must include:**

- References—setting out the written materials both published and unpublished, that have been used scientifically.
- Record of consultations, and surveys with stakeholders,
- List of associated reports or plans.

## 5. STUDY TEAM AND REQUIRED EXPERTISE

The Client has hired the Bureau for Engineering and Environmental Studies/BESST Ltd to conduct this ESIA. BESST LTD is registered under Rwanda Association of Professional Environmental Practitioners (RAPEP) at level of firm of experts and has vast experience in preparing ESIA proven by at least five (5) EIA completion Certificates have worked on different ESIA for energy development projects funded by international development partners.

BESST will avail the following key Personnel with indicated Qualifications and Experience.

| S/N | Key personnel                  | Desired Qualifications and Experience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Environmental<br>(Team Leader) | <ul style="list-style-type: none"> <li>- At least Master's degree from a Recognized Academic Institution in Environmental sciences, Environmental Management, Natural Resources Management, Environmental Engineering and related fields with at least 5 years of practice/experience in the environment field/studies or bachelor's degree from Recognized Academic Institution in Environmental sciences, Environmental Management, Natural Resources Management, Environmental Engineering and related fields with at least 10 years of practice/experience in the environmental field/studies.</li> <li>- To have conducted at least 3 EIAs, proven by service completion certificates and copy of RDB EIA certificates of approval.</li> <li>- Must be registered in RAPEP as Lead Expert or Associate Expert, proven by a valid RAPEP certificate.</li> <li>- To have worked on at least 2 international donor funded projects such as the World Bank, African Development Bank, European Investment Bank etc proved by 1 completion certificate.</li> </ul> |
| 2.  | Social Scientist               | <ul style="list-style-type: none"> <li>- At least Master's degree from a Recognized Academic Institution in Social Sciences or related fields with at least 5 years of experience in social sciences or bachelor's degree from Recognized Academic Institution in Social Sciences with at least 10 years of experience in the Social Sciences and related fields such as gender studies.</li> <li>- To have participated in preparation of at least 3 ESIA, proven by service completion certificates.</li> <li>- To have worked on at least 1 international donor funded projects such as the World Bank, African Development Bank, European Investment Bank etc proved by 1 completion certificates.</li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| 3.  | Electrical Engineer            | <ul style="list-style-type: none"> <li>- Bachelor's degree from Recognized Academic Institution in Electrical Engineering with at least 5 years of experience working in the implementation of energy projects such as construction of transmission, distribution and access lines.</li> <li>- Must be registered at the national institution of engineers or other recognized foreign institutions (proven by membership certificates) -He/She must have a certificate of License (category) Z in electrical installation issued by RURA.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4.  | Civil Engineer                 | <ul style="list-style-type: none"> <li>- Bachelor's degree from Recognized Academic Institution in Civil Engineering with at least 5 years of experience working in the implementation of energy projects such as construction of transmission, distribution and access lines.</li> <li>- Must be registered at the national institution of engineers or other recognized foreign institutions (proven by membership certificates)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5.  | Health and Safety expert       | <ul style="list-style-type: none"> <li>- Bachelor's degree from Recognized Academic Institution in Environmental health sciences or related fields with at least 5 years of experience working in the implementation of energy projects such as construction of transmission, distribution and access lines.</li> <li>- To have worked on at least 2 international donor funded infrastructure projects such as the World Bank, African Development Bank, European Investment Bank</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6.  | Surveyor                       | <ul style="list-style-type: none"> <li>- Bachelor's degree from Recognized Academic Institution in Surveying and Geomatics Engineering with at least 5 years of experience in the field of Environmental and Social studies.</li> <li>- Must be a member of national association of surveyors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Annex 2: Environmental and Social Management and Monitoring Plan for Musanze district

### Environmental and Social Management Plan for Musanze district

| Activities                                                                                                                   | Description of Potential Impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation                                         | Budget (USD)                                  |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|-----------------------------------------------|
| <b>Design and Construction Phase</b>                                                                                         |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                                                        |                                               |
| Environmental and Social risk management                                                                                     | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor<br>Supervising engineer<br>Contractor &supervising firm | Under the cost of EPC's contract <sup>4</sup> |
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops, and trees along the Right of Way and Poles foundations                                                | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works       | REG-EDCL/EPC Contractor and District, Districts                        | 6,560 <sup>5</sup>                            |
|                                                                                                                              | PAPs complaints about their crops and trees affected by survey team                                                  | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | 4,000*                                        |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW                                             | <ul style="list-style-type: none"> <li>- All crops, and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | RAP budget                                    |
| Clearing all vegetation,                                                                                                     | Loss of vegetation cover in in the right of way and                                                                  | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | During site clearance   | REG-EDCL/ /District REG-                                               | To be included in                             |

<sup>4</sup> One EPC contract was considered for two district. The cost under this activity will be covered under the EPC.

<sup>5</sup> Estimated based on other projects in eastern province (to be updated and included in RAP for each district) estimation is done at 800 US\$ per 1 km of MV

\*: Estimates are based on similar project in the area of intervention and the length of MV lines by district

| Activities                                | Description of Potential Impacts                 | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule          | Responsible for implementation                                                             | Budget (USD)                        |
|-------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------|
| felling trees in 6m width of Right of Way | poles foundations.                               | <ul style="list-style-type: none"> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                        |                                  | EDCL/ Contractor, Districts                                                                | EPC contract's Budget               |
|                                           | Loss of flora and fauna species                  | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities;</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The reptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul> | During design and Site clearance | EPC contractor                                                                             | Mobilization and Operational Budget |
| Recruitment and employment                | Labor influx/ Labour issues and employee conduct | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 12,000*                             |

| Activities        | Description of Potential Impacts                                             | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Implementation schedule | Responsible for implementation                                                                    | Budget (USD)       |
|-------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------|--------------------|
|                   |                                                                              | labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;<br>- All workers to have contracts and time sheets for casual labourers;<br>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement<br>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;<br>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff                                                                                                                                                                                                                         |                         |                                                                                                   |                    |
|                   | Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | - Undertake training and awareness sessions for workers on SH, SEA, and GBV<br>- Maximum effort shall be made to recruit locals who return to their home after work;<br>- The contractor will be required to prepare and implement a code of conduct and each employee will sign it;<br>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement<br>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.<br>- Work with Existing GBV and isange one stop centers program to address GBV and SEA complaints                                                                                                                                                                                                                    | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center | 8,000              |
|                   | Possible increases of HIV/AIDS and other communicable                        | - Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;<br>- All project workers shall be regularly sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;<br>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.<br>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.<br>- Sensitize community and schools about construction hazards as well as HIV/AIDS.<br>- Provide workers with condoms. Free of charge as means of HIV prevention<br>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.<br>- All workers to have access to medical care | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,                        | 8,000              |
|                   | Child labor, forced labour and discrimination.                               | - Avoid any form of discrimination or exclusion during project activities;<br>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;<br>- Protect workers' rights by providing work contract to every project employee;<br>- Recruitment of project workers shall be done based on the working age.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                                        | Operational Budget |
| Foundation works, | Injuries or fatalities from improper manual handling                         | - The entire project should be insured;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ongoing                 | EPC contractor, Supervising                                                                       |                    |

| Activities                | Description of Potential Impacts           | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible for implementation                 | Budget (USD)                    |
|---------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------|---------------------------------|
| excavation, and trenching |                                            | <ul style="list-style-type: none"> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         | engineer, REG-EDCL                             | 5,000                           |
|                           | Vandalism of construction material         | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget              |
|                           | Health and Safety issues                   | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget<br><br>2,000 |
|                           | Loss of on Physical and Cultural Resources | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | EPC contractor, Supervising                    | Operational Budget              |

| Activities | Description of Potential Impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|            |                                                    | <ul style="list-style-type: none"> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure";</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul> |                         | engineer /district                   |                     |
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning".</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | EPC contractor, Supervising engineer | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> </ul>                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities | Description of Potential Impacts                | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|            |                                                 | <ul style="list-style-type: none"> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> <li>- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes</li> </ul>                                                                                                                                                                                                                                                                                               |                         |                                      |                     |
|            | Increased risks of soil erosion                 | <ul style="list-style-type: none"> <li>- During project works, contractor shall only clear areas earmarked for construction;</li> <li>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.</li> <li>- The excavated soil shall be re-used in backfilling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Poor Solid waste management                     | <ul style="list-style-type: none"> <li>- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;</li> <li>- Avoid or minimize the generation of waste materials, as far as practicable;</li> <li>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;</li> <li>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;</li> <li>- Use only waste handlers licensed by REMA to dispose of hazardous waste.</li> <li>- Provide adequate sanitary facilities for workers especially at staging areas;</li> <li>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;</li> <li>- Consider developing a waste management plan for proper solid waste management</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Noise and Vibration pollution                   | <ul style="list-style-type: none"> <li>- No night-time works will be undertaken.</li> <li>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.</li> <li>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.</li> <li>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).</li> <li>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance</li> </ul>                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Impact on Ambient air quality and air pollution | <ul style="list-style-type: none"> <li>- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;</li> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities                                                                        | Description of Potential Impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|                                                                                   |                                                                                                                           | <ul style="list-style-type: none"> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;</li> <li>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;</li> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul>                                                                                                                                                                                                                                                                                           |                         |                                      |                     |
|                                                                                   | Human waste disposal issues                                                                                               | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | EPC contractor, Supervising engineer | 5,000               |
|                                                                                   | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refilling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- Apply industry standard precautions to prevent electrocutions</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> <li>- More details are included in Occupational health and safety</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Operational budget  |

| Activities                                                                                     | Description of Potential Impacts                                                                                       | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementation schedule | Responsible for implementation    | Budget (USD)        |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------|---------------------|
|                                                                                                | Risk of accidents during lifting equipment to position, erection of poles, stringing and wiring as well as connection. | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               | Ongoing                 | REG-EDCL/Contractor and Districts | Construction budget |
| <b>Operational &amp; Maintenance Phase</b>                                                     |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                                   |                     |
| Maintenance of electrical principal equipment and Power Distribution through the proposed line | Theft of equipment and Vandalism of power distribution infrastructure                                                  | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul>                                                                                                                                                                     | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Health and safety issues due to Electric and magnetic field                                                            | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                                                                                                                                                                                     | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Risk of bird collision                                                                                                 | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Pollution from transformer oil spillages                                                                               | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during repair and maintenance of transformers</li> </ul> | Ongoing                 | REG-EDCL, District                | Operational Budget  |
|                                                                                                | Fire accidents due to inappropriate power usage                                                                        | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> </ul>                                                                                                                                                                                                                                                                                                                                                         | Ongoing                 | REG-EDCL, District                | Operational Budget  |

| Activities                                                        | Description of Potential Impacts                                                                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible for implementation | Budget (USD)           |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|                                                                   |                                                                                                                    | <ul style="list-style-type: none"> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                            |                         |                                |                        |
|                                                                   | Vandalism of the electrical cables and other structures                                                            | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                 | REG-EDCL, District             | Operational Budget     |
|                                                                   | Disruption of electrical supply due to encroachment of the RoW and plantation of high trees under electrical lines | <ul style="list-style-type: none"> <li>- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines</li> <li>- Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ongoing                 | REG-EDCL, District             | Operational Budget     |
|                                                                   | Workers safety                                                                                                     | <ul style="list-style-type: none"> <li>- Provide adequate PPEs to all maintenance technicians and operator</li> <li>- Put in place all precautions to prevent electrocution</li> <li>- Ensure that operators and maintenance workers are adequately trained</li> <li>- Establish and communicate regular maintenance plans</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Regularly               | REG-EDCL                       | Operational budget     |
|                                                                   |                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                                |                        |
| <b>Decommissioning Phase</b>                                      |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                |                        |
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's                                                 | <ul style="list-style-type: none"> <li>- A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.</li> <li>- Provide protective equipment to site workers as means of impact prevention.</li> <li>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.</li> <li>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.</li> <li>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.</li> <li>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.</li> <li>- The wooden poles shall be used as source of energy for cooking by local people.</li> </ul> | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |

| Activities          | Description of Potential Impacts                        | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible for implementation | Budget (USD)           |
|---------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|                     |                                                         | - Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |                                |                        |
|                     | Water and soil pollution from transformer oil spillages | - The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage or disposal.<br>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.<br>- Oil spill kits to be provided for during decommissioning.                                                                                                                           | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|                     | Ambient air pollution                                   | - Personal protective equipment like dust masks will be availed to workers whenever needed;<br>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;<br>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.<br>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties<br>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
| <b>Total budget</b> |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                         |                                | <b>50,560</b>          |

#### Environmental and Social Monitoring Plan to be implemented in Musanze district

| Environmental items                                    | Monitoring item                                                                               | Parameter/Indicator                    | Frequency                      | Responsible                                   | Budget (USD)                                   |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------|-----------------------------------------------|------------------------------------------------|
| <b>Pre-construction and project mobilization phase</b> |                                                                                               |                                        |                                |                                               |                                                |
| Securing of the RoW                                    | Fair compensation for affected crops, and trees                                               | Reports for affected crops and, trees  | Once before project activities | Districts/ local Authorities/ property valuer | To be determined under A-RAP for each district |
|                                                        | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook<br>Project area            | Regular                        | Districts local authorities/ PAPs             | 7,380 <sup>6</sup>                             |
| <b>Construction phase</b>                              |                                                                                               |                                        |                                |                                               |                                                |
| Accidents and incidents                                | Number of accidents and incidents                                                             | Incidents and accidents logbook        | When deemed necessary          | EDCL /Districts local traffic police          | no cost required for recording                 |
| Labor influx                                           | Number of workers for the project                                                             | Workers log book by sex and by area of | Permanent                      | Contractor                                    | No budget required to register                 |

<sup>6</sup> Costing is based on estimation of 3 complaints by 1km of MV and 300 USD by complaints

| Environmental items                                                          | Monitoring item                                                                     | Parameter/Indicator                                                                                                 | Frequency                    | Responsible                                | Budget (USD)                                                        |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------|---------------------------------------------------------------------|
|                                                                              |                                                                                     | origin                                                                                                              |                              |                                            |                                                                     |
| Increased traffic in the project area                                        | Availability of traffic management plan                                             | Availability of traffic management plan                                                                             | Before project start         | Contractor / supervisor                    | Budgeted for under ESMP                                             |
|                                                                              | Number of the traffic accidents                                                     | Report on traffic accidents                                                                                         | Monthly                      | Contractor / supervisor                    | No cost required for recording                                      |
|                                                                              | Flagmen at the construction site                                                    | Presence of Flagmen and traffic signals at the site                                                                 | When necessary               | Contractor / supervisor                    | Under construction budget                                           |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                 | Training reports and awareness minutes of SH, SEA and GBV                                                           | During project works         | Contractor / supervisor                    | Under construction budget                                           |
|                                                                              |                                                                                     | GBV complaints resolution reports                                                                                   | As appropriate               | Contractor / supervisor                    | Under construction budget                                           |
|                                                                              |                                                                                     | Availability of Code of conduct                                                                                     | Permanent                    | Contractor / supervisor                    | budgeted for under ESMP                                             |
| Noise and vibrations                                                         | Noise and vibrations                                                                | Noise level (in dB) and vibrations levels                                                                           | during project works         | Contractor/ supervisor                     | 300 for noise measurement                                           |
| Air pollution                                                                | Equipment and automobiles in good conditions                                        | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate               | Contractor/ traffic police                 | 750 for automobile certification                                    |
| Soil erosion                                                                 | Presence of soil erosion barriers at the project sites                              | Soil erosion and Turbidity in storm water                                                                           | Daily                        | EDCL/ Districts                            | 200                                                                 |
| Soil Waste                                                                   | Proper management of excavated soil and other soil waste generated from the project | Re- used excavated soil                                                                                             | regular                      | EDCL/ Districts                            | No cost is required                                                 |
| Fauna and flora removal                                                      | Reforestation where possible to offset loss of flora and fauna                      | Restored area                                                                                                       | After project implementation | Locals /local authorities /EDCL/ Districts | cost for restauration to be included in project construction budget |
| Working conditions                                                           | Occupational health and Safety                                                      | Availability at site of OHS Plan                                                                                    | Permanent                    | EDCL/ Districts                            | Cost covered during the preparation of OHS plan                     |
|                                                                              | Awareness on social, health and safety                                              | Number of awareness conducted                                                                                       | Daily                        | EDCL/ districts                            | 5,000 for signing MoU with district hospital                        |
|                                                                              | Incidents and accidents at the project site                                         | Presence of warning and reminding sign posts at the site                                                            | daily                        | Districts/ EDCL                            | Cost for signposts covered under construction budget                |
|                                                                              | Personal Protective Equipment (PPEs)                                                | Number of workers with PPEs                                                                                         | daily                        | EDCL/ Districts district / workers         | 40 to cater for overall PPE for each staff                          |
| HIV/ AIDS and other contaminating diseases                                   | Health and sanitation plan for workers                                              | Presence of sanitation facilities at project sites such as toilets and water                                        | regular                      | EDCL/ DISTRICTS District                   | 500                                                                 |
| Child and forced labor                                                       | Minimum working age and working condition                                           | Employment record by age                                                                                            | regular                      | EDCL /Local authorities/ project           | No cost is required                                                 |

| Environmental items                      | Monitoring item                                         | Parameter/Indicator                                                   | Frequency | Responsible                                                  | Budget (USD)                                                                    |
|------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------|-----------|--------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                          |                                                         |                                                                       |           | workers/ local population                                    |                                                                                 |
| Tree removal (deforestation)             | Areas of the project with cleared trees                 | Number of trees removed at by district                                | Once      | EDCL / Contractor/ Districts                                 | No cost required                                                                |
| <b>Operation phase</b>                   |                                                         |                                                                       |           |                                                              |                                                                                 |
| Effects from electrocution               | Presence of warning signs and anti-climbing barbed wire | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables | Regular   | EDCL/ Districts district/ local authorities/ local residents | Continuous: To be included under line RED-EDCL operation and Maintenance budget |
| Degraded sites by the project activities | Rehabilitated areas after project activities            | Areas rehabilitated after project works                               | Once      | Contractors/ EDCL                                            | 2,000                                                                           |
| <b>TOTAL</b>                             |                                                         |                                                                       |           |                                                              | <b>16,170</b>                                                                   |

### Annex 3: Environmental and Social Management and Monitoring Plan for Gakenke district

#### Environmental and Social Management Plan for Gakenke district

| Activities                                                                                                                   | Description of potential impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation                                         | Budget (USD)                                  |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|-----------------------------------------------|
| <b>Design and Construction Phase</b>                                                                                         |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                                                        |                                               |
| Environmental and Social risk management                                                                                     | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor<br>Supervising engineer<br>Contractor &supervising firm | Under the cost of EPC's contract <sup>7</sup> |
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops, and trees along the Right of Way and Poles foundations                                                | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works       | REG-EDCL/EPC Contractor and District, Districts                        | 74,560 <sup>8</sup>                           |
|                                                                                                                              | PAPs complaints about their crops and tress affected by survey team                                                  | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | 8,000*                                        |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW                                             | <ul style="list-style-type: none"> <li>- All crops, and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | RAP budget                                    |
| Clearing all vegetation,                                                                                                     | Loss of vegetation cover in in the right of                                                                          | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | During site clearance   | REG-EDCL/ /District REG-                                               | To be included in                             |

<sup>7</sup> One EPC contract was considered for two district. The cost under this activity will be covered under the EPC.

<sup>8</sup> Estimated based on other projects in eastern province (to be updated and included in RAP for each district) estimation is done at 800 US\$ per 1 km of MV

\*: Estimates were made based on similar project in the area of intervention and the length of MV lines by district

| Activities                                | Description of potential impacts                 | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule          | Responsible for implementation                                                             | Budget (USD)                        |
|-------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------|
| falling trees in 6m width of Right of Way | way and poles foundations.                       | <ul style="list-style-type: none"> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                        |                                  | EDCL/ Contractor, Districts                                                                | EPC contract's Budget               |
|                                           | Loss of flora and fauna species                  | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities;</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The reptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul> | During design and Site clearance | EPC contractor                                                                             | Mobilization and Operational Budget |
| Recruitment and employment                | Labor influx/ Labour issues and employee conduct | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 15,000*                             |

| Activities                                  | Description of potential impacts                                             | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Implementation schedule | Responsible for implementation                                                                    | Budget (USD)       |
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|                                             |                                                                              | <ul style="list-style-type: none"> <li>- All workers to have contracts and time sheets for casual labourers;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                                                                                                   |                    |
|                                             | Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | <ul style="list-style-type: none"> <li>- Undertake training and awareness sessions for workers on SH, SEA, and GBV</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.</li> <li>- Work with Existing GBV and isange one stop centers program to address GBV and SEA complaints</li> </ul>                                                                                                                                                                                                                             | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center | 8,000              |
|                                             | Possible increases of HIV/AIDS and other communicable                        | <ul style="list-style-type: none"> <li>- Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;</li> <li>- All project workers shall be regular sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;</li> <li>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.</li> <li>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.</li> <li>- Sensitize community and schools about construction hazards as well as HIV/AIDS.</li> <li>- Provide workers with condoms. Free of charge as means of HIV prevention</li> <li>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.</li> <li>- All workers to have access to medical care</li> </ul> | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,                        | 7,000              |
|                                             | Child labor, forced labour and discrimination.                               | <ul style="list-style-type: none"> <li>- Avoid any form of discrimination or exclusion during project activities;</li> <li>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;</li> <li>- Protect workers' rights by providing work contract to every project employee;</li> <li>- Recruitment of project workers shall be done based on the working age.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                                        | Operational Budget |
| Foundation works, excavation, and trenching | Injuries or fatalities from improper manual handling                         | <ul style="list-style-type: none"> <li>- The entire project should be insured;</li> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ongoing                 | EPC contractor, Supervising engineer, REG-EDCL                                                    | 6,000              |

| Activities | Description of potential impacts        | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible for implementation                 | Budget (USD)                    |
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|            |                                         | <ul style="list-style-type: none"> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                                                |                                 |
|            | Vandalism of construction material      | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget              |
|            | Health and Safety issues                | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget<br><br>4,000 |
|            | Loss of Physical and Cultural Resources | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget              |

| Activities | Description of potential impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Implementation schedule | Responsible for implementation       | Budget (USD)        |
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|            |                                                    | <ul style="list-style-type: none"> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure;</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                                      |                     |
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning".</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Construction budget |

| Activities | Description of potential impacts                | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Implementation schedule | Responsible for implementation       | Budget (USD)        |
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|            |                                                 | - All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                                      |                     |
|            | Increased risks of soil erosion                 | - During project works, contractor shall only clear areas earmarked for construction;<br>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.<br>- The excavated soil shall be re-used in backfilling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Poor Solid waste management                     | - Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;<br>- Avoid or minimize the generation of waste materials, as far as practicable;<br>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;<br>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;<br>- Use only waste handlers licensed by REMA to dispose of hazardous waste.<br>- Provide adequate sanitary facilities for workers especially at staging areas;<br>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;<br>- Consider developing a waste management plan for proper solid waste management | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Noise and Vibration pollution                   | - No night-time works will be undertaken.<br>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.<br>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.<br>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).<br>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance                                                                                                                                                                                                                     | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Impact on Ambient air quality and air pollution | - Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;<br>- Personal protective equipment like dust masks will be availed to workers whenever needed;<br>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;<br>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties<br>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;<br>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;                                                                                                  | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities                                                                        | Description of potential impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible for implementation       | Budget (USD)        |
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|                                                                                   |                                                                                                                           | <ul style="list-style-type: none"> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                                      |                     |
|                                                                                   | Human waste disposal issues                                                                                               | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                 | EPC contractor, Supervising engineer | 8,000               |
|                                                                                   | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refilling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> <li>- More details are included in Occupational health and safety</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Operational budget  |
|                                                                                   | Risk of accidents during lifting equipment to position, erection of poles, stringing and wiring as well as connection.    | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | REG-EDCL/Contractor and Districts    | Construction budget |
| <b>Operational &amp; Maintenance Phase</b>                                        |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                      |                     |
| Maintenance of electrical principal                                               | Theft of equipment and Vandalism of power distribution                                                                    | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | REG-EDCL, District                   | Operational Budget  |

| Activities                                                 | Description of potential impacts                            | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Implementation schedule | Responsible for implementation | Budget (USD)       |
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| equipment and Power Distribution through the proposed line | infrastructure                                              | <ul style="list-style-type: none"> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                                |                    |
|                                                            | Health and safety issues due to Electric and magnetic field | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | REG-EDCL, District             | Operational Budget |
|                                                            | Risk of bird collision                                      | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL, District             | Operational Budget |
|                                                            | Pollution from transformer oil spillages                    | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during repair and maintenance of transformers</li> </ul>                                                                                                                                                                                                                                  | Ongoing                 | REG-EDCL, District             | Operational Budget |
|                                                            | Fire accidents due to inappropriate power usage             | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul> | Ongoing                 | REG-EDCL, District             | Operational Budget |
|                                                            | Vandalism of the electrical cables and other structures     | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ongoing                 | REG-EDCL, District             | Operational Budget |

| Activities                                                        | Description of potential impacts                                                                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation | Budget (USD)           |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|                                                                   |                                                                                                                    | - Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                                |                        |
|                                                                   | Disruption of electrical supply due to encroachment of the RoW and plantation of high trees under electrical lines | - Restrict clearance for the trees growing under the transmission line or branches overhanging the lines<br>- Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                 | REG-EDCL, District             | Operational Budget     |
|                                                                   | Workers safety                                                                                                     | - Provide adequate PPEs to all maintenance technicians and operator<br>- Put in place all precautions to prevent electrocution<br>- Ensure that operators and maintenance workers are adequately trained<br>- Establish and communicate regular maintenance plans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Regularly               | REG-EDCL                       | Operational budget     |
|                                                                   |                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |                                |                        |
| <b>Decommissioning Phase</b>                                      |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                |                        |
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's                                                 | - A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.<br>- Provide protective equipment to site workers as means of impact prevention.<br>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.<br>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.<br>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.<br>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.<br>- The wooden poles shall be used as source of energy for cooking by local people.<br>- Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA). | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|                                                                   | Water and soil pollution from transformer oil spillages                                                            | - The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage or disposal.<br>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.<br>- Oil spill kits to be provided for during decommissioning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|                                                                   | Ambient air pollution                                                                                              | - Personal protective equipment like dust masks will be availed to workers whenever needed;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Once                    | REG-EDCL, EPC contractor       | Decommissioning        |

| Activities          | Description of potential impacts | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible for implementation | Budget (USD)   |
|---------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|----------------|
|                     |                                  | <ul style="list-style-type: none"> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.</li> <li>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles</li> </ul> |                         |                                | budget         |
| <b>Total budget</b> |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                | <b>139,560</b> |

#### Environmental and Social Monitoring Plan to be implemented in Gakenke district

| Environmental items                                                          | Monitoring item                                                                               | Parameter/Indicator                                       | Frequency                      | Responsible                                   | Budget (USD)                                   |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------|-----------------------------------------------|------------------------------------------------|
| <b>Pre-construction and project mobilization phase</b>                       |                                                                                               |                                                           |                                |                                               |                                                |
| Securing of the RoW                                                          | Fair compensation for affected crops, and trees                                               | Reports for affected crops, and trees                     | Once before project activities | Districts/ local Authorities/ property valuer | To be determined under A-RAP for each district |
|                                                                              | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook<br>Project area                               | Regular                        | Districts local authorities/ PAPs             | 12,000                                         |
| <b>Construction phase</b>                                                    |                                                                                               |                                                           |                                |                                               |                                                |
| Accidents and incidents                                                      | Number of accidents and incidents                                                             | Incidents and accidents logbook                           | When deemed necessary          | EDCL /Districts local traffic police          | no cost required for recording                 |
| Labor influx                                                                 | Number of workers for the project                                                             | Workers log book by sex and by area of origin             | Permanent                      | Contractor                                    | No budget required to register                 |
| Increased traffic in the project area                                        | Availability of traffic management plan                                                       | Availability of traffic management plan                   | Before project start           | Contractor / supervisor                       | Budgeted for under ESMP                        |
|                                                                              | Number of the traffic accidents                                                               | Report on traffic accidents                               | Monthly                        | Contractor supervisor                         | No cost required for recording                 |
|                                                                              | Flagmen at the construction site                                                              | Presence of Flagmen and traffic signals at the site       | When necessary                 | Contractor supervisor                         | Under construction budget                      |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                           | Training reports and awareness minutes of SH, SEA and GBV | During project works           | Contractor / supervisor                       | Under construction budget                      |
|                                                                              |                                                                                               | GBV complaints resolution reports                         | As appropriate                 | Contractor / supervisor                       | Under construction budget                      |
|                                                                              |                                                                                               | Availability of Code of conduct                           | Permanent                      | Contractor / supervisor                       | budgeted for under ESMP                        |
| Noise and vibrations                                                         | Noise and vibrations                                                                          | Noise level (in dB) and vibrations                        | during project works           | Contractor/                                   | 300 for noise                                  |

| Environmental items                        | Monitoring item                                                                     | Parameter/Indicator                                                                                                 | Frequency                    | Responsible                                                | Budget (USD)                                                        |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------|---------------------------------------------------------------------|
|                                            |                                                                                     | levels                                                                                                              |                              | supervisor                                                 | measurement                                                         |
| Air pollution                              | Equipment and automobiles in good conditions                                        | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate               | Contractor/ traffic police                                 | 750 for automobile certification                                    |
| Soil erosion                               | Presence of soil erosion barriers at the project sites                              | Soil erosion and Turbidity in storm water                                                                           | Daily                        | EDCL/ Districts                                            | 200                                                                 |
| Soil Waste                                 | Proper management of excavated soil and other soil waste generated from the project | Re- used excavated soil                                                                                             | regular                      | EDCL/ Districts                                            | No cost is required                                                 |
| Fauna and flora removal                    | Reforestation where possible to offset loss of flora and fauna                      | Restored area                                                                                                       | After project implementation | Locals /local authorities /EDCL/ Districts                 | cost for restauration to be included in project construction budget |
| Working conditions                         | Occupational health and Safety                                                      | Availability at site of OHS Plan                                                                                    | Permanent                    | EDCL/ Districts                                            | Cost covered during the preparation of OHS plan                     |
|                                            | Awareness on social, health and safety                                              | Number of awareness conducted                                                                                       | Daily                        | EDCL/ districts                                            | 5,000 for signing MoU with district hospital                        |
|                                            | Incidents and accidents at the project site                                         | Presence of warning and reminding sign posts at the site                                                            | daily                        | Districts/ EDCL                                            | Cost for signposts covered under construction budget                |
|                                            | Personal Protective Equipment (PPEs)                                                | Number of workers with PPEs                                                                                         | daily                        | EDCL/ Districts district / workers                         | 40 to cater for overall PPE for each staff                          |
| HIV/ AIDS and other contaminating diseases | Health and sanitation plan for workers                                              | Presence of sanitation facilities at project sites such as toilets and water                                        | regular                      | EDCL/ DISTRICTS District                                   | 500                                                                 |
| Child and forced labor                     | Minimum working age and working condition                                           | Employment record by age                                                                                            | regular                      | EDCL /Local authorities/ project workers/ local population | No cost is required                                                 |
| Tree removal (deforestation)               | Areas of the project with cleared trees                                             | Number of trees removed at by district                                                                              | Once                         | EDCL / Contractor/ Districts                               | No cost required                                                    |
| <b>Operation phase</b>                     |                                                                                     |                                                                                                                     |                              |                                                            |                                                                     |
| Effects from electrocution                 | Presence of warning signs and anti-climbing barbed wire                             | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables                                               | Regular                      | EDCL/ Districts district/ local authorities/ local         | Continuous: To be included under line RED-EDCL                      |

| Environmental items                      | Monitoring item                              | Parameter/Indicator                     | Frequency | Responsible       | Budget (USD)                     |
|------------------------------------------|----------------------------------------------|-----------------------------------------|-----------|-------------------|----------------------------------|
|                                          |                                              |                                         |           | residents         | operation and Maintenance budget |
| Degraded sites by the project activities | Rehabilitated areas after project activities | Areas rehabilitated after project works | Once      | Contractors/ EDCL | 2,000                            |
| <b>TOTAL</b>                             |                                              |                                         |           |                   | <b>21,670</b>                    |

#### Annex 4: Environmental and Social Management and Monitoring Plan for Gicumbi district

##### Environmental and Social Management Plan for Gicumbi district

| Activities                                                                                                                   | Description of Potential Impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation on schedule | Responsible for implementation                                   | Budget (USD)                                  |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------|-----------------------------------------------|
| <b>Design and Construction Phase</b>                                                                                         |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |                                                                  |                                               |
| Environmental and Social risk management                                                                                     | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         | Ongoing                    | EPC contractor Supervising engineer Contractor &supervising firm | Under the cost of EPC's contract <sup>9</sup> |
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops, and trees along the Right of Way and Poles foundations                                                | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works          | REG-EDCL/EPC Contractor and District, Districts                  | 29,600 <sup>10</sup>                          |
|                                                                                                                              | PAPs complaints about their crops and trees affected by survey team                                                  | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                    | REG-EDCL/EPC Contractor and District, Districts                  | 4,000*                                        |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW                                             | <ul style="list-style-type: none"> <li>- All crops, and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                    | REG-EDCL/EPC Contractor and District, Districts                  | To be included under RAP budget               |
| Clearing all vegetation,                                                                                                     | Loss of vegetation cover in in the right of                                                                          | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | During site clearance      | REG-EDCL/ /District REG-EDCL/                                    | To be included in                             |

<sup>9</sup> One EPC contract was considered for two district. The cost under this activity will be covered under the EPC.

<sup>10</sup> Estimated based on other projects in eastern province (to be updated and included in RAP for each district) estimation is done at 800 US\$ per 1 km of MV

\*: Estimates were made based on similar project in the area of intervention and the length of MV lines by district

| Activities                                | Description of Potential Impacts                 | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation on schedule       | Responsible for implementation                                                             | Budget (USD)                        |
|-------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------|
| felling trees in 6m width of Right of Way | way and poles foundations.                       | <ul style="list-style-type: none"> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                                                                                                                                                                        |                                  | Contractor, Districts                                                                      | EPC contract's Budget               |
|                                           | Loss of flora and fauna species                  | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities;</li> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The reptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul> | During design and Site clearance | EPC contractor                                                                             | Mobilization and Operational Budget |
| Recruitment and employment                | Labor influx/ Labour issues and employee conduct | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 7,000*                              |

| Activities        | Description of Potential Impacts                                             | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Implementation on schedule | Responsible for implementation                                                                    | Budget (USD)       |
|-------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------|--------------------|
|                   |                                                                              | <p>workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;</p> <ul style="list-style-type: none"> <li>- All workers to have contracts and time sheets for casual labourers;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff</li> </ul>                                                                                                                                                                                                                                                   |                            |                                                                                                   |                    |
|                   | Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | <ul style="list-style-type: none"> <li>- Undertake training and awareness sessions for workers on SH, SEA, and GBV</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.</li> <li>- Work with Existing GBV and isange one stop centers program to address GBV and SEA complaints</li> </ul>                                                                                                                                                                                                                             | Ongoing                    | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center | 5,000              |
|                   | Possible increases of HIV/AIDS and other communicable                        | <ul style="list-style-type: none"> <li>- Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;</li> <li>- All project workers shall be regular sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;</li> <li>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.</li> <li>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.</li> <li>- Sensitize community and schools about construction hazards as well as HIV/AIDS.</li> <li>- Provide workers with condoms. Free of charge as means of HIV prevention</li> <li>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.</li> <li>- All workers to have access to medical care</li> </ul> | Ongoing                    | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,                        | 5,000              |
|                   | Child labor, forced labour and discrimination.                               | <ul style="list-style-type: none"> <li>- Avoid any form of discrimination or exclusion during project activities;</li> <li>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;</li> <li>- Protect workers' rights by providing work contract to every project employee;</li> <li>- Recruitment of project workers shall be done based on the working age.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                    | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                                        | Operational Budget |
| Foundation works, | Injuries or fatalities from improper                                         | <ul style="list-style-type: none"> <li>- The entire project should be insured;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                    | EPC contractor, Supervising                                                                       |                    |

| Activities                | Description of Potential Impacts           | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation on schedule | Responsible for implementation                 | Budget (USD)                    |
|---------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------|---------------------------------|
| excavation, and trenching | manual handling                            | <ul style="list-style-type: none"> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            | engineer, REG-EDCL                             | 5,000                           |
|                           | Vandalism of construction material         | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                    | EPC contractor, Supervising engineer /district | Operational Budget              |
|                           | Health and Safety issues                   | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                    | EPC contractor, Supervising engineer /district | Operational Budget<br><br>3,000 |
|                           | Loss of on Physical and Cultural Resources | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                    | EPC contractor, Supervising engineer /district | Operational Budget              |

| Activities | Description of Potential Impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Implementati on schedule | Responsible for implementation       | Budget (USD)        |
|------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------|---------------------|
|            |                                                    | <ul style="list-style-type: none"> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure";</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul>                                                                                                                                                                                                                  |                          |                                      |                     |
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning".</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                  | EPC contractor, Supervising engineer | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> </ul> | Ongoing                  | EPC contractor, Supervising engineer | Constriction budget |

| Activities | Description of Potential Impacts                | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation on schedule | Responsible for implementation       | Budget (USD)        |
|------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------|---------------------|
|            |                                                 | <ul style="list-style-type: none"> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> <li>- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                      |                     |
|            | Increased risks of soil erosion                 | <ul style="list-style-type: none"> <li>- During project works, contractor shall only clear areas earmarked for construction;</li> <li>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.</li> <li>- The excavated soil shall be re-used in backfilling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ongoing                    | EPC contractor, Supervising engineer | Constriction budget |
|            | Poor Solid waste management                     | <ul style="list-style-type: none"> <li>- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;</li> <li>- Avoid or minimize the generation of waste materials, as far as practicable;</li> <li>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;</li> <li>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;</li> <li>- Use only waste handlers licensed by REMA to dispose of hazardous waste.</li> <li>- Provide adequate sanitary facilities for workers especially at staging areas;</li> <li>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;</li> <li>- Consider developing a waste management plan for proper solid waste management</li> </ul> | Ongoing                    | EPC contractor, Supervising engineer | Constriction budget |
|            | Noise and Vibration pollution                   | <ul style="list-style-type: none"> <li>- No night-time works will be undertaken.</li> <li>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.</li> <li>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.</li> <li>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).</li> <li>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance</li> </ul>                                                                                                                                                                                                                                       | Ongoing                    | EPC contractor, Supervising engineer | Constriction budget |
|            | Impact on Ambient air quality and air pollution | <ul style="list-style-type: none"> <li>- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;</li> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                    | EPC contractor, Supervising engineer | Constriction budget |

| Activities                                                                        | Description of Potential Impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation on schedule | Responsible for implementation       | Budget (USD)        |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------|---------------------|
|                                                                                   |                                                                                                                           | <ul style="list-style-type: none"> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;</li> <li>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;</li> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul>                                                                                                                                                                                                                                                                                                                               |                            |                                      |                     |
|                                                                                   | Human waste disposal issues                                                                                               | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                    | EPC contractor, Supervising engineer | 6,000               |
|                                                                                   | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refilling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                    | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> <li>- More details are included in Occupational health and safety</li> </ul> | Ongoing                    | EPC contractor, Supervising engineer | Operational budget  |
|                                                                                   | Risk of accidents during lifting equipment to position, erection of                                                       | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all' safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                    | REG-EDCL/Contractor and Districts    | Construction budget |

| Activities                                                                                     | Description of Potential Impacts                                      | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementati on schedule | Responsible for implementation | Budget (USD)       |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|--------------------|
|                                                                                                | poles, stringing and wiring as well as connection.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                |                    |
| <b>Operational &amp; Maintenance Phase</b>                                                     |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                                |                    |
| Maintenance of electrical principal equipment and Power Distribution through the proposed line | Theft of equipment and Vandalism of power distribution infrastructure | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, , staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul>                                                                                                                                                                   | Ongoing                  | REG-EDCL, District             | Operational Budget |
|                                                                                                | Health and safety issues due to Electric and magnetic field           | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                                                                                                                                                                                     | Ongoing                  | REG-EDCL, District             | Operational Budget |
|                                                                                                | Risk of bird collision                                                | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                  | REG-EDCL, District             | Operational Budget |
|                                                                                                | Pollution from transformer oil spillages                              | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during repair and maintenance of transformers</li> </ul> | Ongoing                  | REG-EDCL, District             | Operational Budget |
|                                                                                                | Fire accidents due to inappropriate power usage                       | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> </ul>                                                                                                                                                                                                                  | Ongoing                  | REG-EDCL, District             | Operational Budget |

| Activities                                                        | Description of Potential Impacts                                                                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementati on schedule | Responsible for implementation | Budget (USD)            |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|-------------------------|
|                                                                   |                                                                                                                    | <ul style="list-style-type: none"> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |                                |                         |
|                                                                   | Vandalism of the electrical cables and other structures                                                            | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                  | REG-EDCL, District             | Operational Budget      |
|                                                                   | Disruption of electrical supply due to encroachment of the RoW and plantation of high trees under electrical lines | <ul style="list-style-type: none"> <li>- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines</li> <li>- Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ongoing                  | REG-EDCL, District             | Operational Budget      |
|                                                                   | Workers safety                                                                                                     | <ul style="list-style-type: none"> <li>- Provide adequate PPEs to all maintenance technicians and operator</li> <li>- Put in place all precautions to prevent electrocution</li> <li>- Ensure that operators and maintenance workers are adequately trained</li> <li>- Establish and communicate regular maintenance plans</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Regularly                | REG-EDCL                       | Operational budget      |
|                                                                   |                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                |                         |
| <b>Decommissioning Phase</b>                                      |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                                |                         |
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's                                                 | <ul style="list-style-type: none"> <li>- A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.</li> <li>- Provide protective equipment to site workers as means of impact prevention.</li> <li>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.</li> <li>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.</li> <li>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.</li> <li>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.</li> <li>- The wooden poles shall be used as source of energy for cooking by local people.</li> </ul> | Once                     | REG-EDCL, EPC contractor       | Decommissio ning budget |

| Activities          | Description of Potential Impacts                        | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementati on schedule | Responsible for implementation | Budget (USD)           |
|---------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|------------------------|
|                     |                                                         | - Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                                |                        |
|                     | Water and soil pollution from transformer oil spillages | - The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage or disposal.<br>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.<br>- Oil spill kits to be provided for during decommissioning.                                                                                                                           | Once                     | REG-EDCL, EPC contractor       | Decommissioning budget |
|                     | Ambient air pollution                                   | - Personal protective equipment like dust masks will be availed to workers whenever needed;<br>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;<br>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.<br>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties<br>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles | Once                     | REG-EDCL, EPC contractor       | Decommissioning budget |
| <b>Total budget</b> |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                | <b>59,600</b>          |

#### Environmental and Social Monitoring Plan to be implemented in Gicumbi district

| Environmental items                                    | Monitoring item                                                                               | Parameter/Indicator                           | Frequency                      | Responsible                                   | Budget (USD)                                   |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------|-----------------------------------------------|------------------------------------------------|
| <b>Pre-construction and project mobilization phase</b> |                                                                                               |                                               |                                |                                               |                                                |
| Securing of the RoW                                    | Fair compensation for affected crops, trees                                                   | Reports for affected crops, and trees         | Once before project activities | Districts/ local Authorities/ property valuer | To be determined under A-RAP for each district |
|                                                        | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook<br>Project area                   | Regular                        | Districts local authorities/ PAPs             | 33,300 <sup>11</sup>                           |
| <b>Construction phase</b>                              |                                                                                               |                                               |                                |                                               |                                                |
| Accidents and incidents                                | Number of accidents and incidents                                                             | Incidents and accidents logbook               | When deemed necessary          | EDCL /Districts local traffic police          | no cost required for recording                 |
| Labor influx                                           | Number of workers for the project                                                             | Workers log book by sex and by area of origin | Permanent                      | Contractor                                    | No budget required to register                 |

<sup>11</sup> Estimates of 3 complaints by 1 km of MV and 300 USD by complaints

| Environmental items                                                          | Monitoring item                                                                     | Parameter/Indicator                                                                                                 | Frequency                    | Responsible                                | Budget (USD)                                                        |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------|---------------------------------------------------------------------|
| Increased traffic in the project area                                        | Availability of traffic management plan                                             | Availability of traffic management plan                                                                             | Before project start         | Contractor / supervisor                    | Budgeted for under ESMP                                             |
|                                                                              | Number of the traffic accidents                                                     | Report on traffic accidents                                                                                         | Monthly                      | Contractor / supervisor                    | No cost required for recording                                      |
|                                                                              | Flagmen at the construction site                                                    | Presence of Flagmen and traffic signals at the site                                                                 | When necessary               | Contractor / supervisor                    | Under construction budget                                           |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                 | Training reports and awareness minutes of SH, SEA and GBV                                                           | During project works         | Contractor / supervisor                    | Under construction budget                                           |
|                                                                              |                                                                                     | GBV complaints resolution reports                                                                                   | As appropriate               | Contractor / supervisor                    | Under construction budget                                           |
|                                                                              |                                                                                     | Availability of Code of conduct                                                                                     | Permanent                    | Contractor / supervisor                    | budgeted for under ESMP                                             |
| Noise and vibrations                                                         | Noise and vibrations                                                                | Noise level (in dB) and vibrations levels                                                                           | during project works         | Contractor/ supervisor                     | 300 for noise measurement                                           |
| Air pollution                                                                | Equipment and automobiles in good conditions                                        | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate               | Contractor/ traffic police                 | 750 for automobile certification                                    |
| Soil erosion                                                                 | Presence of soil erosion barriers at the project sites                              | Soil erosion and Turbidity in storm water                                                                           | Daily                        | EDCL/ Districts                            | 200                                                                 |
| Soil Waste                                                                   | Proper management of excavated soil and other soil waste generated from the project | Re- used excavated soil                                                                                             | regular                      | EDCL/ Districts                            | No cost is required                                                 |
| Fauna and flora removal                                                      | Reforestation where possible to offset loss of flora and fauna                      | Restored area                                                                                                       | After project implementation | Locals /local authorities /EDCL/ Districts | cost for restauration to be included in project construction budget |
| Working conditions                                                           | Occupational health and Safety                                                      | Availability at site of OHS Plan                                                                                    | Permanent                    | EDCL/ Districts                            | Cost covered during the preparation of OHS plan                     |
|                                                                              | Awareness on social, health and safety                                              | Number of awareness conducted                                                                                       | Daily                        | EDCL/ districts                            | 5,000 for signing MoU with district hospital                        |
|                                                                              | Incidents and accidents at the project site                                         | Presence of warning and reminding sign posts at the site                                                            | daily                        | Districts/ EDCL                            | Cost for signposts covered under construction budget                |
|                                                                              | Personal Protective Equipment (PPEs)                                                | Number of workers with PPEs                                                                                         | daily                        | EDCL/ Districts district / workers         | 40 to cater for overall PPE for each staff                          |

| Environmental items                        | Monitoring item                                         | Parameter/Indicator                                                          | Frequency | Responsible                                                  | Budget (USD)                                                                    |
|--------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|-----------|--------------------------------------------------------------|---------------------------------------------------------------------------------|
| HIV/ AIDS and other contaminating diseases | Health and sanitation plan for workers                  | Presence of sanitation facilities at project sites such as toilets and water | regular   | EDCL/ DISTRICTS District                                     | 500                                                                             |
| Child and forced labor                     | Minimum working age and working condition               | Employment record by age                                                     | regular   | EDCL /Local authorities/ project workers/ local population   | No cost is required                                                             |
| Tree removal (deforestation)               | Areas of the project with cleared trees                 | Number of trees removed at by district                                       | Once      | EDCL / Contractor/ Districts                                 | No cost required                                                                |
| <b>Operation phase</b>                     |                                                         |                                                                              |           |                                                              |                                                                                 |
| Effects from electrocution                 | Presence of warning signs and anti-climbing barbed wire | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables        | Regular   | EDCL/ Districts district/ local authorities/ local residents | Continuous: To be included under line RED-EDCL operation and Maintenance budget |
| Degraded sites by the project activities   | Rehabilitated areas after project activities            | Areas rehabilitated after project works                                      | Once      | Contractors/ EDCL                                            | 2,000                                                                           |
| <b>TOTAL</b>                               |                                                         |                                                                              |           |                                                              | <b>42,090</b>                                                                   |

#### Annex 5: Environmental and Social Management and Monitoring Plan for Rulindo district

##### Environmental and Social Management Plan for Rulindo district

| Activities                               | Description of potential impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementation schedule | Responsible for implementation                                         | Budget (USD)                                   |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|------------------------------------------------|
| <b>Design and Construction Phase</b>     |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                                                                        |                                                |
| Environmental and Social risk management | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul> | Ongoing                 | EPC contractor<br>Supervising engineer<br>Contractor &supervising firm | Under the cost of EPC's contract <sup>12</sup> |

<sup>12</sup> One EPC contract was considered for two district. The cost under this activity will be covered under the EPC.

| Activities                                                                                                                   | Description of potential impacts                                         | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation                      | Budget (USD)                            |
|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------|-----------------------------------------|
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops, and trees along the Right of Way and Poles foundations    | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works       | REG-EDCL/EPC Contractor and District, Districts     | 29,600 <sup>13</sup>                    |
|                                                                                                                              | PAPs complaints about their crops and trees affected by survey team      | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts     | 4,000*                                  |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW | <ul style="list-style-type: none"> <li>- All crops and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts     | To be included under RAP budget         |
| Clearing all vegetation, felling trees in 6m width of Right of Way                                                           | Loss of vegetation cover in in the right of way and poles foundations.   | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> </ul>                                                               | During site clearance   | REG-EDCL/ /District REG-EDCL/ Contractor, Districts | To be included in EPC contract's Budget |

<sup>13</sup> Estimated based on other projects in eastern province (to be updated and included in RAP for each district) estimation is done at 800 US\$ per 1 km of MV

\*: Estimates are based on similar project in the area of intervention and the length of MV lines by district

| Activities                 | Description of potential impacts                 | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementation schedule          | Responsible for implementation                                                             | Budget (USD)                        |
|----------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------|
|                            |                                                  | <ul style="list-style-type: none"> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                                                                                            |                                     |
|                            | Loss of flora and fauna species                  | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities;</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The reptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul>                                  | During design and Site clearance | EPC contractor                                                                             | Mobilization and Operational Budget |
| Recruitment and employment | Labor influx/ Labour issues and employee conduct | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;</li> <li>- All workers to have contracts and time sheets for casual labourers;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff</li> </ul> | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 7,000*                              |
|                            | Risk of Gender Based Violence (GBV) and Sexual   | <ul style="list-style-type: none"> <li>- Undertake training and awareness sessions for workers on SH, SEA, and GBV</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                          | REG/EDCL, Supervising Engineer, EPC                                                        | 5,000                               |

| Activities                                  | Description of potential impacts                      | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation                                             | Budget (USD)       |
|---------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------|--------------------|
|                                             | Exploitation and Abuse (SEA),                         | <ul style="list-style-type: none"> <li>- The contractor will be required to prepare and implement a code of conduct and each employee will sign it;</li> <li>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement</li> <li>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.</li> <li>- Work with Existing GBV and isange one stop centers program to address GBV and SEA complaints</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | Contractor, Health Centers, Districts, Isange One stop center              |                    |
|                                             | Possible increases of HIV/AIDS and other communicable | <ul style="list-style-type: none"> <li>- Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;</li> <li>- All project workers shall be regularly sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;</li> <li>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.</li> <li>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.</li> <li>- Sensitize community and schools about construction hazards as well as HIV/AIDS.</li> <li>- Provide workers with condoms. Free of charge as means of HIV prevention</li> <li>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.</li> <li>- All workers to have access to medical care</li> </ul> | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, | 5,000              |
|                                             | Child labor, forced labour and discrimination.        | <ul style="list-style-type: none"> <li>- Avoid any form of discrimination or exclusion during project activities;</li> <li>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;</li> <li>- Protect workers' rights by providing work contract to every project employee;</li> <li>- Recruitment of project workers shall be done based on the working age.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                 | Operational Budget |
| Foundation works, excavation, and trenching | Injuries or fatalities from improper manual handling  | <ul style="list-style-type: none"> <li>- The entire project should be insured;</li> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                       | Ongoing                 | EPC contractor, Supervising engineer, REG-EDCL                             | 6,000              |
|                                             | Vandalism of                                          | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor,                                                            | Operational        |

| Activities | Description of potential impacts           | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible for implementation                 | Budget (USD)                    |
|------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------|---------------------------------|
|            | construction material                      | <ul style="list-style-type: none"> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | Supervising engineer /district                 | Budget                          |
|            | Health and Safety issues                   | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget<br><br>3,000 |
|            | Loss of on Physical and Cultural Resources | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure";</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul>                                                                                                                                                      | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget              |

| Activities | Description of potential impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as “Men at Work” or “Work in Progress” or “trucks turning”.</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | EPC contractor, Supervising engineer | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</li> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> <li>- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Increased risks of soil erosion                    | <ul style="list-style-type: none"> <li>- During project works, contractor shall only clear areas earmarked for construction;</li> <li>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.</li> <li>- The excavated soil shall be re-used in backfilling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities | Description of potential impacts                | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|            | Poor Solid waste management                     | <ul style="list-style-type: none"> <li>- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;</li> <li>- Avoid or minimize the generation of waste materials, as far as practicable;</li> <li>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;</li> <li>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;</li> <li>- Use only waste handlers licensed by REMA to dispose of hazardous waste.</li> <li>- Provide adequate sanitary facilities for workers especially at staging areas;</li> <li>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;</li> <li>- Consider developing a waste management plan for proper solid waste management</li> </ul>                                                                             | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Noise and Vibration pollution                   | <ul style="list-style-type: none"> <li>- No night-time works will be undertaken.</li> <li>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.</li> <li>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.</li> <li>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).</li> <li>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance</li> </ul>                                                                                                                                                                                                                                                                                                                   | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Impact on Ambient air quality and air pollution | <ul style="list-style-type: none"> <li>- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;</li> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;</li> <li>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;</li> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Human waste disposal issues                     | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | EPC contractor, Supervising          | 6,000               |

| Activities                                                                                     | Description of potential impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible for implementation       | Budget (USD)        |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|                                                                                                |                                                                                                                           | <ul style="list-style-type: none"> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                         | engineer                             |                     |
|                                                                                                | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refilling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers              | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> <li>- More details are included in Occupational health and safety</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Operational budget  |
|                                                                                                | Risk of accidents during lifting equipment to position, erection of poles, stringing and wiring as well as connection.    | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                 | REG-EDCL/Contractor and Districts    | Construction budget |
| <b>Operational &amp; Maintenance Phase</b>                                                     |                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                      |                     |
| Maintenance of electrical principal equipment and Power Distribution through the proposed line | Theft of equipment and Vandalism of power distribution infrastructure                                                     | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL, District                   | Operational Budget  |

| Activities | Description of potential impacts                            | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Implementation schedule | Responsible for implementation | Budget (USD)       |
|------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|--------------------|
|            | Health and safety issues due to Electric and magnetic field | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                      | Ongoing                 | REG-EDCL, District             | Operational Budget |
|            | Risk of bird collision                                      | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL, District             | Operational Budget |
|            | Pollution from transformer oil spillages                    | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during repair and maintenance of transformers</li> </ul>                                                                                                                                                                                                                                  | Ongoing                 | REG-EDCL, District             | Operational Budget |
|            | <i>Fire accidents due to inappropriate power usage</i>      | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul> | Ongoing                 | REG-EDCL, District             | Operational Budget |
|            | Vandalism of the electrical cables and other structures     | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL, District             | Operational Budget |
|            | Disruption of electrical supply due to                      | <ul style="list-style-type: none"> <li>- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL, District             | Operational Budget |

| Activities                                                        | Description of potential impacts                                            | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible for implementation | Budget (USD)           |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|
|                                                                   | encroachment of the RoW and plantation of high trees under electrical lines | - Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                |                        |
|                                                                   | Workers safety                                                              | - Provide adequate PPEs to all maintenance technicians and operator<br>- Put in place all precautions to prevent electrocution<br>- Ensure that operators and maintenance workers are adequately trained<br>- Establish and communicate regular maintenance plans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Regularly               | REG-EDCL                       | Operational budget     |
|                                                                   |                                                                             | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |                                |                        |
| <b>Decommissioning Phase</b>                                      |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                |                        |
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's          | - A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.<br>- Provide protective equipment to site workers as means of impact prevention.<br>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.<br>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.<br>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.<br>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.<br>- The wooden poles shall be used as source of energy for cooking by local people.<br>- Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA). | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|                                                                   | Water and soil pollution from transformer oil spillages                     | - The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage or disposal.<br>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.<br>- Oil spill kits to be provided for during decommissioning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |
|                                                                   | <b>Ambient air pollution</b>                                                | - Personal protective equipment like dust masks will be availed to workers whenever needed;<br>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;<br>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Once                    | REG-EDCL, EPC contractor       | Decommissioning budget |

| Activities          | Description of potential impacts | Mitigations measures                                                                                                                                                                                                                                                                                                                                                 | Implementation schedule | Responsible for implementation | Budget (USD)  |
|---------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------|---------------|
|                     |                                  | <ul style="list-style-type: none"> <li>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles</li> </ul> |                         |                                |               |
| <b>Total budget</b> |                                  |                                                                                                                                                                                                                                                                                                                                                                      |                         |                                | <b>36,000</b> |

#### Environmental and Social Monitoring Plan to be implemented in Rulindo district

| Environmental items                                                          | Monitoring item                                                                               | Parameter/Indicator                                       | Frequency                      | Responsible                                   | Budget (USD)                                   |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------|-----------------------------------------------|------------------------------------------------|
| <b>Pre-construction and project mobilization phase</b>                       |                                                                                               |                                                           |                                |                                               |                                                |
| Securing of the RoW                                                          | Fair compensation for affected crops, and trees                                               | Reports for affected crops, and trees                     | Once before project activities | Districts/ local Authorities/ property valuer | To be determined under A-RAP for each district |
|                                                                              | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook<br>Project area                               | Regular                        | Districts local authorities/ PAPs             | To be determined after project designs         |
| <b>Construction phase</b>                                                    |                                                                                               |                                                           |                                |                                               |                                                |
| Accidents and incidents                                                      | Number of accidents and incidents                                                             | Incidents and accidents logbook                           | When deemed necessary          | EDCL /Districts local traffic police          | no cost required for recording                 |
| Labor influx                                                                 | Number of workers for the project                                                             | Workers log book by sex and by area of origin             | Permanent                      | Contractor                                    | No budget required to register                 |
| Increased traffic in the project area                                        | Availability of traffic management plan                                                       | Availability of traffic management plan                   | Before project start           | Contractor / supervisor                       | Budgeted for under ESMP                        |
|                                                                              | Number of the traffic accidents                                                               | Report on traffic accidents                               | Monthly                        | Contractor supervisor                         | No cost required for recording                 |
|                                                                              | Flagmen at the construction site                                                              | Presence of Flagmen and traffic signals at the site       | When necessary                 | Contractor supervisor                         | Under construction budget                      |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                           | Training reports and awareness minutes of SH, SEA and GBV | During project works           | Contractor / supervisor                       | Under construction budget                      |
|                                                                              |                                                                                               | GBV complaints resolution reports                         | As appropriate                 | Contractor / supervisor                       | Under construction budget                      |
|                                                                              |                                                                                               | Availability of Code of conduct                           | Permanent                      | Contractor / supervisor                       | budgeted for under ESMP                        |
| Noise and vibrations                                                         | Noise and vibrations                                                                          | Noise level (in dB) and vibrations levels                 | during project works           | Contractor/ supervisor                        | 300 for noise measurement                      |

| Environmental items                        | Monitoring item                                                                     | Parameter/Indicator                                                                                                 | Frequency                    | Responsible                                                  | Budget (USD)                                                             |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|
| Air pollution                              | Equipment and automobiles in good conditions                                        | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate               | Contractor/ traffic police                                   | 750 for automobile certification                                         |
| Soil erosion                               | Presence of soil erosion barriers at the project sites                              | Soil erosion and Turbidity in storm water                                                                           | Daily                        | EDCL/ Districts                                              | 200                                                                      |
| Soil Waste                                 | Proper management of excavated soil and other soil waste generated from the project | Re- used excavated soil                                                                                             | regular                      | EDCL/ Districts                                              | No cost is required                                                      |
| Fauna and flora removal                    | Reforestation where possible to offset loss of flora and fauna                      | Restored area                                                                                                       | After project implementation | Locals /local authorities /EDCL/ Districts                   | cost for restauration to be included in project construction budget      |
| Working conditions                         | Occupational health and Safety                                                      | Availability at site of OHS Plan                                                                                    | Permanent                    | EDCL/ Districts                                              | Cost covered during the preparation of OHS plan                          |
|                                            | Awareness on social, health and safety                                              | Number of awareness conducted                                                                                       | Daily                        | EDCL/ districts                                              | 5,000 for signing MoU with district hospital                             |
|                                            | Incidents and accidents at the project site                                         | Presence of warning and reminding sign posts at the site                                                            | daily                        | Districts/ EDCL                                              | Cost for signposts covered under construction budget                     |
|                                            | Personal Protective Equipment (PPEs)                                                | Number of workers with PPEs                                                                                         | daily                        | EDCL/ Districts district / workers                           | 40 to cater for overall PPE for each staff                               |
| HIV/ AIDS and other contaminating diseases | Health and sanitation plan for workers                                              | Presence of sanitation facilities at project sites such as toilets and water                                        | regular                      | EDCL/ DISTRICTS District                                     | 500                                                                      |
| Child and forced labor                     | Minimum working age and working condition                                           | Employment record by age                                                                                            | regular                      | EDCL /Local authorities/ project workers/ local population   | No cost is required                                                      |
| Tree removal (deforestation)               | Areas of the project with cleared trees                                             | Number of trees removed at by district                                                                              | Once                         | EDCL / Contractor/ Districts                                 | No cost required                                                         |
| <b>Operation phase</b>                     |                                                                                     |                                                                                                                     |                              |                                                              |                                                                          |
| Effects from electrocution                 | Presence of warning signs and anti-climbing barbed wire                             | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables                                               | Regular                      | EDCL/ Districts district/ local authorities/ local residents | Continuous: To be included under line RED-EDCL operation and Maintenance |

| Environmental items                      | Monitoring item                              | Parameter/Indicator                     | Frequency | Responsible       | Budget (USD) |
|------------------------------------------|----------------------------------------------|-----------------------------------------|-----------|-------------------|--------------|
|                                          |                                              |                                         |           |                   | budget       |
| Degraded sites by the project activities | Rehabilitated areas after project activities | Areas rehabilitated after project works | Once      | Contractors/ EDCL | 2,000        |
| <b>TOTAL</b>                             |                                              |                                         |           |                   | <b>8,790</b> |

## Annex 6: Environmental and Social Management and Monitoring Plan for Burera district

### Environmental and Social Management Plan for Burera District

| Activities                                                                                                                   | Description of potential impacts                                                                                     | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Implementation schedule | Responsible entity                                                     | Budget (USD)                                   |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------|------------------------------------------------|
| <b>Design and Construction Phase</b>                                                                                         |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |                                                                        |                                                |
| Environmental and Social risk management                                                                                     | Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer | <ul style="list-style-type: none"> <li>- Recruit and maintain a qualified environmental Expert, a social expert at contractor level;</li> <li>- Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district;</li> <li>- Preparation and implementation of Contractor Environmental and Social management Plans including at Minimum Occupational Health and Safety Plan( a general plan is provided in this ESIA), Waste Management Plan, Traffic Management Plan and site restoration plan etc.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor<br>Supervising engineer<br>Contractor &supervising firm | Under the cost of EPC's contract <sup>14</sup> |
| Survey of ROW for medium and low voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way | Loss of crops and trees along the Right of Way and Poles foundations                                                 | <ul style="list-style-type: none"> <li>- Prepare and implement a resettlement plan once the right of Way is identified;</li> <li>- Project activities shall be implemented after harvest to avoid crops losses and damages;</li> <li>- Local community and project beneficiaries must be involved in survey activities to identify and locate such protect areas such as graves and cemeteries where applicable;</li> <li>- Priority in job allocation shall be given to the affected local people as an alternative income source to sustain their domestic requirements.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations.</li> <li>- Ensure the RoW is restricted as much as possible to the road reserve and other public spaces.</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations</li> </ul> | Before site works       | REG-EDCL/EPC Contractor and District, Districts                        | 9,000 <sup>15</sup>                            |
|                                                                                                                              | PAPs complaints about their crops and trees affected by survey team                                                  | <ul style="list-style-type: none"> <li>- Establishment and operationalization of community Grievance Redress Mechanism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | 4,000                                          |
|                                                                                                                              | Disruption of agricultural activities and land use restriction under RoW                                             | <ul style="list-style-type: none"> <li>- All crops and trees that are likely to be affected by the proposed project shall be compensated for except those which are in the road reserve;</li> <li>- Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,</li> <li>- Continuous sensitization of the communities through the District Authorities is recommended. There should be signed agreements between the Community and districts on restriction in the Right of Way.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  | Ongoing                 | REG-EDCL/EPC Contractor and District, Districts                        | RAP budget                                     |
| Clearing all                                                                                                                 | Loss of vegetation                                                                                                   | <ul style="list-style-type: none"> <li>- Ensure the RoW is restricted as much as possible to the road reserve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | During site clearance   | REG-EDCL/                                                              | To be                                          |

<sup>14</sup> One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC and not by district

<sup>15</sup> Estimated cost for RAP preparation after project designs approvals.

| Activities                                            | Description of potential impacts                    | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Implementation schedule          | Responsible entity                                                                         | Budget (USD)                        |
|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------|
| vegetation, felling trees in 6m width of Right of Way | cover in in the right of way and poles foundations. | <ul style="list-style-type: none"> <li>- The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;</li> <li>- Clearing of trees should be for only those that are more than 2m high within the RoW, and the tall trees and branches adjacent the power lines that are of safety concern</li> <li>- Limit clearance for access, installation work and maintenance to the necessary extent, mainly at pole locations;</li> <li>- Remove as much vegetation as possible by hand held tools and avoid the use of heavy machinery, especially in sloping areas and sensitive areas.</li> <li>- The wetlands, rivers, streams and areas that have surface water should be avoided and protected from earth works and contamination, and poles sited away from wet sections of the lines where possible.</li> <li>- All workers to be sensitized against unnecessary destruction, trampling and clearance of flora, blocking drainage and dumping wastes in swamps or water courses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  | /District REG-EDCL/ Contractor, Districts                                                  | included in EPC contract's Budget   |
|                                                       | Loss of flora and fauna species                     | <ul style="list-style-type: none"> <li>- The sites clearance should be only done on an area demarcated for project activities;</li> <li>- Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected.</li> <li>- To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve;</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Given the slow nature of amphibians and mammals, they should be scared away and allowed to escape prior to works once sited</li> <li>- Any amphibian and reptiles encountered during the construction phase that cannot flee on its own accord should be relocated. The herptiles should be relocated to a suitable area immediately outside the construction footprint area but under no circumstance to an area further away</li> <li>- Construction workers to be sensitized no to cause harm to wildlife</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> <li>- Limit clearance for installation work and inspection to the necessary extent.</li> <li>- Ensure that the habitats are not disturbed by limiting the RoW within the road reserve.</li> </ul> | During design and Site clearance | EPC contractor                                                                             | Mobilisation and Operational Budget |
| Recruitment and employment                            | Labor influx/ Labour issues and employee conduct    | <ul style="list-style-type: none"> <li>- Establish and operationalize Workers Grievance Redress Mechanism at all construction sites</li> <li>- Development and implementation of a Labor Management Plan</li> <li>- Maximum effort shall be made to recruit locals who return to their home after work;</li> <li>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;</li> <li>- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ongoing                          | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/ | 5,000                               |

| Activities        | Description of potential impacts                                             | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible entity                                                                                | Budget (USD)       |
|-------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------|--------------------|
|                   |                                                                              | labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism;<br>- All workers to have contracts and time sheets for casual labourers;<br>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement<br>- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly;<br>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff                                                                                                                                                                                                                       |                         |                                                                                                   |                    |
|                   | Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | - Undertake training and awareness sessions for workers on SH, SEA, and GBV<br>- Maximum effort shall be made to recruit locals who return to their home after work;<br>- The contractor will be required to prepared and implement a code of conduct and each employee will sign it;<br>- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement<br>- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.<br>- Work with Existing GBV and isange one stop center's program to address GBV and SEA complaints                                                                                                                                                                                                                | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center | 5,000              |
|                   | Possible increases of HIV/AIDS and other communicable                        | - Contractor to have in place a worker's code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour;<br>- All project workers shall be regular sensitized on ways of HIV/AIDS contamination and prevention and other communicable diseases;<br>- Toolboxes talks will be conducted on the ways of diseases contamination and prevention.<br>- Contractor to have in place an HIV/AIDS Prevention and Management Policy.<br>- Sensitize community and schools about construction hazards as well as HIV/AIDS.<br>- Provide workers with condoms. Free of charge as means of HIV prevention<br>- Communities will be encouraged to report cases of illicit sexual behaviour by contractor workers to REG and local authorities.<br>- All workers to have access to medical care | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,                        | 7,000              |
|                   | Child labor, forced labour and discrimination.                               | - Avoid any form of discrimination or exclusion during project activities;<br>- Mitigation measures against child labor, forced labor, discrimination and abusive dismissal should be clearly included in contractor labor management Plan;<br>- Protect workers' rights by providing work contract to every project employee;<br>- Recruitment of project workers shall be done based on the working age.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ongoing                 | REG/EDCL, Supervising Engineer, EPC Contractor, Districts,                                        | Operational Budget |
| Foundation works, | Injuries or fatalities from improper                                         | - The entire project should be insured;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Ongoing                 | EPC contractor, Supervising                                                                       |                    |

| Activities                | Description of potential impacts   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Implementation schedule | Responsible entity                             | Budget (USD)                    |
|---------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------|---------------------------------|
| excavation, and trenching | manual handling                    | <ul style="list-style-type: none"> <li>- The contractor will establish health and safety measures that must be implemented at the project site by all workers;</li> <li>- Provision of appropriate Personnel Protective Equipment (PPE) to all employees;</li> <li>- Provide and avail permanent First aid kit at the work site;</li> <li>- Provide health insurance for all workers as means of health affordability;</li> <li>- Working conditions should respect the requirement of the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda;</li> <li>- Measures are taken to oblige workers to wear properly the PPEs and to properly manage generated waste to prevent any accidents during the construction works;</li> <li>- The safety plan and measure must be prepared and enforced at the project site;</li> <li>- Provide sign boards at the project site to prevent accidents and troubles involving site workers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         | engineer, REG-EDCL                             | 5,000                           |
|                           | Vandalism of construction material | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget              |
|                           | Health and Safety issues           | <ul style="list-style-type: none"> <li>- Avoid excavation works in areas with loose materials in extremely dry weathers to prevent dust;</li> <li>- Reduce cases of trespass and theft; and control entry and exist in working areas to avoid conflicts between people at the site and the people in the neighborhood;</li> <li>- Have a fully always equipped First Aid Kit at the site and ensure that trained first aid personnel are available to handle any incidents that may occur;</li> <li>- Provide workers with appropriate PPE including boots and overalls etc. The PPE must be worn in all situations where the body and skin are potentially exposed to hazards such as harmful dusts, infectious wastes, sharp objects etc.</li> <li>- Ensure adequate clean water supply that keeps to the minimum chances of disease outbreaks;</li> <li>- Provide hazard notifications, signage and warnings to warn visitors and staff of potential dangers that may exist in different areas of the project sites;</li> <li>- Clearly display emergency contacts such as ambulance and police at the construction site;</li> <li>- Warning signs will be expected to be displayed next to dangerous points and machines to restrict the movement of unauthorized personnel on site during construction and to warn heavy load vehicles that will be at the site against possible danger;</li> <li>- A safety officer will be at the construction site during the construction phase, always to make sure a first aid kit is always available and that the skilled workers are aware of the safety rules</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget<br><br>3,000 |

| Activities | Description of potential impacts                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Implementation schedule | Responsible entity                             | Budget (USD)        |
|------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------|---------------------|
|            | Loss of on Physical and Cultural Resources         | <ul style="list-style-type: none"> <li>- At the local level, additional consultations will be carried out prior to commencement of works by the contractor, particularly on sites of cultural importance along the RoW.</li> <li>- Where cultural resources are encountered, compensation will be provided including support for relocation, such as graves, where applicable in a culturally acceptable manner.</li> <li>- Excavation of sites of known archaeological importance should be avoided, and the routing of distribution lines should be designed to avoid graveyards or sites of historical or spiritual importance;</li> <li>- Construction workers and managers should be trained in basic skills of how to identify and handle archaeological materials/artefacts before commencement of work. Such training should be administered in liaison with district;</li> <li>- In the event of any chance finds of significance by the contractor, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure";</li> <li>- The Contractor will be required to stop works and contact local Authority to inform the Department of Museums and Monuments. The Contractor should have the artefacts secured or protected, and prevent any access.</li> <li>- The museum and district authority will then undertake investigations, and works will only resume once authorization is provided.</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer /district | Operational Budget  |
|            | Increased traffic in the project area              | <ul style="list-style-type: none"> <li>- Local traffic police will be involved for traffic monitoring;</li> <li>- Where possible speed limit and other traffic signs shall be installed especially in project working areas.</li> <li>- Traffic guides will be employed (flagmen) to control traffic;</li> <li>- Use of safety signage with labels such as "Men at Work" or "Work in Progress" or "trucks turning".</li> <li>- Sensitize drivers on traffic management measures, good conduct while on public roads, and enforce speed limits for crew of up to 30 kph near construction sites;</li> <li>- Project vehicles will give the right of way to the local vehicles in the project area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ongoing                 | EPC contractor, Supervising engineer           | Operational Budget  |
|            | Impacts on Soil, hydrology, water and ground water | <ul style="list-style-type: none"> <li>- Siting of poles and transformers to avoid permanently and seasonally wet sections and water courses; change impacts;</li> <li>- The contractor to ensure disturbed sites, particularly the pole sites are restored immediately after works, and sediment control measures are in place for sites prone to soil erosion</li> <li>- Waste management during construction is crucial to prevent negative aesthetic impacts on the surroundings environment of the project areas.</li> <li>- At the staging areas clearance of vegetation will be limited to only those areas where it is absolutely necessary;</li> <li>- If the storage of hazardous chemicals (i.e. fuels, lubricants) onsite cannot be avoided, these will be stored on raised locations such as paved ground surfaces to prevent leakage into the ground. The storage areas and the containers will be inspected daily and any spills</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ongoing                 | EPC contractor, Supervising engineer           | Constriction budget |

| Activities | Description of potential impacts | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Implementation schedule | Responsible entity                   | Budget (USD)        |
|------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|            |                                  | <p>immediately cleaned; Contractors however should consider use of mobile fueling tankers other than fuel storage on sites</p> <ul style="list-style-type: none"> <li>- The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground</li> <li>- No hazardous materials (e.g. fuel or lubricant drums) will be stockpiled on site;</li> <li>- All vehicles to be checked for potential of oil leakages prior to works in wet sections of the line</li> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized, and sites restored after works;</li> <li>- Location of staging areas on steep gradients should be avoided to prevent increased erosion.</li> <li>- All vehicles and equipment to be serviced in designated areas, preferably at garages in urban Centers along the line routes</li> </ul>                                                                                                                                                                |                         |                                      |                     |
|            | Increased risks of soil erosion  | <ul style="list-style-type: none"> <li>- During project works, contractor shall only clear areas earmarked for construction;</li> <li>- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion.</li> <li>- The excavated soil shall be re-used in backfilling.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|            | Poor Solid waste management      | <ul style="list-style-type: none"> <li>- Waste management hierarchy (3 or 4Rs – reduce, reuse, recycle (and recover) which is an acceptable guide for prioritizing waste management practices should be considered;</li> <li>- Avoid or minimize the generation of waste materials, as far as practicable;</li> <li>- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste; and;</li> <li>- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner;</li> <li>- Use only waste handlers licensed by REMA to dispose of hazardous waste.</li> <li>- Provide adequate sanitary facilities for workers especially at staging areas;</li> <li>- Provide labelled waste bins at work sites for segregation of waste into biodegradable, no biodegradable and hazardous streams, and dispose appropriately;</li> <li>- Consider developing a waste management plan for proper solid waste management</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | 6,000               |
|            | Noise and Vibration pollution    | <ul style="list-style-type: none"> <li>- No night-time works will be undertaken.</li> <li>- Activities with highest noise emissions will be undertaken at less sensitive times, especially near schools and health centers.</li> <li>- Vehicles delivering construction materials will be prohibited from waiting near sites with their engines running. The movement of heavy vehicles during the night will be avoided.</li> <li>- Where appropriate, noise barriers /attenuation will be employed to ensure that the maximum noise level at 1 m distance from a single source does not exceed 85 dB(A).</li> <li>- If particularly noisy works are scheduled, the nearest sensitive receptors (homestead owners, nearby schools, hospitals and retail shops) will be informed of the timing and duration of the nuisance</li> </ul>                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |

| Activities                                                                        | Description of potential impacts                                                                                          | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Implementation schedule | Responsible entity                   | Budget (USD)        |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|---------------------|
|                                                                                   | Impact on Ambient air quality and air pollution                                                                           | <ul style="list-style-type: none"> <li>- Regular vehicle maintenance and confirmation of compliance with Ugandan emissions standards;</li> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission. To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles;</li> <li>- Trucks transporting materials likely to emit dust will be well covered with appropriate material e.g. tarpaulins to prevent them from emitting dust;</li> <li>- All idle equipment or machinery will be turned off to minimize on gaseous emission;</li> <li>- Wherever possible, transport through densely populated areas should be avoided</li> </ul> | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
|                                                                                   | Human waste disposal issues                                                                                               | <ul style="list-style-type: none"> <li>- Put in place mobile toilets for use by workers during construction and ensure their periodic emptying by a licensed cesspool provider to any waste disposal designated facility</li> <li>- Workers should be made aware of the available sanitary facilities and trained on their use.</li> <li>- Ensure regular inspection of the worksite and the distribution line routes to identify sanitation non-conformances and ensure timely re-address.</li> <li>- Ensure that separate toilets are availed for both men and women and they should be well labelled</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Ongoing                 | EPC contractor, Supervising engineer | 7,000               |
|                                                                                   | Oil spillage                                                                                                              | <ul style="list-style-type: none"> <li>- Careful handling of oils and other liquids will be done to prevent oils spillage during refilling;</li> <li>- Proper maintenance of machinery and equipment is required to avoid leakages;</li> <li>- Transformers to be supplied must comply with the approved standard;</li> <li>- The refilling and maintenance should be done with qualified and experienced personnel;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ongoing                 | EPC contractor, Supervising engineer | Constriction budget |
| Poles erection, Stringing works, line energising and installation of transformers | Fall and trip hazards for workers and passers-by during mounting of strength electric equipment and Risk of poles failure | <ul style="list-style-type: none"> <li>- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,</li> <li>- PPE use and safety equipment;</li> <li>- call the attention of the operator on the ground before starting the movement;</li> <li>- proper locking of the support/implementation of the vehicle with ropes;</li> <li>- appropriate locking and stability of the hold of the supports on the ground;</li> <li>- controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;</li> <li>- ban on driving under suspended loads;</li> <li>- adequate stabilization of the crane;</li> <li>- immediate application of the sling above the center of gravity;</li> <li>- use of wooden beams to store backup elements or support sections preassembled;</li> <li>- Use of signs and red flags protruding loads into the ends of the poles.</li> </ul>                                                                    | Ongoing                 | EPC contractor, Supervising engineer | Operational budget  |

| Activities                                                                                     | Description of potential impacts                                                                                       | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Implementation schedule | Responsible entity                | Budget (USD)       |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------|--------------------|
|                                                                                                |                                                                                                                        | - More details are included in Occupational health and safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |                                   |                    |
|                                                                                                | Risk of accidents during lifting equipment to position, erection of poles, stringing and wiring as well as connection. | <ul style="list-style-type: none"> <li>- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly;</li> <li>- Ensure all safety measures to workers and public including provision of protective safety equipment specific to works;</li> <li>- First aid box and emergency medical coverage will be provided to workers.</li> </ul>                                                                                                                                                                                                                                           | Ongoing                 | REG-EDCL/Contractor and Districts | No cost required   |
| <b>Operational &amp; Maintenance Phase</b>                                                     |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                                   |                    |
| Maintenance of electrical principal equipment and Power Distribution through the proposed line | Theft of equipment and Vandalism of power distribution infrastructure                                                  | <ul style="list-style-type: none"> <li>- Sensitize the community through local radio projects and messages through places of worship (churches and mosques), and posters in public places on the negative effects of vandalizing electrical infrastructure;</li> <li>- Workers to be employed on site should be vetted or obtain reference letters by their respective village;</li> <li>- Contractor to engage a reputable security firm to provide security at sites, storage site, staging areas, and during materials transportation;</li> <li>- The security firms will be screened and references sought</li> </ul> | Ongoing                 | REG-EDCL, District                | Operational Budget |
|                                                                                                | Health and safety issues due to Electric and magnetic field                                                            | <ul style="list-style-type: none"> <li>- Sensitization of communities to avoid activities and putting up developments along the right of way of the distribution lines;</li> <li>- Sensitization of communities on electromagnetic fields, level of exposure and their impacts to avoid speculation;</li> <li>- Liaise with local authorities to ensure developments are not approved or occur within the right of way;</li> <li>- Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)</li> </ul>                 | Ongoing                 | REG-EDCL, District                | Operational Budget |
|                                                                                                | Risk of bird collision                                                                                                 | <ul style="list-style-type: none"> <li>- Conductors along wetlands and in bird's migration areas will run horizontal not vertical.</li> <li>- Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                | Ongoing                 | REG-EDCL, District                | Operational Budget |
|                                                                                                | Pollution from transformer oil spillages                                                                               | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and installation.</li> </ul>                                                                                                                                                                          | Ongoing                 | REG-EDCL, District                | Operational Budget |

| Activities                   | Description of potential impacts                                                                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Implementation schedule | Responsible entity | Budget (USD)       |
|------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|--------------------|
|                              |                                                                                                                    | <ul style="list-style-type: none"> <li>- Damage to native grasses and low shrubs vegetation onsite during construction/installation shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during repair and maintenance of transformers</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |                    |                    |
|                              | <i>Fire accidents due to inappropriate power usage</i>                                                             | <ul style="list-style-type: none"> <li>- A robust fire prevention program and fire suppression system should be developed by the contractor for use in each cabin.</li> <li>- All of the cabins site must contain firefighting equipment of recommended standards and in key strategic points. This should include at least, Carbon dioxide systems, Detection/alarm systems and portable fire extinguishers among others.</li> <li>- A fire evacuation plan must be posted in various points of the cabins including procedures to take when a fire is reported.</li> <li>- EDCL should continuously ensure that the ROW is kept clear by regular trimming of trees and maintenance.</li> <li>- Technical field personnel should report power outages to the REG-EDCL and repair faults quickly</li> <li>- Public education to raise awareness of electricity danger and how to utilize the system safely;</li> <li>- Improve supervision of field workers and conduct system maintenance regularly and diligently</li> </ul> | Ongoing                 | REG-EDCL, District | Operational Budget |
|                              | Vandalism of the electrical cables and other structures                                                            | <ul style="list-style-type: none"> <li>- Sensitization of local communities on the project ownership and protection;</li> <li>- Use community policing as a means of ascertaining security to avoid vandalism;</li> <li>- Regulations on penalties to perpetrators convicted of vandalism are necessary;</li> <li>- Punitive actions towards perpetrators by the authorities will facilitate compliance by the locals thereby avoiding vandalism</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ongoing                 | REG-EDCL, District | Operational Budget |
|                              | Disruption of electrical supply due to encroachment of the RoW and plantation of high trees under electrical lines | <ul style="list-style-type: none"> <li>- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines</li> <li>- Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ongoing                 | REG-EDCL, District | Operational Budget |
|                              | Workers safety                                                                                                     | <ul style="list-style-type: none"> <li>- Provide adequate PPEs to all maintenance technicians and operator</li> <li>- Put in place all precautions to prevent electrocution</li> <li>- Ensure that operators and maintenance workers are adequately trained</li> <li>- Establish and communicate regular maintenance plans</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Regularly               | REG-EDCL           | Operational budget |
|                              |                                                                                                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                    |                    |
| <b>Decommissioning Phase</b> |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |                    |                    |

| Activities                                                        | Description of potential impacts                                   | Mitigations measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Implementation schedule | Responsible entity       | Budget (USD)           |
|-------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|------------------------|
| Removal and disposal of electrical cables, poles and transformers | Waste generation and inappropriate storage of electric equipment's | <ul style="list-style-type: none"> <li>- A decommissioning plan for permanent closure of the project shall be developed prior to the decommissioning works.</li> <li>- Provide protective equipment to site workers as means of impact prevention.</li> <li>- Specific actions shall be identified and scheduled to restore the project areas to acceptable conditions.</li> <li>- Measures to minimize effects on surface water, groundwater, and other resources during decommissioning phase, and identify how project materials would be recycled.</li> <li>- Most of the decommissioned materials shall be recyclable such as steel structures and cabling. The recycling or reuse of materials, such as scrap metal, would depend on the market and existing technology.</li> <li>- Materials such as insulators, concrete foundations etc. shall be disposed of at a formal waste disposal or recycling center.</li> <li>- The wooden poles shall be used as source of energy for cooking by local people.</li> <li>- Proper disposal of uninstalled electrical equipment's in site approved by Rwanda Environment Management Authority (REMA).</li> </ul> | Once                    | REG-EDCL, EPC contractor | Decommissioning budget |
|                                                                   | Water and soil pollution from transformer oil spillages            | <ul style="list-style-type: none"> <li>- All transformers in the equipment storage yard should be placed on wooden platforms laid in high-density polythene bags spread with sawdust to soak away and contain oil leakage.</li> <li>- The Contractors shall also be required to develop and implement Standard Handling Procedures for Transformers to take care of any oil spillage during transportation, storage and disposal.</li> <li>- Damage to native grasses and low shrubs vegetation onsite during decommissioning shall be minimized. If there are areas where the natural vegetation has been severely damaged, these will be restored using native species.</li> <li>- Oil spill kits to be provided for during decommissioning.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         | Once                    | REG-EDCL, EPC contractor | Decommissioning budget |
|                                                                   | Ambient air pollution                                              | <ul style="list-style-type: none"> <li>- Personal protective equipment like dust masks will be availed to workers whenever needed;</li> <li>- Ensure regular servicing of vehicles and machinery likely to produce excessive gaseous emissions;</li> <li>- The speed of haulage trucks and other vehicles will be limited 30km/hr to reduce dust emission.</li> <li>- To ensure this, speed humps will be erected and the drivers of vehicles will be made to adhere to speed limits through sensitization and enforcement of penalties</li> <li>- unpaved access roads will be sprinkled with water (using water browsers); to minimize dust emissions caused by movement of vehicles</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Once                    | REG-EDCL, EPC contractor | Decommissioning budget |
| <b>Total budget</b>                                               |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         |                          | <b>42,000</b>          |

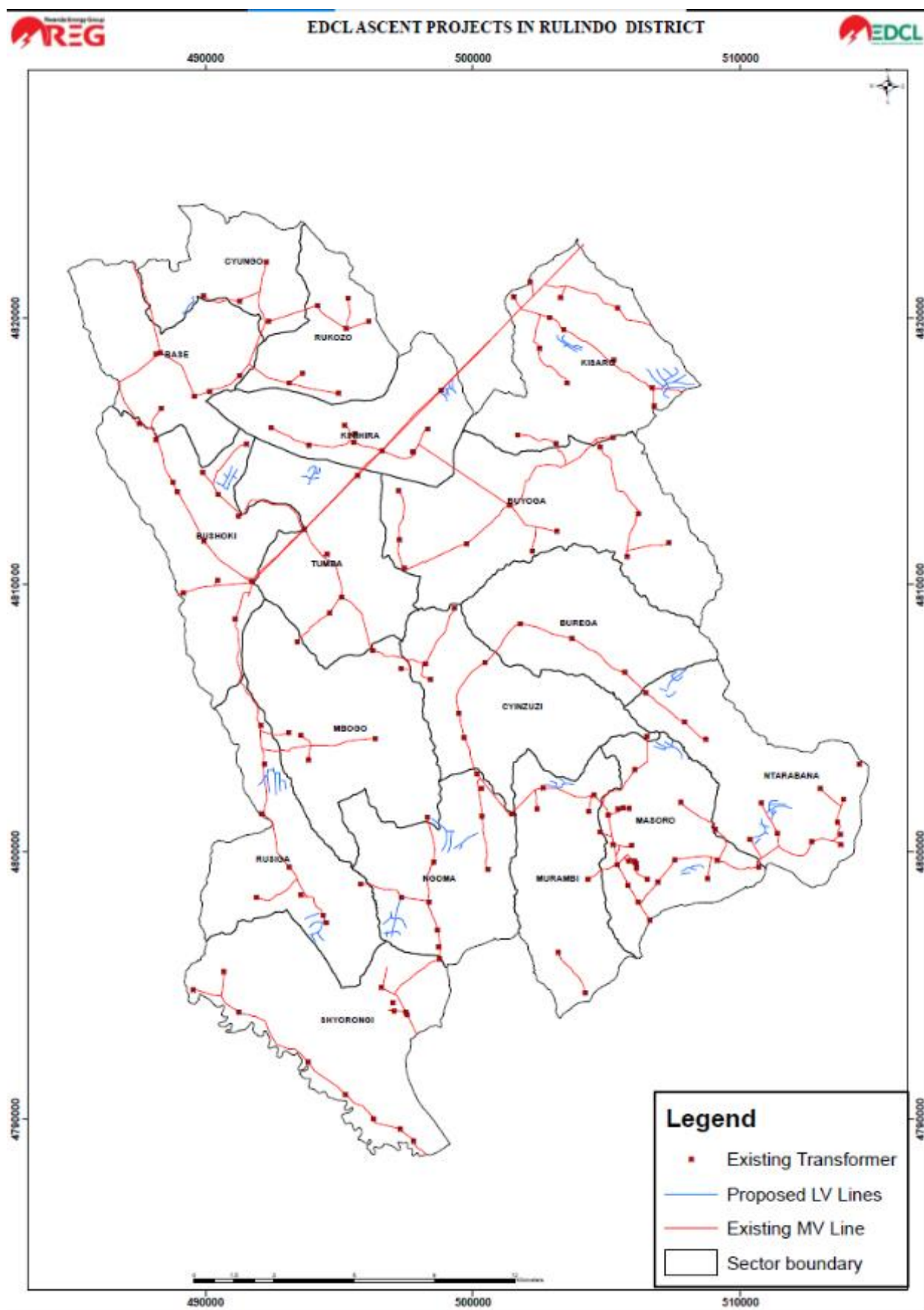
#### Environmental and Social Monitoring Plan to be applied in Burera district

| Environmental items                                                          | Monitoring item                                                                               | Parameter/Indicator                                                                                                 | Frequency                      | Responsible                                                 | Budget (USD)                                                            |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Planning and construction Phase</b>                                       |                                                                                               |                                                                                                                     |                                |                                                             |                                                                         |
| Securing of the RoW                                                          | Fair compensation for affected crops, and trees                                               | Reports for affected crops, and trees                                                                               | Once before project activities | District/ local Authorities/ property valuer                | To be determined under RAP                                              |
|                                                                              | Complaints associated to the transmission electrical cables located nearby residential houses | GRM logbook                                                                                                         | Regular                        | District local authorities/ PAPs                            | To be determined based on the final design and RAP budget <sup>16</sup> |
| Accidents and incidents                                                      | Number of accidents and incidents                                                             | Incidents and accidents logbook                                                                                     | When deemed necessary          | EDCL /District local traffic police, Supervising consultant | no cost required for recording                                          |
| Labor influx                                                                 | Number of workers for the project                                                             | Workers log book by sex and by area of origin                                                                       | Permanent                      | Contractor                                                  | No budget required to register                                          |
| Increased traffic in the project area                                        | Availability of traffic management plan                                                       | Availability of traffic management plan                                                                             | Before project start           | Contractor / supervisor                                     | Budgeted for under ESMP                                                 |
|                                                                              | Number of the traffic accidents                                                               | Report on traffic accidents                                                                                         | Monthly                        | Contractor / supervisor                                     | No cost required for recording                                          |
|                                                                              | Flagmen at the construction site                                                              | Presence of Flagmen and traffic signals at the site                                                                 | When necessary                 | Contractor / supervisor                                     | Under construction budget                                               |
| Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA), | Number of complaints related to GBV                                                           | Training reports and awareness minutes of SH, SEA and GBV                                                           | During project works           | Contractor / supervisor                                     | Under construction budget                                               |
|                                                                              |                                                                                               | GBV complaints resolution reports                                                                                   | As appropriate                 | Contractor / supervisor                                     | Under construction budget                                               |
|                                                                              |                                                                                               | Availability of Code of conduct                                                                                     | Permanent                      | Contractor / supervisor                                     | budgeted for under ESMP                                                 |
| Noise and vibrations                                                         | Noise and vibrations                                                                          | Noise level (in dB) and vibrations levels                                                                           | during project works           | Contractor/ supervisor                                      | 300 for noise measurement                                               |
| Air pollution                                                                | Equipment and automobiles in good conditions                                                  | Certificate of good working condition issued by automobile inspection center for all project machinery and vehicles | As appropriate                 | Contractor/ traffic police                                  | 750 for automobile certification                                        |
| Soil erosion                                                                 | Presence of soil erosion barriers at the project sites                                        | Soil erosion and Turbidity in storm water                                                                           | Daily                          | EDCL/ District                                              | 200                                                                     |
| Soil Waste                                                                   | Proper management of excavated soil and other soil waste generated from the project           | Re- used excavated soil                                                                                             | regular                        | EDCL/ District                                              | No cost is required                                                     |
| Fauna and flora removal                                                      | Reforestation where possible to offset loss of flora and fauna                                | Restored area                                                                                                       | After project implementation   | Locals /local authorities /EDCL/ District                   | cost for restauration to be included in                                 |

<sup>16</sup> The total length of MV and LV is not yet determined. The estimation shall be based on the final designs and length of the project. Other estimates are based on similar project in the area

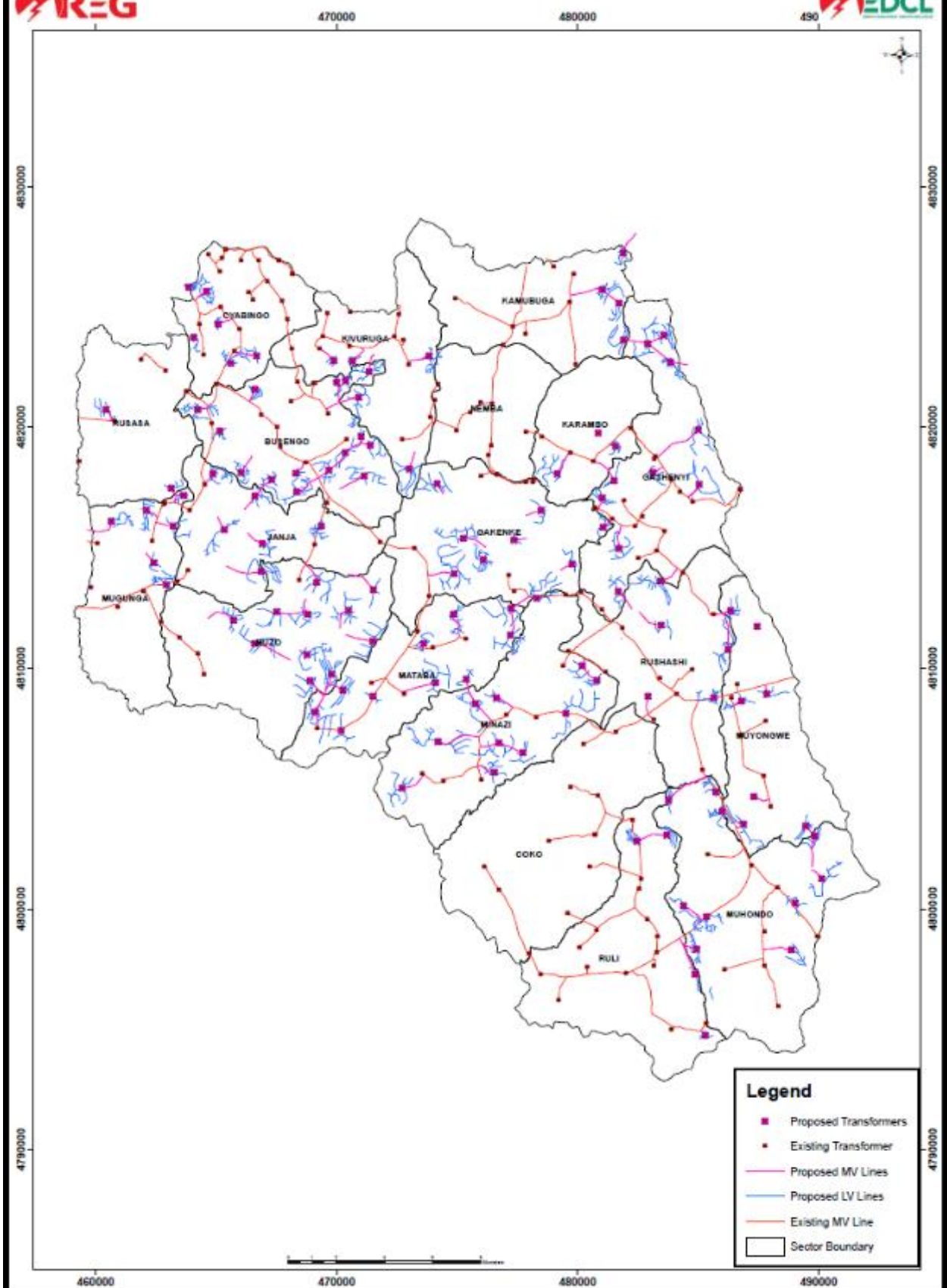
| Environmental items                        | Monitoring item                                         | Parameter/Indicator                                                          | Frequency | Responsible                                                | Budget (USD)                                                        |
|--------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|-----------|------------------------------------------------------------|---------------------------------------------------------------------|
|                                            |                                                         |                                                                              |           |                                                            | project construction budget                                         |
| Working conditions                         | Occupational health and Safety                          | Availability at site of OHS Plan                                             | Permanent | EDCL/ District                                             | Cost covered during the preparation of OHS plan                     |
|                                            | Awareness on social, health and safety                  | Number of awareness conducted                                                | Daily     | EDCL/ district                                             | 5,000 for MoU signed between district hospital                      |
|                                            | Incidents and accidents at the project site             | Presence of warning and reminding sign posts at the site                     | daily     | District/ EDCL                                             | Cost for sign post covered under construction budget                |
|                                            | Personal Protective Equipment (PPEs)                    | Number of workers with PPEs                                                  | daily     | EDCL/ District / workers                                   | 40 USD to cater for overall PPE for staff                           |
| HIV/ AIDS and other contaminating diseases | Health and sanitation plan for workers                  | Presence of sanitation facilities at project sites such as toilets and water | regular   | EDCL/ District                                             | 15000 to cater for sanitation facilities                            |
| Child and forced labor                     | Minimum working age and working condition               | Employment record by age                                                     | regular   | EDCL /Local authorities/ project workers/ local population | No cost is required                                                 |
| Tree removal (deforestation)               | Areas of the project with cleared trees                 | Number of trees removed at by district                                       | Once      | EDCL / Contractor/ District                                | to be covered under project construction budget                     |
| <b>Operation and maintenance Phase</b>     |                                                         |                                                                              |           |                                                            |                                                                     |
| Effects from electrocution                 | Presence of warning signs and anti-climbing barbed wire | Infrastructures damages<br>Proper sagging<br>Damaged poles and cables        | Regular   | EDCL/ District/ local authorities/ local residents         | To be included under line RED-EDCL operation and Maintenance budget |
| Degraded sites by the project activities   | Rehabilitated areas after project activities            | Areas rehabilitated after project works                                      | Once      | Contractors/ EDCL                                          | Under project construction budget                                   |
| <b>Total Monitoring Budget</b>             |                                                         |                                                                              |           |                                                            | <b>26,590</b>                                                       |

## Annex 7: Maps of the project location



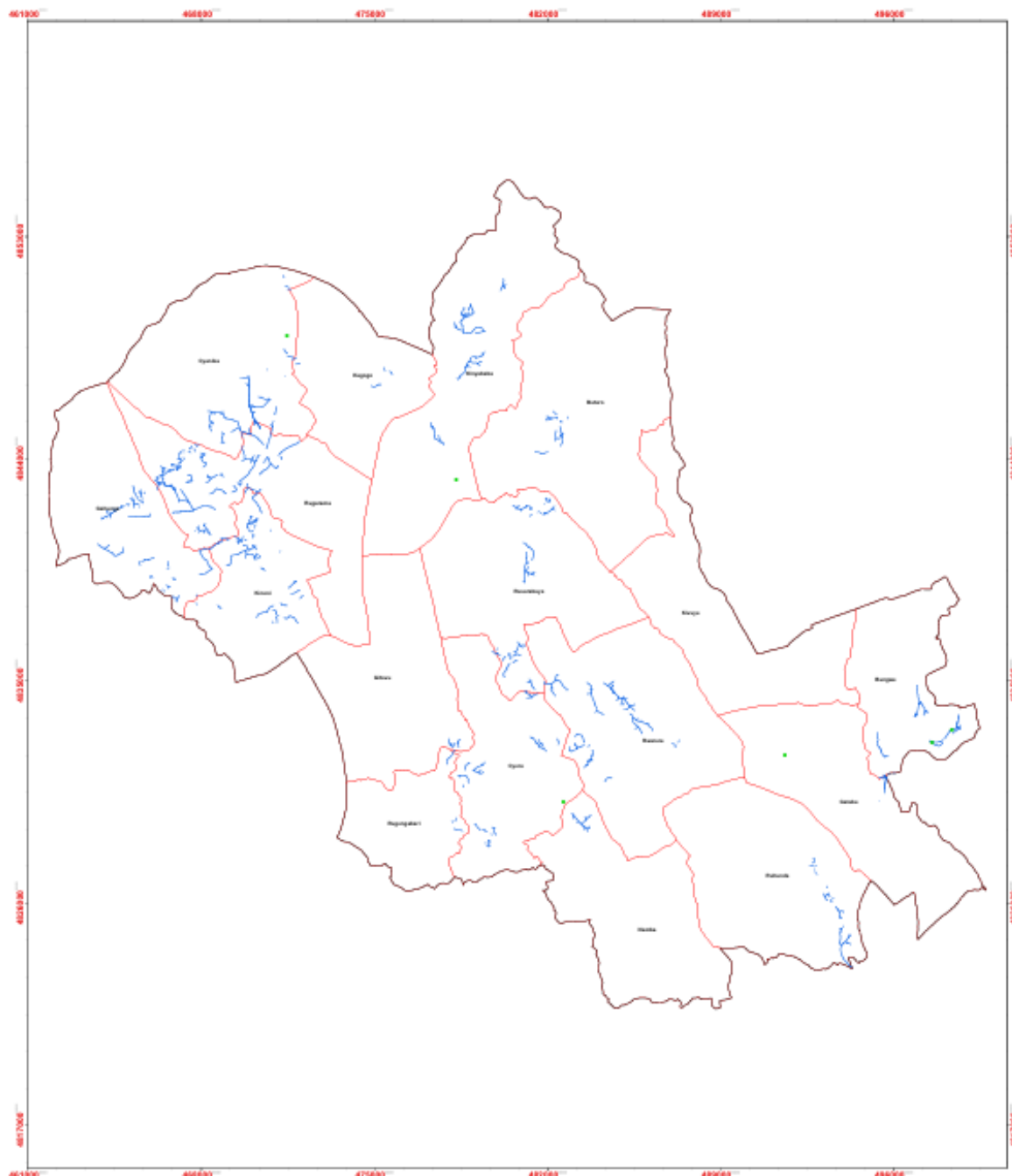








## EDCL PROJECTS BURERA DISTRICT



1:51,000

7,700 3,850 0 7,700 Meters

| Legend |                                          |
|--------|------------------------------------------|
|        | SINGLE PHASE TRANSFORMER BURERA DISTRICT |
|        | SINGLE PHASE LV LINES BURERA DISTRICT    |
|        | BURERA_DISTRICT SECTORS OK               |
|        | BURERA_DISTRICT                          |

**Guidelines N° 01/GL/EL-EWS/RURA/2015)**

| <b>VOLTAGE LEVELS</b>         | <b>0.4 kV</b> | <b>15kV≤V≤30 kV</b> | <b>110 kV</b> | <b>220 kV</b> | <b>400 kV</b> |
|-------------------------------|---------------|---------------------|---------------|---------------|---------------|
| <b>Right of Way width (m)</b> | 3             | 12                  | 25            | 30            | 50            |

**Note: Note: The power lines shall be centered in the Right-of-Ways.**

## Annex 9: List of contacted persons

| No | Names                  | District | Sector  | Position   | Telephone  | Signature   |
|----|------------------------|----------|---------|------------|------------|-------------|
| 1  | Furikwame Enoch        | Gashaka  | Kibungo | P98, RPF   | 0783022432 | [Signature] |
| 2  | Kwesi Tettey Francis   | Gashaka  | Kibungo | Mmuturanga | -          | [Signature] |
| 3  | Nkabunyo Samuel        | Gashaka  | Kibungo | Mmuturanga | 0941375412 | [Signature] |
| 4  | Munyamira Leonard      | Gashaka  | Kibungo | Mmuturanga | -          | [Signature] |
| 5  | Jesse Nkabunyo         | Mutoko   | Cyulo   | Mmuturanga | 076782123  | [Signature] |
| 6  | Ntshondile Alex        | Mutoko   | Cyulo   | Mmuturanga | 073194501  | [Signature] |
| 7  | Emanuel Muzenge        | Mutoko   | Goroka  | Mmuturanga | 072699563  | [Signature] |
| 8  | Theogene Ndlovu        | Mutoko   | Goroka  | Mmuturanga | -          | [Signature] |
| 9  | Paul Ntshondile        | Mutoko   | Goroka  | Mmuturanga | 078031506  | [Signature] |
| 10 | Patrick Ngokwizwe      | Mutoko   | Goroka  | Mmuturanga | 073692126  | [Signature] |
| 11 | Sarciso Nyirabazwe     | Mutoko   | Cyulo   | Mmuturanga | -          | [Signature] |
| 12 | Betha Thukuma          | Mutoko   | Cyulo   | Mmuturanga | 073032943  | [Signature] |
| 13 | Austin Hakiyima        | Mutoko   | Cyulo   | Mmuturanga | 0734920491 | [Signature] |
| 14 | Dominika Ntshondile    | Mutoko   | Cyulo   | Mmuturanga | -          | [Signature] |
| 15 | Silvien Umahana        | Mutoko   | Cyulo   | Mmuturanga | 078540196  | [Signature] |
| 16 | Constance Nyirabazwe   | Mutoko   | Cyulo   | Mmuturanga | -          | [Signature] |
| 17 | Bales Muzimbazi        | Mutoko   | Goroka  | Mmuturanga | 072140356  | [Signature] |
| 18 | Gabriel Makusha        | Mutoko   | Cyulo   | Mmuturanga | 0767820945 | [Signature] |
| 19 | Tobias Muzenge         | Mutoko   | Goroka  | Mmuturanga | 078002211  | [Signature] |
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## Annex 10: Physical Cultural Resource (PCR) and Chance Finds Procedure

In the case of a Physical Cultural Resource (PCR) chance find, the following procedures shall be followed:

1. Stop the construction activities around the chance find;
2. Delineate the discovered site or area;
3. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present, until the responsible local authorities and the responsible Institution take over;
4. Notify the supervisory Project Engineer and EDCL, who in turn will notify the responsible local authorities and the responsible Institution (within 24 hours or less);
5. The responsible Institution would oversee protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the Technicians and Specialists of the responsible Institution (within 24 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to historical, socio sensitivity and cultural heritage;
6. Decisions on how to handle the finding shall be taken by the responsible Institution. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
7. Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the responsible Institution;
8. These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Project Engineer shall monitor the above regulations relating to the treatment of any chance find encountered are observed;
9. Construction work will resume only after authorization is given by the responsible local authorities and the responsible Institution concerning the safeguard of the heritage; and
10. Relevant findings will be recorded in Implementation Supervision Reports and Implementation Completion Reports will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.
11. The Chance Finds Procedures should identify the responsible institution(s) to be contacted depending on the type of cultural heritage found on site. The following table prides an indicative list of some of the authorities that can be contacted:

| Type of cultural heritage | Responsible agency/authority                     |
|---------------------------|--------------------------------------------------|
| Grave                     | Local authorities                                |
| Mass graves               | Local authorities                                |
| Genocide memory/memorials | Ministry of National Unity and local authorities |
| Archaeological items      | Rwanda Cultural Heritage Academy                 |



**OCCUPATIONAL HEALTH, AND SAFETY PLAN FOR THE DESIGN, SUPPLY, AND INSTALLATION OF MEDIUM AND LOW VOLTAGE LINES, SERVICE CONNECTIONS, AND UPGRADING THE SINGLE-PHASE LINES TO THREE PHASES IN THE NORTHERN PROVINCE OF RWANDA**



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## ACRONYMS AND ABBREVIATIONS

|                 |                                                    |
|-----------------|----------------------------------------------------|
| <b>BESST</b>    | : Bureau for Engineering and Environmental Studies |
| <b>EA</b>       | : Environmental Assessment                         |
| <b>EDCL</b>     | : Energy Development Corporation Limited           |
| <b>EPC</b>      | : Engineering Design, Procurement and Construction |
| <b>HSP</b>      | : Health and Safety Plan                           |
| <b>ESHS</b>     | : Environmental, Social Health and Safety Plan     |
| <b>ESIA</b>     | : Environmental and Social Impact Assessment       |
| <b>ESF</b>      | : Environmental and Social Framework               |
| <b>ESS</b>      | : Environment and Social Standards                 |
| <b>GoR</b>      | : Government of Rwanda                             |
| <b>IFC</b>      | : International Finance Corporation                |
| <b>MININFRA</b> | : Ministry of Infrastructure                       |
| <b>OHS</b>      | : Occupational Health and Safety                   |
| <b>PPE</b>      | : Personal Protective Equipment                    |
| <b>PS</b>       | : Performance Standard                             |
| <b>RDB</b>      | : Rwanda Development Board                         |
| <b>REG</b>      | : Rwanda Energy Group                              |
| <b>REMA</b>     | : Rwanda Environment Management Authority          |
| <b>MoE</b>      | : Ministry of Environment                          |
| <b>WBG</b>      | : World Bank Group                                 |
| <b>WMP</b>      | : Waste Management Plan                            |

## 1. INTRODUCTION

This Occupational Health and Safety Plan (OHSP) has been developed to design, supply, and install medium and low voltage lines, service connections, and upgrade single-phase lines to three phases in the Northern Province of Rwanda. OHSP has been prepared in compliance with Rwanda regulations especially law no 48/2018 of 13/08/2018 on environment and law no 027/2023 of 18/05/2023, the World Bank Environmental and Social Standards.

The OHSP delineates and details actions to be implemented to identify not only general risks but also potential hazards specific to the project and establish the procedures to mitigate them. The plan is established to assist the Project implementing entity in achieving its "Zero Accidents" objective. It serves to inform and define the OHS regulations that must be adhered to by all Contractors, subcontractors, and workers, involved in project activities.

### 1.1. Objective of Occupational Health and Safety Plan

The objective of OHSP is to define the set of measures for the prevention of risks likely to arise from the execution of different activities on site. The OHSP encompasses a package of protection/prevention measures complementing the context of the ESMP and emphasizing health and safety issues to be considered during the overall project cycle.

Specifically, the Occupational Health and Safety plan:

- ✓ Provides instruction and guidance to the Project team, including contractors and subcontractors, on the development and implementation of project-specific Health and Safety requirements;
- ✓ Guides on how to identify and incorporate safety considerations as related to detailed design and construction;
- ✓ Guides how to identify coordination and collaboration arrangements of the detailed design and execution phases of the project;
- ✓ Provides the minimum requirements of safety in the subproject site to be achieved;
- ✓ Guides how to ensure compliance with all relevant statutory requirements;
- ✓ Inform contractors and subcontractors in advance of the Occupational Health and Safety requirements that shall be strictly enforced on the Project;
- ✓ Informs the Consultant Firm, of the content of the project's Environmental, Social, Occupational Health and Safety program and relevant responsibilities under current Regulations;
- ✓ Establishes a framework for the implementation and sequencing of Occupational Health and Safety initiatives across the various phases of Construction activities;
- ✓ Establishes roles and responsibilities associated with the Occupational Health and Safety Management Manual;
- ✓ Eliminates and prevent any health, safety, community, and any OHS related hazards within the working environment, and control the hazard at its source as possible ;
- ✓ Promote safety consciousness among all employees, contractors, subcontractors, and visitors within the project premises.

### 1.2. Scope of application

This OHSP must be applied to the entire project cycle of design, supply, and installation of medium and low voltage lines, service connections, and upgrading single phase lines to three phases in the Northern Province of Rwanda as well as, employees and subcontractors. This document must be considered as a minimum requirement and the application of this plan is the direct responsibility of the EDCL management and all employees, subcontractors, and Contractors involved in its day-to-day operation.

### 1.3. Project Location and Activities

This OHSP is for the design, supply, and installation of medium and low voltage lines, service connections, and upgrading single phase lines to three phases in all districts of the Northern Province namely Gicumbi, Burera, Gakenke, Musanze and Rulindo to improve the rate of access to electricity supply countrywide. The main component of the present project is the construction of electrical distribution networks in different sectors and service connections to the local population. The focus is to connect households and public institutions (schools, administration offices, health centers, etc) and productive users (small industries where applicable). During the project implementation, different activities will be done, and these are divided into 4 phases: (i) Design and Planning phase, (ii) Construction Phase, (iii) Commissioning Phase, and (iv) Operation Phase.

### **1.3.1. Design and construction phases.**

During the Design and Planning Phase, there will be a process of survey and mapping for new transmission and distribution routes and transformer locations to avoid harming sensitive ecosystems. There is no land acquisition for MV and LV lines as there will be passing in land for agriculture; only, it will be a compensation process for the crops and trees damage.

#### **✓ ROW Clearance**

During the construction phase, it will be the process of clearing the Right of Way (ROW) as the initial activity that will occur during the construction phase. This is done to create the vertical and horizontal clearance required when constructing power lines. The clearance will be done on 12 meters large (6 m each side from the center line). However, only trees and crops that can grow to more than 3 meters in height will be cleared on 12 meters; the short crops will be damaged by the passengers only and it is expected to be minimum like not more than 2 meters large. The asset valuation will be done to 12 meters and will cover all trees and crops on that surface. In case a residential house is found within the 6 m will be relocated and fair compensation will be done. However, maximum efforts will be made during the line route design to avoid houses under the RoW.

### **1.4. Foundation excavation and pole erection**

Foundation excavations and erection of poles will consist of creating the foundations for erecting poles. The general outlines of the poles may be varied but the general dimensions, phase spacing, clearances, and the configuration of the conductors and earth wire are those applied to similar projects being implemented countrywide.

#### **✓ Installation of transformers.**

MV/LV transformers will be installed at different sites along the transmission lines. These transformers will play the role of stepping down the electricity from MV to LV before distribution to consumers.

### **1.5. Operation phase and Maintenance of the RoW**

During the operation phase, it will be operation and maintenance of the transformers and the lines that will have been installed during the construction phase. It is important to note that REG will no longer use transformers containing PCBs (as commonly used in old equipment) which are harmful to the environment and humans.

Just as for the line, maintenance for the transformers is required. It must provide for the regular replacement of coolants and lubricants for transformers. However, this is not frequently done unless where it is required to be. REG has indicated that they would use no more transformers containing PCBs because of their toxicity against the environment and human beings.

#### **1.5.1. Decommissioning phase**

During the decommissioning phase, it will be dismantling and removing all the structures from project construction sites, dismantling the supporting infrastructures and all those structures that were associated with the project implementation. The project also will rehabilitate the damaged sites to their former status or near what they were before the project was commissioned.

The transmission line requires clearing a permanent ROW. Its width generally is 12 m wide. Trees along the ROW must also be cleared for the safety of the lines.

The regular maintenance of the ROW will be done to maintain clearance, among poles, conductors, and all the vegetation or structures. Those maintenance operations will normally take place twice a year but may vary according to the local conditions of the project areas.

## **2. POLICY STATEMENT, ROLES, AND RESPONSIBILITIES**

### **2.1. Occupational Health and Safety Policy Statement**

It is EDCL's policy to manage its business affairs safely and to ensure the safety and well-being of all personnel involved in the project. This is reflected in this Health, Safety, and Environment(OHSP) plan that EDCL has adopted for all its project activities.

EDCL recognizes the following obligations and principles:

- Each employee has a right to work in an environment that will not adversely affect his or her health and safety;
- Is committed to providing safe workplaces for all its employees;
- Is committed to protecting the health and safety of its contracting parties and the public;
- Will diligently carry out the duties contained in the OHSP plan;
- Will minimize the risk of occupational injury, illness, and property damage;
- Monitors the continuous implementation of OHSP programs;
- Ensures that contractors, managers, and supervisors identify and control workplace hazards and communicate information about those hazards throughout the workplace.

Every employee has a personal responsibility to become involved in solving OHSP hazards. To achieve this, all employees must work together to identify and control situations that could cause harm. It is EDCL's priority to integrate OHSP practices into daily activities headed by project personnel, from project managers to site managers, to foremen, to linesmen, to maintain an engrained OHSP culture throughout the organization.

## **2.2. Zero accident policy**

The creation of an "Incident Free" environment within the project requires a thorough understanding and acceptance of the principles explained in the OHSP plan. EDCL will stand for activities free from incidents to be consistent in delivering safe, productive, and efficient project deliverables prioritizing a zero-accident performance. EDCL will ensure the implementation of the following principles:

- ✓ The immediate identification and elimination of unsafe work practices and conditions at any workplace.
- ✓ Elimination of human error as a source of incidents, irrespective of rank or position in the organization.
- ✓ Building a team safety mentality where each worker contributes to the effort and each supervisor is fully aware of the capabilities and limitations of their team either individually or collectively.
- ✓ A culture in which everyone accepts responsibility and accountability for their own and each co-worker's safety and health.

## **2.3. Incident readiness**

It is the personal responsibility of each employee to ensure that the action taken by them does not endanger the health and safety of other colleagues. The person to be contacted and the relevant telephone number, in case of any incident, shall be known to all personnel.

They must ensure and be made aware that:

- ✓ Being familiar with the location of first aid boxes and fire extinguishers in the areas in which they work
- ✓ Providing support within their competence
- ✓ Calling for further help if necessary
- ✓ Coordinate Search and Rescue Teams.
- ✓ Determine the need for medical assistance.
- ✓ Administer first aid as needed.
- ✓ Keep a record of types of injuries and aid provided.
- ✓ Mitigate emotional trauma.

## **2.4. Personal initiative empowerment**

It is the personal responsibility of each employee to ensure that the action taken by them does not endanger the health and safety of other colleagues. They must ensure and be made aware that:

- ✓ They and the company are responsible for their safety and health and for other personnel on site;
- ✓ They should understand potential hazards and their likely effect;
- ✓ They must report any accident immediately to their supervisor;
- ✓ They must always keep the workplace in a clean and tidy condition and must not interfere with or misuse any protective equipment that has been provided for the safety site personnel;
- ✓ They must use all personal and mechanical protective equipment provided for them by the company for their safety and well-being;
- ✓ They must report any unsafe conditions and practices to their supervisor;
- ✓ They must always comply with all statutory and client requirements;
- ✓ They must assist the company management in achieving the goals and objectives of the safety plan;
- ✓ They must understand the safety plan its objectives and its support activities where no item of safety shall be ignored or deferred.

## **2.5. Continuous Improvement**

EDCL is dedicated to the concept that all accidents are preventable. Accordingly, EDCL has adopted and committed to achieving and sustaining a “ZERO ACCIDENT” culture through continuous improvement practices. This applies also to its contractors and subcontractors who should:

- ✓ Strive to eliminate all occupational injuries and illnesses;
- ✓ Promote health, safety, and environment program objectives as a constant value in designing, planning, training, and executing work;
- ✓ Spread ownership for health, safety, and environment program effectiveness throughout the company's organization;
- ✓ Increase employees' consistent use of safe practices in their daily work activities;
- ✓ Optimize the use of continuous improvement practices as the basis for zero accident initiatives;
- ✓ Promote the opportunity for employees and affected communities to submit concerns about OHSP through feedback channels to collect possible complaints.

## **2.6. OHSP Management team and responsibilities**

Project managers, site managers, site supervisors, foremen, linesmen, etc. shall be familiar with the OHSP rules, regulations, and laws that apply to the project. They shall document all actions taken to ensure compliance with this OHSP plan. Site personnel and its management will participate in scheduled project activities, site audits, and safety walks, and will implement and document all required corrective actions.

The site management team will attend and will communicate OHSP expectations and will conduct orientation sessions for all employees, selected suppliers, and subcontractors working in/with the project site. The specific responsibilities and authority of OHSP management are detailed as follows:

### **2.6.1. Project Manager**

- Demonstrate ownership, and leadership and actively participate in all phases of the OHSP Plan
- Provide management support necessary to carry out OHSP system requirements;
- Participate and support OHSP initiatives and preventive actions;
- Lead by positive example
- Communicate personally with direct reports on OHSP issues related to their area of responsibility;
- Inspection of OHSP documentation and working places

### **2.6.2. Site Manager**

OHSP role/function is an area for which the Project Manager is fully responsible, it is allocated to the Site Manager who will ensure that OHSP practices are implemented by the Site Supervisors. The Project Manager is responsible for the overall Project OHSP and the site manager is responsible for the on-site OHSP management of the project.

The site manager is responsible for:

- ✓ Familiarization with and assist in the interpretation of all local, national, and international laws that apply to project operations;
- ✓ Prioritizing and producing a strategy for implementing the various elements of the OHSP plan and ensuring that it is being communicated effectively throughout the project organization and subcontracting companies;
- ✓ Reporting continuously to the management team on implementation progress, points of concern, and topical points of issue regularly;
- ✓ Being the custodian of the OHSP plan;
- ✓ Ensure that EDCL personnel and subcontractors comply with the required Personal Protection Equipment (PPE) as required by the OHSP plan;
- ✓ Seeking assistance from the project manager for specific parts of the OHSP plan;
- ✓ Updating and giving feedback to the OHSP plan based on observed circumstances;
- ✓ Establishing and maintaining a professional relationship with the employer's representative and with the subcontractor company's representatives to ensure that OHSP practices are implemented during daily operations;
- ✓ Providing direction as necessary to attain safety management standards and goals required by the safety program;
- ✓ Ensuring that sufficient training and daily induction of all personnel is being provided and maintained;
- ✓ Developing the safety awareness of all personnel employed on the project via the various OHSP programs, and ensuring their participation in all aspects OHSP program;
- ✓ Overall safety administration and resources for the entire duration of the project;

- ✓ Identification of all hazard-related activities and development of specific contingencies in preventing any work-related accidents;
- ✓ Define a program for visits and safety inspections of work sites, storage areas, and fabrication yards;
- ✓ Report procedures and keep records for loss prevention.
- ✓ Preparation, monitoring, review, and updating of the Environmental Plan;
- ✓ Assist the Project Manager with environmental problems;
- ✓ Verify the implementation of the Environmental Plan and the Work Environmental Plan;
- ✓ Determination and reporting of the principal causes of Environmental problems to the EDCL Project Manager;
- ✓ Participate actively in OHSP promotional activities;
- ✓ Conduct daily Pre-Job Briefings on-site (Toolbox meetings) to ensure all OHSP guidelines are understood and followed.

### **2.6.3. Site Supervisors/ Foremen**

The Supervisors/Foremen reports to Site Manager, and he is responsible for:

- ✓ Be familiar with, explain, and enforce OHSP regulations that apply to project operations;
- ✓ Ensures that safety devices and PPE are used by persons under his supervision;
- ✓ Instructs and trains all persons within the area of responsibility in job OHSP requirements, including hazard recognition and avoidance, and requires compliance by workers with the safety rules established;
- ✓ Conducts as often as needed safety briefings with all workers under his supervision;
- ✓ Conducts informative toolbox talks every day before the start of activities;
- ✓ Ensures that injuries are treated promptly and reported properly;
- ✓ Investigates all accidents/incidents, obtains all pertinent data, and initiates corrective action;
- ✓ Conducts frequent and regular safety and health inspections of his work areas and ensures that no unsafe conditions exist in responsibility.
- ✓ Reports to the Project Manager/OHSP Manager on any corrective actions needed which are beyond his control;
- ✓ Ensures that adequate inspection and maintenance of the equipment has been carried out;
- ✓ Identifies defects and incidents and ensures that corrective action is taken;
- ✓ Stops the operation whenever an unsafe condition is identified;
- ✓ Ensures the completion of the work method statements and procedures.

### **2.6.4. Subcontractors**

Being consistent with contractual obligations, all subcontractors shall fully comply with the Contractors' E&S commitments, subcontractors are responsible for:

- ✓ Subcontractor management promotes, supports, and actively participates in the "Zero Accident" philosophy.
- ✓ Implementing the sub-project OHS Plan as well as the subcontractors' own OHS plan;
- ✓ Identifying the hazards of their work, assessing the risks arising from these hazards, and informing how these risks will be controlled.
- ✓ Providing a safe and healthy work environment for their personnel;
- ✓ Complying with local OHS legislative requirements;
- ✓ Providing OHS information to the workers;
- ✓ Issuing to any lower-tier subcontractors a copy of the health and safety plan and any other applicable safety and health procedures;
- ✓ Developing and maintaining risk assessments for all site construction activities.

### **2.6.5. Workers**

Each worker/ who is performing their working duties is responsible for assuring the safety for themselves; Safety for fellow employees; protection for the public; and protection for sub-project property and for public and private property.

Workers will be in charge of the following:

- ✓ It is the responsibility of each worker to notify his senior or the designated OHS Officer or the Construction Project Manager once an unsafe condition or act is witnessed on the job.
- ✓ When a worker is requested to perform duties under unsafe conditions, the worker should not perform those duties without first notifying the person in charge of the unsafe conditions. On the other meaning, no one should be in unsafe conditions. Rather than risky work, there should be certain safety measures that should be provided and followed to minimize the risk and ensure the safe implementation of the activity. It's the responsibility of the contractor to provide and request the workers to use the PPEs;
- ✓ It is the responsibility of each worker to attend safety training and meetings where possible and to take an active

part in safety work. It is the responsibility of each contractor to ensure workers know and understand the safety rules of this Plan Manual, and the sub-project OHS Plan, which will apply to the work being performed.

### 3. OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

#### 3.1. Identification and Evaluation of Risks

##### 3.1.1. Risk identification.

To identify the risks to the safety of the persons present on and near the site, the following rules shall be applied;

- Analysis of the work activities foreseen in the method statement. The Method Statement analysis shall be carried out before the commencement of the works, by the Resident Site Manager and the OHS officer to evaluate the risks related to the work activities,
- Identification of potentially dangerous activities,
- Risk factors identification,
- Risk evaluation based on the probability that the event (accident) will occur (probability) and the effects on the health of persons involved (damage) based on the experience held by the Contractor's similar projects or work conditions,
- Checking safe work procedures.

##### 3.1.2. Method of evaluation

To evaluate the safety of the persons, present on and near the site, the following rules shall be applied;

- Analysis of the work activities foreseen in the method statement. The Method Statement analysis shall be carried out before the commencement of the works, by the Resident Site Manager and the Safety Officer to evaluate the risks related to the work activities,
- Identification of potentially dangerous activities,
- Risk factors identification,
- Risk evaluation based on the probability that the event (accident) will occur (probability) and the effects on the health of persons involved (damage) based on the experience held by the Contractor's similar projects or work conditions,
- Checking safe work procedures.

##### 3.1.3. Hazard identification

The following risks have been identified because of the analysis of the work activities together with the tools, equipment, facilities, and dangerous or potentially dangerous materials that shall be used or present on site;

Risks for safety have therefore injuries or physical damages:

- **People falling to the ground:** Slides and falls on the plane of the job, provoked by the presence of oil, grease, or dirt on the points of grip (in the case of slope on means or cars), tripping hazards in the workplace, (for example miscellaneous debris or cords) or from bad conditions of the pedestrian visibility created by poor lighting.
- **People falling from high places (higher than 2m):** People fall from high places, due to the loss of equilibrium of the worker and/or to the absence of suitable protections (collective or individual), slips or trips, from improperly constructed temporary work, crane or within overly steep excavations, lifting or transport vehicles, or from any other higher job posting;
- **Drop of materials or tools:** Materials, tools, or objects dropped down from higher working places or fallen during transport with trucks, cranes, or other lifting means. Materials projected by blasting;
- **Running down by vehicles:** Personnel being rundown by improperly operated vehicles or allowing personnel to be in restricted areas or by personnel error;
- **Blows, knocks, impacts & compressions:** caused by violent contact with equipment, structures, or other object present in the workplace;
- **Pricks, cuts & abrasions:** cuts, punctures, and abrasions to the hands; bruises and traumas to the whole body without a specific location, for contact with the used utensil or consequent to bumps with any kind of object present in the work yard;
- **Heat, flames:** the accidental contact with parts or tools at high temperatures (welding tools, grinders, parts of engines, etc.), flames or materials (bitumen, hot liquids, etc.), the prolonged exposure to the heat or sunlight causes burns;
- **Electrocution or Fulguration:** Electrocution for direct or indirect contact with under-tension parts of the electric line or equipment;

- **Jets, squirts:** Lesions in any part of the body during the jobs performed by hand or with utensils, with material, substances, products, and equipment that can cause jets you squirt dangerous for the health. Lesions concerning any part of the body consequent to the projection of splinters or fragments during workmanships performed directly or in neighbouring postings of the job;
- **Hurling of particles into eyes:** Lesions at the eyes consequent to the projection of splinters or fragments during workmanships performed directly or in neighbouring postings of the job;
- **Fire explosion:** Lesions provoked by fires and/or consequent to the explosion due to the combustion of containers or reservoirs containing fuels, gasses, or chemical substances highly deflagrating or to the blasting of explosives;
- **Vehicle accident:** includes accidental contact between two or more vehicles or between a vehicle and a person.

Risks for health that need long exposure to the risk:

- **Vibrations and Noise:** damages to the skeletal and muscular apparatus caused by the vibrations transmitted to the worker by equipment, tools cars, or parts of them; damages to the auditory apparatus caused by the prolonged exposure to the noise produced by the processing, tools, equipment, or plants;
- **Dust, fibres:** Damages to the respiratory apparatus and in general to the health of the worker, consequently to the exposure to fine course materials, or materials releasing minute fibres;
- **Non-ionizing Radiations:** prolonged exposure to non-ionizing radiations as electromagnetic fields with extremely low frequencies, radio frequencies, microwaves, infrared, etc.;
- **Mineral Oils, hydrocarbons:** Dermatitis, coetaneous irritations, allergic reactions, or damages to the respiratory apparatus caused by the contact with mineral oils or hydrocarbons or inhalation of the vapours developed during the process;

Other risks are caused by an incorrect organization of the job site.

- **Loads manual handling:** Lesions to the skeletal and/or muscular apparatus during the manual handling of loads, because of their excessive weight or dimension or due to the incorrect position assumed by the worker during the handling;
- **Ergonomics:** Muscular pains because of wrong positions assumed during the use of the equipment;
- **Interferences:** Presence of different activities in the same or near the working area which can interfere and transfer risks of one activity to the workers engaged in another.

### 3.2. Risk assessment and Management.

#### 3.2.1. Safety Inspections

Safety inspections will be made continuously by the site manager or appointed representative to identify any situation that could result in possible hazardous conditions before the start of work and as needed throughout the work. Where a safety representative finds evidence of a situation that could result in possible hazardous conditions, exposed employees will be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

#### 3.2.2. Job hazard analysis

Job hazard analysis is a procedure that serves to identify risks associated with activities that need to be performed during the project implementation. The analysis identifies risks and control measures are defined to ensure that such risks do not materialize when conducting the work. Based on the output of the analysis, activities shall be planned so that they are carried out under specified conditions to control the risks.

The project manager, site manager, and site supervisor shall prepare a Job Hazards Analysis for all important and higher-risk construction works. The job hazard analysis will assess the risks of the task to ensure that the health, safety, and environmental risks posed by the project activities are as low as reasonably possible. The job hazard analysis shall be a complement of the work method statements where local conditions for the project implementation will take place, these shall include:

- ✓ Reference to work method statements that describe the sequential steps of the task including before, during, and/or after the task;
- ✓ Hazards and risks posed by the task to people performing the task and to third parties;
- ✓ The need for PPE;
- ✓ Any limitations on other activities posed by the task and/or by adjacent activities;
- ✓ Any emissions to the environment resulting from the task.

The assessment will be performed early enough to allow any changes to the proposed task to be incorporated as necessary. For repetitive low-risk tasks, a generic job hazard analysis may be used.

### **3.2.3. Stop work authority.**

Everyone involved in the project and site activities will have the responsibility and authority to ensure that all personnel at the site always comply with the safe operation resulting in zero accidents. At the project site, everyone is authorized to stop work that does not comply with a safe operation. EDCL guarantees that there will be no repercussions for the persons who stop the work for any given reason.

## **3.3. Personal Protective Equipment**

Personal protective equipment (PPE) protects employees from the risks of injury by creating a barrier against workplace hazards.

### **3.3.1. Appropriate personnel protective equipment**

PPE must be used when the eyes, face, hands, extremities, or other parts of the body are exposed to workplace hazards that cannot be controlled by other means.

- **Head protection** will be worn on job sites when there are potentials of falling objects, hair entanglement, burning, or electrical hazards;
- **Eye protection** will be worn when there are potentials of hazards from flying objects or particles, chemicals, arcing, glare, or dust;
- **Protective footwear** shall be worn to protect from falling objects, chemicals, or stepping on sharp objects. Athletic or canvas-type shoes shall not be worn;
- **Body protection like overalls**, raincoats, etc. shall be provided and worn in all those activities where risks for the body (acids or corrosive substances, burns, pricks, cuts, abrasions, etc.) are present;
- **Appropriate respiratory masks** shall be provided to prevent damage to the respiratory apparatus in the presence of dust, gasses, or other substances;
- **Protective gloves** or clothing shall be worn when required to protect against a hazard;
- **Harnesses and lanyards** shall be utilized for fall protection as required;

The use of other PPE shall be evaluated from time to time and provided and worn to the workers involved in the activity or exposed to the risk.

### **3.3.2. Distribution of PPE**

All new employees, before starting their activities, shall be provided with all the protective equipment needed in connection with the risks they can be exposed to in the course of their duties. Special PPE will be given to the workers in case of activities to be carried out. At the act of the delivery of the PPE, each worker shall be informed and trained on the correct way to use and conserve them. Each worker will sign for receipt of the PPE. Records of all the PPE given to each single worker, including any replacement, shall be kept, using individual cards, from the safety Department. The PPE will be replaced periodically or whenever they are damaged in a way to is useful for safety purposes. Checks shall be carried out on the existence, use, and condition of the personal protections assigned to each worker. Each worker who is found on site without the PPE will not be allowed to work and shall be sent out of the job site and sanctioned. If the item is misused, misappropriated, or lost, the worker shall be strictly sanctioned.

### **3.3.3. Type of Personal Protective Equipment (PPE)**

Personnel at the project site shall wear appropriate PPE according to their area of work. PPE shall include but not be limited to:

- ✓ Head Protection / Hard hat with chin strap;
- ✓ Eye Protection / Safety Glasses with side covers;
- ✓ Foot Protection (Safety Boots);
- ✓ Hand Protection (Hand gloves);
- ✓ Flame, electrical and mechanical Resistance (Hand Gloves, Sleeves, boots, etc...);
- ✓ Face Protection (face shield);
- ✓ Fall protection (harness and fall protection equipment);
- ✓ Protective Clothing;
- ✓ High visibility safety Vest;
- ✓ High visibility clothing with reflecting bands;

The minimum required PPE includes a hard hat with a chin strap, a high visibility safety vest, and safety boots with steel caps and ankle support. The PPE is to be used all the time. Employees are expected to report to work in adequate and appropriate construction clothing. Long pants and a T-shirt, both in good condition, are the minimum acceptable. Going shirtless is prohibited.

The distribution of PPE will be controlled with a form that will be filled during the distribution of the equipment. PPE distribution will be accompanied by a related training focusing on the correct use, maintenance, fault detection, disposal, and storage of each type of PPE. The site manager will keep control of the PPE required on-site and used by the workers. The project will have an adequate number of the above PPE for the replacement of damaged and out-of-standard PPE.

### 3.3.4. PPE for working at Heights.

Working at heights represents one of the most critical risks in the project. In addition to work preparations) special PPE shall always be used when conducting any activity under these circumstances. It is working at heights when the work implemented is 2 meters or more from the ground level.

- **Harness:** including hardware must be capable of withstanding a tensile loading without cracking, breaking, or taking a permanent deformation
- **Lanyard:** The lanyard must be a rope or shock-absorbing web lanyard. The lanyard and all its components in a fall arrest system must have a tensile strength. Locking-type snap hooks shall be used to connect the lanyard to the harness. The lanyard may be retractable allowing freedom of movement but protects the worker should a fall occur. A shock-absorbing lanyard will substantially reduce the force created during a fall. The maximum lanyard elongation when resisting a fall must not exceed 1.06 m in length.
- **Lifeline:** The lifeline can be horizontal or vertical. Vertical lifelines may only support one worker.
- **Rope Grabs:** A person may be connected to a lifeline using a rope grab or by a rope grab and lanyard combination. The lanyard must be less than 1.8 m long to restrict the overall fall to 1.8 m or less. The lifeline size must be stamped on the rope grab, and only that size and type of line used.
- **Anchorage:** The strength of any fall protection system is dependent on a secure attachment point.
- **Rigging:** Anchor points should be as high as possible, but never lower than the connection point on the harness. Workers must be tied off in a manner that ensures no lower level, or other surfaces are struck during a fall.

### 3.3.5. PPE maintenance and storage

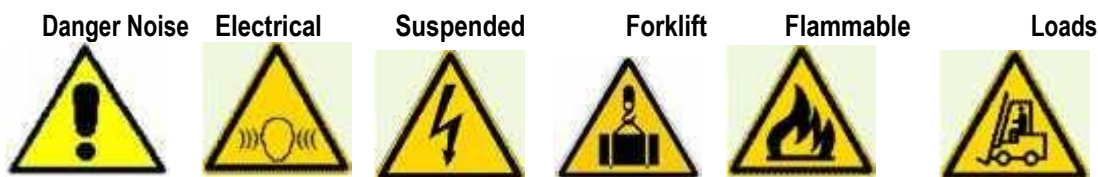
The site manager and/or personnel allocated with the responsibility will ensure that reusable PPE is regularly inspected and tested under the manufacturer's specifications and the relevant Standards.

- ✓ All persons have a responsibility to verify the conditions of PPE before and after use to detect defects.
- ✓ All persons using a fall protection system must be trained on the safe use of the system including Proper fit, wear, inspection, limitations, and care of the system. Fall protection systems must be inspected before use, at intervals as established by the manufacturer.
- ✓ Cleaning agents or equipment will be supplied by the site manager to enable employees to clean reusable PPE as required.

### 3.3. Signs and markings

Signboards indicating the obligation to wear PPE, or other safety measures, as well as dangers or hazards, will be placed at the entrance and in the proximity of each working area. There are three major types of signs and markings, the samples of which shall be established in due time.

**Warning signs:** are used to properly identify and warn of possible hazards. They should have a triangular shape, black text on a yellow background, and should always include a pictorial symbol.





Falling from High places



Welding



Battery acids



Explosion radiation



**Mandatory signs:** indicate that a particular course of action must be undertaken. They should have a round shape and a white pictorial symbol on a blue background.



Generic



Helmet



Ear  
Protection



Respiratory  
Protection



Eye  
Protection



Protective  
Gloves

**Prohibition signs:** are used to properly give a clear message that a certain action is prohibited. They should have a round shape, black pictorial symbol, white background, red border, and 45-degree red diagonal band across the symbol (from upper left to lower right).



Do not  
Smoke



Not drinkable  
Water



Halt



Do not use  
in case of fire

**Safety signs:** are used to properly identify the locations of emergency equipment. They have a green background with white pictorial symbols.



Emergency Exit



First Aid



Meeting Point

**Fire-fighting signs:** Each item of Fire-fighting equipment should be marked with the appropriate symbol. Where various types of equipment are stored at one location, 'Fire Point' signs may be used. When equipment is stored in a recess or cupboard, a panoramic sign, mounted well above head height, should be used to enable the equipment to be identified from a distance.



Fire Extinguishers

The proper use of these signs and the appropriate compliance with their indications shall prevent potentially dangerous situations.

and accidents.

### **3.4. Incident and accidents management**

#### **3.4.1. Incident Notification and Reporting**

Contractors will notify the Project immediately following any environmental or social incident. The project will ensure that all environmental and social incidents are appropriately documented that the relevant parties are notified and that reporting requirements around the incident are met.

#### **3.4.2. Injury and accident management**

In case of injury, accident, or near miss, the workers involved must immediately report it to their Foreman, regardless of the seriousness of the event. Based on the nature/sources of the event (related to environment, health, or safety), the Foreman must implement promptly the emergency management procedure and inform the assigned Supervisor and the OHS Officer, for safety as soon as practicable. The OHS officer in collaboration with the Supervisor must immediately fill out the "notification report" and submit it to the SE. The SE must transmit it to the responsible persons based on the magnitude of the event. In case of a high-level injury/accident, the PM must be immediately informed by the SE. The PM must inform OIA management, the client, and the supervising engineer. The form filled by the OHS Plan shall include the following details;

- Description of the event;
- Causes of the event;
- Damages;
- Injury;
- Personnel or equipment involved in the event;
- Time of the Event;
- Place of the Event;
- Witnesses;
- Corrective Actions;
- Further information/attachments.

Whenever needed the OHS officer will request persons involved in the event or witnesses to provide input in the investigation form. The completed form must be then sent to the SE and subsequently to the PM for approval. Special attention to:

- Corrective measures identified and carried out with the designation of the responsible for corrective action and estimated date of closure;
- Proposed additional corrective measures with the designation of the responsible for corrective action and estimated date of closure.

Accident cases must be discussed during specific Safety Talks, called as soon as possible by the OHS Officer and involving at least the Supervisor, SE, and the foreman having witnessed the event. Record of the meeting must be prepared by the OHS Officer and transmitted to all the participants. At the estimated scheduled corrective action date of closure, the OHS officer checks the implementation of the action. In case the required actions have not been fulfilled the OHS officer requires the support of the PM and calls a Safety Talk involving at least one Supervisor.

The OHS officer must fill out the "Monthly Injury Report and HS metrics" In addition, after any injury/accident/near miss event, the OHS officer must update the "record book". The PM, according to information contained in the Monthly Injury Reports and injury/accident reports, must fill monthly overall reports that must be sent to the Site Client Representative.

#### **3.4.3. First Aid and Emergency Medical**

Provisions shall be made so that response times are not exceeded.

- ✓ An injured person will be treated by a first aider **within 5 minutes of the incident**.
- ✓ A seriously injured person will be treated by a medical professional **within one hour of the incident**. This will normally be at the hospital, or a suitable health Center.

#### **Numbers of First Aiders**

Where 5 – 50 workers there should be at least one qualified first aider present all the time. A further first aider is required for every additional 50 workers. A team member can act as a first aider if he/she holds adequate training.

It may be that additional qualified first aiders are required to achieve the response times detailed in this sheet. Also, if there are additional hazards and risks.

#### First Aid Kits on Site

- ✓ All projects and work areas must have at least one first aid kit. With additional kits for each 50 workers.
- ✓ First aid kits shall be constructed of resistant material, dustproof, and of sufficient size to store the required contents. They must be capable of being sealed and have a handle for emergency transport.
- ✓ The exterior of the first aid kit must be labelled in a manner that will identify, for example - "First Aid".  
Contents of the kits shall be suitable and sufficient for the site.

#### 3.4.4. Incident report and notification

|                                                  |                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WORK-RELATED INCIDENT</b>                     | <b>The incident happens at EDCL-controlled worksites or at time</b>                                                                                                                                           | <b>EXAMPLES:</b> All work-related travel and transportation by EDCL rented vehicle / All activities at company worksite and office.                                                                                                                                                                                                                              |
| <b>NOT WORK-RELATED INCIDENT</b>                 | <b>Incident which does not happen at EDCL controlled situation</b>                                                                                                                                            | <b>EXAMPLES:</b> Travel from home to office / Injure at accommodation / Social events and customer entertainment / Sports supported by company / Transport by vehicle that is not dedicated to project use (bus, taxi).                                                                                                                                          |
|                                                  | <b>Actions</b>                                                                                                                                                                                                | <b>Notes</b>                                                                                                                                                                                                                                                                                                                                                     |
| <b>FATAL or LIFE-THREATENING ACCIDENT</b>        | <b>Immediately 24/7</b> by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | <b>Ensure that the message goes through.</b> You must send additional detailed information by email within 12 hours of the accident.                                                                                                                                                                                                                             |
| <b>ENVIRONMENT, MAJOR ROAD or OTHER ACCIDENT</b> | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | An accident that affects many people. You have to send additional detailed information by email within 12 hours of the accident.                                                                                                                                                                                                                                 |
| <b>LOST TIME INCIDENT (WITH BODILY INJURIES)</b> | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | <b>The incident resulted in more than one day's absence from work.</b> For example, when a person is taken to hospital and is not able to work the next day.<br>E.g. a tool fell from a pole and hit a ground man's head that requires stitches.                                                                                                                 |
| <b>RESTRICTED WORK</b>                           | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | When a person suffers an injury but is relocated to work with alternative works<br>E.g. a person injures his arm and can't do site work, the person is sent to do office work                                                                                                                                                                                    |
| <b>MINOR INCIDENT (WITH BODILY INJURIES)</b>     | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | When first aid is provided, the injured person can return to regular work the following morning or can do substitute work during the recovery period.<br>NOTE: When only a third party is injured, this is treated as a Near Miss.<br>E.g. a tool fell from a pole and hit the hand of a person on the ground causing a minor wound that is treated with plaster |
| <b>NEAR MISS (NO BODILY INJURIES)</b>            | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | <b>An incident that occurred already but it did not cause any personnel injury.</b><br>E.g. a tool fell from a pole but did not hit anybody or hit a helmet without injury.                                                                                                                                                                                      |
| <b>POTENTIAL INCIDENT (NO BODILY INJURIES)</b>   | Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager<br>The Project Manager informs the Project Director, who in return informs the Managing Director. | <b>An event that could happen in the future if it is not prevented by preventing action.</b><br>E.g. a tool could fall because it is not put properly into the tool pocket.<br>E.g. car tires are slippery and may not be safe if rains.                                                                                                                         |

### **3.4.5. Contact information:**

A list of contact persons in case of emergency will be disclosed to all site workers. This includes contact for the site manager, EHS staff project manager, a nearby hospital, nearby Police Station Traffic, and Road Safety; Fire Brigade, Traffic Accidents; Child-Help Line; Anti-GBV; Anti-Corruption; and Ambulance only to mention but a few.

### **3.4.6. Communication**

EDCL recognizes that the objectives of OHSP can only be achieved with effective communication. With this in mind, numerous mediums will be used to educate, raise OHSP awareness, motivate and stimulate participation. These may include:

- ✓ Safety Bulletins;
- ✓ Clear meeting agenda and meeting minutes;
- ✓ Bulletin boards, posters, or banners
- ✓ E-mail communication;
- ✓ Reports and Campaigns;
- ✓ Toolbox talks;
- ✓ Job hazard analysis.

## **3.5. Material and works handling.**

### **3.5.1. Electrical facilities and installation**

- Electrical connections and related works must be performed by qualified electricians, or under strict supervision of qualified professionals.
- Electrical systems shall comply with the local regulations on High and Low Voltage Facilities.
- The distribution centers shall consist of standard steel cabinets, with a mounting plate at the rear, readily accessible from the outside. They have doors fitted with thumb latches and triangular keys and are suitable for the installation of padlocks.

In addition, they are provided with the following:

- Automatic sectionalizing switch;
- Grounding network (the resistance of the grounding network shall not be greater than that against which it protects, depending on the sensitivity of the differential breaker);
- Differential circuit-breaker.

The differential circuit breaker shall have medium sensitivity in the usual case that the equipment and machines are connected to the ground network and the resistance of said equipment does not exceed 20 Ohms. To protect against overloads and short circuits, the provision shall be for automatic fuses of the magneto-thermal type. From these general distribution centers, connections shall be made for the secondary circuits, which, in turn, shall be provided with cabinets fitted with watertight inlets, with the power being supplied always through a female socket. Such secondary boards shall be provided with a general ground terminal, a standard Omni-pole circuit breaker (with circuits calibrated for each of the taps, a maximum of three), and a high-sensitivity differential breaker (30 mA). Where portable devices are used in high-humidity areas, provision shall be made for safety transformers, with a maximum rating of 220 volts, or a safety voltage shall be used (24 V).

As a rule of thumb and nail, the following precautions shall be taken about these facilities:

- Both the board and equipment terminals shall be protected with insulating tape;
- The cables that supply power to the equipment and tools shall be provided with protection covers, which shall be of the humidity-proof kind and shall not touch, or be laid, on the floor in passage areas;
- It is strictly forbidden to use cables with bare tips unless properly connected. Plugs should be used;
- All power lines shall be disconnected by switching the breakers off;
- Periodic servicing of all the facilities is essential. This servicing shall be thorough and conducted by specialized personnel;
- Notices shall be used to indicate all electrical risks, as well as the performance of servicing work;
- In case of ongoing electric shock that has not been controlled by switch-breakers, the cable giving electricity has to be disconnected immediately without touching the part of the cable/appliance that is causing the accident.

### 3.5.2. Load handling.

Load handling implies potential hazards, with high-risk levels for both operators and labour working in the handling area; also, the handled load could get damaged. This activity requires especially trained personnel and lifting/harnessing equipment in mint conditions and adequate for the load to be handled. The basic elements are the load to be handled and the handling operation to be carried out. In function of the load and of the type of handling, you must carry out a careful selection of handling and harnessing equipment.

- **Load to be handled and handling operation**

- All the selected personnel must know the following load characteristics:
- Typology;
- Weight;
- Centre of gravity;
- Harnessing points.

All the selected personnel must know and evaluate the following details of the handling operation:

- Distance and gradient between harnessing point and landing point;
- Transport route and possible obstacles to overcome;
- A complete view of the operation;
- Difficulties related to final positioning;
- Details of the equipment to be used to move the load.

- **Typology**

- Typology means the shape and physical characteristics of the load to be handled. The shape can be regular or irregular, and this can imply stability or instability. The shape can have a small or big volume and/or it can be quite long (for ex. piping), and this can make handling easy or hard due to narrow spaces, hindrances, or external actions (for ex. wind). The load physical and characteristics are very important:
- A fragile solid (for ex. glass) also requires precautions as an accidental bump can damage the entire load;
- A load placed inside a package also requires precautions; if the materials placed inside are not correctly secured, they can create a displacement of the center of gravity due to oscillation;
- Flexibility of the materials must be considered.
- The transport of people using lifting devices is forbidden unless specific qualified equipment (basket) is used.

- **Weight**

Knowing the weight of the load to be moved is essential. The weight must be recorded on the documents supporting the load or on the product manufacturing drawings. In their absence, it is necessary to assess the weight that must be estimated in excess (For ex. a metal body with a cavity must be evaluated as if it were a full solid).

- **Centre of gravity**

The center of gravity of the load to be handled is a critical element. This element is fundamental also for storage operations (load stability). Depending on where an item's center of gravity is located the item at rest may be in a stable or unstable condition. When the item is to be moved it is important to review the positions of the lifting points about the item's center of gravity.

The center of gravity, if not identified on supporting documents, products, or manufacturing drawings, is quite easy to determine on a regular body, but very hard on irregular bodies or packages that have not been inspected. In such a case, the lifting initial stage is fundamental to identifying the center of gravity (the lifting device hook always tends to position itself in correspondence with the center of gravity).

- **Harnessing points**

In many cases, load feature harnessing points are included during the product design stage, and in such cases, identified during the manufacturing. It is important not to mix these harnessing points with those of the single components forming the product. In other cases, the products have threaded holes for installing eyebolts or shackles: such harnessing points must be included during design and identified on the manufacturing drawings. In many cases, the hook-up man decides the harnessing points, and in this case, the choice must be carried out with extreme attention, and in particular:

- Harnessing points must guarantee a firm hooking and grip also in the event of a bump or loosening of the harnessing equipment;
- The center of gravity must be below the harnessing points;
- The center of gravity must be vertical compared to the lifting hook.

### 3.5.3. Lifting equipment

Where no particular requirements are specified, the following general safety requirements are considered sufficient:

- All lifting operations must be directed by only a single crane operator standing in a safe position;
- All the lift equipment and means must be following the Ugandan and international law and standards;
- Before starting to use lifting equipment, the SE must ensure that there is no wind speed faster than 40 km/hour;
- Before starting any lifting/translating operation, a sound alarm must be activated to advise all present persons of the beginning of the operations;
- Before starting any lifting activity all safety devices such as limit-switch devices and brakes, must be checked;
- Before every use the lifting device is given a reasonable visual inspection to check that the equipment looks to be in good repair and then every 3 months a more thorough visual inspection is performed for every chain, rope, hook, shackles, brakes, etc....;
- The lifting means and equipment and materials to be lifted must not be used unless it is of good construction, sound and suitable material, adequate strength, free from patent defect, and properly maintained;
- All the lifting equipment must be tested and examined by or on behalf of the manufacturer or by an authorized person and a certificate of the test and examination specifying the safe working load, signed by or on behalf of the manufacturer or by the authorized person is obtained and kept available for inspection;
- No guards of safety devices shall be disabled or removed.
- All the lifting equipment must be provided with a schedule with a load diagram that shows the load that is possible to lift including safe lifting loads as a function of the length of the boom;
- Use steps and handholds when mounting or dismounting any machine;
- Clean any mud or debris from steps, walkways, or work platforms before using them;
- Always face the machine when using steps, walkways, and handholds;
- Never transport persons inside buckets (unless specifically designed for personnel), on walkways, or platforms;
- Never stand near the operating machine while lifting or transporting materials;
- Drivers and operators must always keep safety belts fastened while operating;

### 3.5.4. Walking and working surfaces.

Walking and working surfaces shall be kept free of debris and other tripping hazards. Holes and ground openings, such as those created for the casting of foundations, shall be marked with demarcation procedures and material approved by local regulation and customer requirements such as caution tape, flagging, or local material such as thornbushes. This fulfills the goal of stopping intruders, persons, or animals, from accidentally falling into these openings.

### 3.5.5. Ladders handling

Except where either permanent or temporary stairways, ramps, man hoists, or runways are provided, ladders meeting these requirements shall be used to provide access to all elevations.

#### ✓ Portable Ladders

The design, construction, use, and maintenance of portable ladders shall comply with the next safety requirements for "Portable Wood Ladders", and "Portable metal Ladders".

- Portable ladders used for access in the absence of fixed ladders, these shall be secured against accidental displacement at the top and bottom.
- Portable ladders shall rest on a firm foundation capable of supporting the load without displacement in any direction.
- Ladders shall be equipped with safety shoes, spurs, spikes, tread feet, or other approved slip-resistant devices at the base section of each rail. The devices shall be designed to foundation at the specified angles of inclination and on the type of surface available.

#### Ladders General Instructions.

- All portable ladders shall be always kept in good condition;
- A competent person shall inspect ladders at intervals not greater than two weeks;
- Any ladder found defective in any way must be returned to the contractor's store and thereafter destroyed.

**Use of portable ladders should be restricted to when:**

- It is impossible or impracticable to use other, safer means of access;
- Access is required irregularly and for a short term;
- There is only a need for one person at a time to use the ladder;
- There is no need to carry loads exceeding the carrying capacity of one man;
- The ladder is not required to exceed the maximum height of 10 m between landings (in all cases it should be supported to prevent any undue sagging);
- Ladders must be inspected before use for cracked or split stiles, missing, broken, lost or damaged rungs, and splinters. To facilitate inspection, ladders should be kept free from dirt and grease. Timber ladders must not be painted, but may be treated with a preservative, which does not obscure defects;
- Ladders must be of adequate length to enable them to extend to at least 10 m above the platform or working point unless other suitable handholds are available.

**It is dangerous:**

- ✓ To use ladders that are too short to provide access and handholds, when work is to be carried out from the ladder;
- ✓ To use short ladders spliced together;
- ✓ To place ladders on insecure supports (loose bricks or other loose packing) to obtain extra height;
- ✓ When using extension ladders an overlap of two rungs is recommended for a length of 5 m and four rungs for a 7 m long ladder.

**Note:** The use of ladders in a horizontal position as scaffolding is forbidden.

### 3.6. Work at heights

#### 3.6.1. General requirements

Working at heights represents one of the most critical risks in electrification projects. In addition to work preparations, special PPE shall always be used when conducting any activity under these circumstances. It is working at heights when the work implemented is 2 m or more from the ground level.

- ✓ **Harness:** including hardware must be capable of withstanding a tensile loading without cracking, breaking, or taking a permanent deformation
- ✓ **Lanyard:** The lanyard must be a rope or shock-absorbing web lanyard. The lanyard and all of its components in a fall arrest system must have tensile strength. Locking-type snap hooks shall be used to connect the lanyard to the harness. The lanyard may be retractable allowing freedom of movement but protects the worker should a fall occur. A shock-absorbing lanyard will substantially reduce the force created during a fall. The maximum lanyard elongation when resisting a fall must not exceed 1.06 m in length.
- ✓ **Lifeline:** The lifeline can be horizontal or vertical. Vertical lifelines may only support one worker.
- ✓ **Rope Grabs:** A person may be connected to a lifeline using a rope grab or by a rope grab and lanyard combination. The lanyard must be less than 1.8 m long to restrict the overall fall to 1.8 m or less. The lifeline size must be stamped on the rope grab, and only that size and type of line used.
- ✓ **Anchorage:** The strength of any fall protection system is dependent on a secure attachment point.
- ✓ **Rigging:** Anchor points should be as high as possible, but never lower than the connection point on the harness. Workers must be tied off in a manner that ensures no lower level, or other surfaces are struck during a fall

#### 3.6.2. Safety while working at heights and permanent attachment.

OHS staff will train project employees in the hazards and control measures associated with working at heights, will make sure that personnel is permanently attached, and will make maximum use of primary fall protection systems, such as scaffolds, aerial lifts, personnel hoists, etc. The contractor will use safe work procedures and enforce, among others, the following prevention/protection measures:

- ✓ Evaluate all overhead work for fall exposures and pre-plan and install required fall protection systems before assigning the work to employees;
- ✓ Adopt a 100% fall protection policy that makes provision for secondary fall protection for all employees who are working more than 2 m above ground or other solid objects.
- ✓ All fall protection devices will be manufactured and used by a recognized international standard;
- ✓ Review work to identify the methods to achieve 100% fall protection before commencement of such work;
- ✓ Require the inspection of fall protection equipment before each use;
- ✓ Defective equipment will be removed from service and destroyed;
- ✓ Contractor shall ensure that each & every activity has fall protection rescue plan;
- ✓ All lifeline equipment (cable, connectors, supports, etc.) shall be part of the system and will only be used for fall protection;

- ✓ Ensure that persons working at height will have their safety helmets secured by chinstraps to retain the helmet on the head;
- ✓ Ensure systems are in place to prevent tools, materials, and other objects from falling from height.

### **3.7. Fire prevention and protection.**

Fire protection and prevention shall be followed throughout all phases of the construction and dismantling. This is to be followed by the project team and its subcontractors.

As fire protection requirements occur, there shall be no delay in providing the necessary equipment. The following points are suggested for the prevention of fire.

- Know the place of work, fire hazards, and the location of firefighting equipment;
- Keeps all the firefighting equipment clear of obstructions.;
- Provide easy access to firefighting equipment to save time and minimize any damage due to fire;
- Keep the place of work clean and tidy;
- Do not smoke in 'No Smoking' zones. Do not carry lighted cigarettes hot substances or any sources of ignition where flammable materials are used or stored;
- Avoid the contact of oil, grease, or paint with oxygen cylinders. There may be an explosion due to oxidation;
- Switch off the main supply if electrical equipment is not in use;
- Never throw lighted cigarettes and burning sticks into dust bins, they may ignite and create a fire when you are not there;
- Special purpose electrical equipment shall only be used at storage places for hazardous/flammable material;
- Training will be provided to employees in the proper use of fire extinguishers, fire prevention, and fire precautions.

### **3.8. Site roads and transport of material**

One of the first causes of injuries on site is vehicular accidents. Site roads shall be:

- Wide enough to allow the free circulation of the vehicles in both ways. In case the ground morphology does not permit the realization of a double-way road, then lay-by shall be foreseen;
- Maintained always in good condition, clean of mud and free stones, and free of holes;
- Speed reducers like bumps or trenches shall be done across the roads before dangerous curves, bottlenecks, or dangerous areas; this procedure shall follow the Traffic rules of the Project.

The following rules shall be followed inside the site area:

Maximum speed for all the vehicles shall be fixed unless otherwise specified in the traffic management rules:

- 50 km/h on-site roads;
- 30 km/h in the proximity of working areas;
- Overtaking between trucks in busy work areas is not allowed;
- Any vehicle descending a downhill road shall give way to the one rising.

Outside the project area, the country traffic rules shall be respected. Anyone found not respecting the above rules will be subject to disciplinary measures.

#### **3.8.1. Work on roads.**

Most of the project work will be done closer to the local roads. Risk shall be assessed before the start, and a written method statement submitted to the project manager or site manager for approval. The method statement shall detail controls including, speed restrictions, warning signs and cones, barriers, and type. Where significant risk of traffic collision vehicle blocks shall be used. Under specific circumstances, in case of an existing overhead crossing of a conductor above a road, adequate scaffolding shall be installed based on EDCL's best practices.

#### **3.8.2. Driving, traffic, and transport Safety**

Driving and traffic are regarded as the most dangerous part of the job, not only because of the potential bodily injuries but also because of the high frequency of occurrence. To minimize the impact and frequency of occurrences, the next guidelines are to be followed. Make sure all cars and trucks are equipped with working safety belts in all seats.

- ✓ Seat belts must be used all the time;
- ✓ All vehicles should be equipped with a first aid kit and fire extinguisher;
- ✓ Monthly inspections of vehicles including General, Fluids, Lights, and Safety.
- ✓ Do not drive if you are tired;
- ✓ Separate bags and boxes from passengers;
- ✓ Do not engage in reckless driving and do not exceed the speed limits;

- ✓ Do not use the mobile phone while driving, not to make calls, nor for texting;
- ✓ Being intoxicated when driving or operating machinery will lead to dismissal;
- ✓ Make inspections of cars, trucks, and driving behavior part of all safety walks;
- ✓ Minimize driving in the dark.

### **3.8.3. Heavy motor vehicles**

Heavy motor vehicles are intended to be used mostly at the project sites to transport project materials including transformers and poles. Specific competency is needed to operate heavy motor vehicles, as well as adequate training and a fit-for-purpose driving license. In addition to this, some requirements are needed to make the project utilization safe:

- ✓ Heavy construction equipment should have a reverse signal alarm;
- ✓ The reverse alarm should be checked, and defective alarms will be replaced;
- ✓ A flagman, warning signs, or other controls will be provided when operations or equipment on/or adjacent to street traffic create a traffic hazard;
- ✓ All drivers must always keep valid Driver Licenses;
- ✓ Seat belts shall be always worn when in vehicles;
- ✓ The speed limits shall be strictly observed;
- ✓ Traffic violations beyond a simple speeding ticket shall be reported to your supervisor;
- ✓ Before loading, unloading, or conducting any activities around a vehicle, the vehicle shall be placed in park or gear, the vehicle shut off, and the parking brake set;
- ✓ On inclines, vehicles shall be chocked, and the wheels turned into the curb;
- ✓ When being loaded or unloaded by a fork truck or other piece of equipment, the vehicle wheels shall be checked to ensure that no movement occurs;
- ✓ Passengers are not allowed to ride in the back of pickup trucks together with bags or boxes;
- ✓ Riding as a passenger on any equipment is prohibited unless the equipment has the safe capability of transporting personnel and was intended for such use.

### **3.8.4. Light vehicle operations**

The following rules concerning vehicles will be implemented:

- ✓ Only licensed drivers shall be allowed to operate vehicles;
- ✓ Seat belts shall be always worn when in vehicles;
- ✓ The speed limits shall be strictly observed;
- ✓ Before loading, unloading, or conducting any activities around a vehicle, the vehicle shall be placed in park or gear, the vehicle shut off, and the parking brake set.
- ✓ When being loaded or unloaded by a fork truck or other piece of equipment, the vehicle wheels shall be checked to ensure that no movement occurs.

## **3.9. Housekeeping, Tools, and equipment handling**

### **3.9.1. Housekeeping**

Good housekeeping practices will be maintained on all work sites. Before leaving for the day, personnel will ensure that all equipment is secured, trash and debris are removed from the site, and adequate safety indications are installed to avoid harm to members of the public. The foreman must conduct a final walk-through of the job site before leaving to inspect for any tripping, foot penetration, or fire hazards.

All personnel's eating and sanitary facilities will always be maintained in a clean and sanitary condition. Contractors will provide the necessary resources to accomplish this, including adequate washing facilities unless mutually agreed with the subcontractors. In this case, contractors will ensure that sub-contractors fulfill adequate requirements.

### **3.9.2. Slips, trips, and falls**

Site personnel will ensure that any instances of poor housekeeping resulting in the creation of tripping, slipping, or other hazards are corrected immediately. It will be ensured that work areas are orderly and regularly maintained. They will be maintained clear of debris, waste, and other rubbish. To minimize any incidents to bystanders, site personnel shall identify work areas through clear demarcation signs to avoid access to restricted zones:

### **3.9.3. Tools and equipment**

To ensure a safe operation, the following guidelines are described:

- ✓ All tools are used by the manufacturers' recommendations; have required guards in place; and, are maintained in good working order as per manufacturer's recommendations;
- ✓ All vehicle/equipment operators are competent and licensed;
- ✓ All equipment used follows certification and legislation requirements;
- ✓ Powered tools and equipment will only be used by operatives trained in their use;
- ✓ Tools and equipment have been inspected before use on-site, including hired tools and equipment. The inspection shall be carried out by a competent person. For electrical tools this will be done by a qualified electrician;
- ✓ Major equipment is individually numbered, labeled, and registered;
- ✓ No modified equipment is brought on-site unless the modification has been approved by a competent person (i.e. typically the equipment supplier or vendor or an engineer);
- ✓ Inspection systems meet the manufacturer's or supplier's specifications.

Heavy equipment shall be thoroughly inspected before use. The foreman will inspect the equipment, using an approved checklist, when the equipment is first placed at the job site and whenever the equipment is demobilized and successively placed back on the job site.

All repairs on machinery or equipment shall be made at a location that will ensure the safety of the mechanics, e.g. heavy machinery, equipment, or parts thereof that are suspended or held apart by the use of slings or jacks shall also be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Any guard or safety device removed or made ineffective for any piece of equipment used at the site or during repair or maintenance shall be replaced or restored to safe operation condition, immediately after completion of the repair that requires its removal.

#### **3.9.4. Hazard material awareness**

Whenever in use of hazardous materials and chemicals, the following measures will be adopted:

- ✓ Material containers will be labeled as to contents and hazards;
- ✓ Material Safety Data Sheets will be available, on-site, for review by employees;
- ✓ A Material Safety Data Sheet will be on-site before any hazardous material is brought onto the job site;
- ✓ All employees shall be trained in the recognition, proper handling, and use of hazardous substances;
- ✓ Product containers are to be properly labeled.

#### **3.10. Alcohol and Drug Control Plan**

The consumption of alcohol and drugs in the workplace can cause changes in the behavior of workers (loss of concentration and reaction time) and lead to situations of risk with disastrous consequences for the workers and their companies.

As the construction activity is considered high risk, is of particular importance to preventing and controlling alcoholism, to increase the quality of life of employees and the contractor's performance.

The consumption of alcohol and drugs on the work site during working hours is strictly prohibited. Information sessions will be held to prevent hazards caused by the consumption of alcohol and drugs. It is also prohibited to perform any work whilst affected by alcohol or drugs.

Smoking is prohibited on-site or at any project office or project location.

### **4. TRAINING AND COMPETENCY**

#### **4.1. General Requirements**

EPC contractor and subcontractor will undertake internal training and education activities to ensure that Project expectations regarding Occupational Health and safety are achieved. In addition, the Project will guide contractors regarding expectations for Occupational Health and Safety training, education, and competencies. Occupational health and safety competencies will be appropriate to the respective parties' scope of activity and level of responsibility. The project will undertake an initial evaluation of training needs associated with this OHS and, on this basis, develop and maintain an OHS training matrix.

The Project's Occupational health and safety training will include several levels of competency, depending on

everyone's level of involvement and responsibility:

- **Induction Training and Awareness:** this training will be for visitors or individuals who do not have direct roles or responsibilities for implementing the OHS and will cover basic Project environmental and social commitments.
- **Management Training and Awareness:** this training focuses attention on management; covering key aspects of the OHS and providing an overview of the Project's environmental and social impact management expectations and the supporting processes and procedures prescribed in the OHS plan to meet performance expectations.
- **Job-specific Training and Awareness:** job-specific training will be provided to all personnel who have direct roles and responsibilities for implementing or managing components of the OHS. This training will also include all people whose specific work activities may have an environmental or social impact.

## **4.2. General training and induction**

### **4.2.1. Induction Training**

All newly recruited employees and visitors shall have to undergo induction training before the commencement of any work activity with the contractor. Workers shall receive this competency training depending on the nature of the activities they shall execute. In these training courses, the recruits shall be introduced to the company safety rules and regulations. Note also that sub-contractor and their employees shall be inducted. All trained personnel must sign against their names to confirm their attendance.

### **4.2.2. Safety meetings / Pre-job briefings**

A preliminary meeting for initial safety induction will be held with the Project Manager, Site Manager, Site Supervisor, and Foremen. All of these have the responsibility to maintain the OHSP activities implemented on-site to achieve the Zero Accident goal. All site meetings will have OHSP as a first item on the agenda, covering both general aspects and those that need highlighting at the time of the meeting.

Additional meetings will be held by the Site manager or project manager, both with assigned OHSP functions when operations with increased risks or the follow-up of near-miss incidents make such meetings necessary. Minutes of the Meeting will be issued. Pre-job Briefings shall be held regularly, depending on the size and complexity of activities at the construction site. The responsible will ensure the Job Hazard Analysis and Toolbox meetings are regularly implemented for each daily work assignment.

### **4.2.3. Toolbox talks**

Toolbox talks communicate the risks identified for project activities and daily work including potential hazards associated with performing such a job. The toolbox talks are complemented by the job hazard analysis which serves as guidance for daily activities.

Toolbox talks are conducted daily and led by site managers, site supervisors, foremen, or team leaders, upon availability. The end objective is to make the team members aware of potential hazards on that specific day to avoid accidents on site. In addition to the informative nature of the talks, they empower employees to identify and discuss specific hazards and protective measures associated with the assigned work. Project managers and site managers will ensure employee involvement in the toolbox talks. This process is mandated by EDCL's policy but is not required to be documented.

### **4.2.4. Safety operation and training**

All personnel appointed to work on-site will have the necessary knowledge, experience, and training to carry out the duties assigned to them. This is ensured and reinforced through the Toolbox talks. All members of staff involved in tasks that require special knowledge are experienced and qualified.

## **4.3. Competency training**

This training will be provided to all contractors, subcontractors, and employees. Those responsible for performing site inspections will receive training by drawing on external resources as necessary. Upon completion of training and once deemed competent by management, staff will be ready to train other people. The Project will require each contractor to institute training programs for their personnel. All contractors and their subcontractors will be responsible for implementing relevant and adequate training programs to maintain the required competency levels. Contractor training programs will be subject to approval by Project Management and will be assessed to confirm that:

- training programs are adequate;
- all relevant personnel have been trained; and

- Competency is achieved.

Contractors will be required to report on their training activities, and the Project will maintain records of all training delivered.

**Table 64: OHS training plan;**

| Training course             | Unskilled labor | Skilled labor | Frontline supervisors | Middle management | Senior manager | Drivers | Safety men |
|-----------------------------|-----------------|---------------|-----------------------|-------------------|----------------|---------|------------|
| Intro to the OHS            | x               | x             | x                     | x                 | X              | x       | x          |
| Emergency response          | x               | x             | x                     | x                 | X              | x       | x          |
| Hazards& controls           |                 |               | X                     | *                 | *              |         |            |
| Foreman responsibilities    |                 |               | *                     | x                 | x              |         |            |
| Managing safely             |                 |               | x                     | *                 | *              |         |            |
| Managing rule-breaking      |                 |               |                       | *                 | *              | x       |            |
| Fire prevention             | *               | *             | x                     | x                 | X              |         | X          |
| First aid                   | *               | *             | *                     | *                 |                |         |            |
| Confined space entry        | x               | x             | x                     | x                 | X              |         |            |
| Back safety/ lifting safety | x               | x             | x                     | x                 | *              |         |            |
| PPE                         | x               | x             | x                     | x                 | X              | x       | X          |
| Fall protection             |                 | *             | *                     | *                 | *              |         |            |
| Small/ power tools          |                 | *             | *                     | *                 | *              |         |            |
| Hand Safety                 | x               | x             | x                     | x                 | X              | x       | X          |
| Scaffold construction       |                 |               | x                     | x                 | X              |         |            |
| Forklift operations         | x               | x             | x                     | x                 | X              |         |            |
| Hazard recognition          | x               | x             | x                     | x                 | X              | x       | X          |
| Excavation safety           |                 |               | x                     | *                 | *              |         | X          |
| Health& hygiene             | *               | *             | x                     | x                 | X              |         | X          |
| Environmental awareness     | x               | x             | x                     | x                 | X              |         | X          |
| Ladder safety               | x               | x             | x                     | x                 | *              |         | *          |
| Excavation safety           | x               | x             | x                     | x                 | *              |         | X          |
| Risk assessment             |                 | x             | x                     | x                 | X              |         | *          |
| Hazard registers            |                 |               |                       | x                 | *              |         |            |
| Lifting operations          |                 | x             | x                     | x                 | *              |         |            |
| Safe use of chemicals       | x               | x             | x                     | x                 | *              | x       | X          |
| Accident prevention         | x               | x             | x                     | x                 | X              | x       | X          |

**Key: x= compulsory**

**\*=selected personnel**

Each training will be provided by a qualified expert hired by a contractor. The number of people to be trained for each topic will be known after the recruitment of workers and screening to define the training appropriate for each category depending on their expertise and knowledge.

## 5. ACTIVITY-BASED PREVENTION PLAN FOR TRANSMISSION AND DISTRIBUTION LINES

### 5.2. Foundation works, excavation, and trenching

#### 5.2.1. Excavation safety plan

This excavation safety plan has been developed to protect employees from safety hazards that may be encountered during work in trenches and excavations. This program is intended to ensure that:

- ✓ Employees who perform work in excavations are aware of their responsibilities and know how to perform the work safely.
- ✓ All persons involved in excavation and trenching work will receive appropriate training in the safe work practices that must be followed when performing this type of work. The project manager shall ensure that:
- ✓ The procedures described in this plan are followed.
- ✓ Employees entering excavations or trenches are properly trained and equipped to perform their duties safely.
- ✓ All required inspections, tests, and recordkeeping functions have been performed.
- ✓ All employees who work in or around excavations, must comply with the requirements of this plan.

Employees are responsible for reporting hazardous practices or situations to the Supervisor/Foreman, as well as reporting incidents that cause injury to themselves or other employees.

The site manager will ensure that whenever an excavation operation is being undertaken, work practices and proper conditions are met before beginning, during, and after such excavation operations. Employees will cease operations if there is a question regarding a hazard or if such is suspected or discovered.

No employee is permitted underneath loads being handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

#### **5.2.2. PPE during foundation works**

All employees working in excavations shall wear PPE. Employees exposed to flying fragments, dust, or other materials produced by drilling, sawing, sanding, grinding, and similar operations shall wear safety glasses with side shields and mouthcovers. Employees using or working near hammer drills, masonry saws, jackhammers, or similar high-noise-producing equipment shall wear suitable hearing protection. Materials and equipment used for protective systems will be free from damage or defects that might impair their proper function.

Manufactured materials and equipment used for protective systems will be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards. When material or equipment that is used for protective systems is damaged, the Contractor's competent person will examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment can support the intended loads or is otherwise suitable for safe use, then the material or equipment will be removed from service and will be evaluated and approved by a registered professional engineer before being returned to service.

#### **5.2.3. Protection from water accumulation hazards**

Employees are not permitted to work in excavations that contain or are accumulating water unless precautions have been taken to protect them from the hazards posed by water accumulation. If water is controlled or prevented from accumulating using water removal equipment, the water removal equipment and operation shall be monitored by a person trained in the use of that equipment.

If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation.

Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains shall be re-inspected after each rain incident to determine if additional precautions, such as special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water or use of safety harnesses and lifelines, should be used. The site supervisor shall inform affected workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

#### **5.2.4. Protection of the public**

Barricades, walkways, lighting, and posting shall be provided as necessary for the protection of the public before the start of excavation operations.

### **5.3. Poles erection protection plan and working at height.**

#### **5.3.1. Poles Erection Plan**

This Erection Protection Plan has been developed to protect employees from safety hazards that may be encountered during erection works and the use of heavy machinery like cranes. All employers involved in pole erection works have complete knowledge of pole erection. This plan is intended to ensure that:

- ✓ Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment,
- ✓ PPE use and safety equipment;
- ✓ Call the attention of the operator on the ground before starting the movement;
- ✓ Proper locking of the support/implementation of the vehicle with ropes;
- ✓ Appropriate locking and stability of the hold of the supports on the ground;

- ✓ Controlling the visibility from the driving position of the crane over the entire work area (with coordination between crew and crane driver) with particular attention to the position of the vehicle concerning the land slopes and visibility;
- ✓ Ban on driving under suspended loads;
- ✓ Adequate stabilization of the crane;
- ✓ Immediate application of the sling above the center of gravity;
- ✓ Use of wooden beams to store backup elements or support sections preassembled;
- ✓ Use of signs and red flags protruding loads into the ends of the poles;

### **5.3.2. Safety while working at heights and permanent attachment.**

The health and safety manager will train project employees in the hazards and control measures associated with working at heights, will make sure that personnel is permanently attached, and will make maximum use of primary fall protection systems, such as scaffolds, aerial lifts, etc. The contractor will use safe work procedures and enforce, among others, the following prevention/protection measures:

- ✓ Evaluate all overhead work for fall exposures and pre-plan and install required fall protection systems before assigning the work to employees;
- ✓ Adopt a 100% fall protection policy that makes provision for secondary fall protection for all employees who are working more than 2 m above ground or other solid objects.
- ✓ Review work to identify the methods to achieve 100% fall protection before the commencement of such work;
- ✓ Require the inspection of fall protection equipment before each use;
- ✓ Defective equipment will be removed from service and destroyed;
- ✓ Contractor shall ensure that each & every activity has fall protection rescue plan;
- ✓ All lifeline equipment (cable, connectors, supports, etc.) shall be part of the system and will only be used for fall protection;
- ✓ Approved safety harnesses are to be used for employees.
- ✓ Ensure that persons working at height will have their safety helmets secured by chinstraps to retain the helmet on the head;
- ✓ Ensure systems are in place to prevent tools, materials, and other objects from falling from height.

### **5.4. Stringing works**

Employees shall not be permitted under overhead operations or on cross-arms while a conductor or pulling line is being pulled (in motion).

A transmission clipping team shall have a minimum of two structures clipped between the team and the conductor being sagged. When working on bare conductors, clipping teams shall always work between earthing equipment; the earthing equipment shall remain intact until the conductors are clipped in, except on dead-end structures. Reliable communications between the reel tender and pulling team shall be provided, e.g. VHF or similar radios. Each pull shall be dead-ended at both ends before subsequent pulls.

### **5.5. Stringing protection plan**

This stringing (ending with sagging and regulation) protection plan has been developed to protect employees from safety hazards that may be encountered during work. All employers involved in stringing work know their role in the process and pay attention to the instruction they receive continuously. This plan is intended to ensure that:

- Control before the work of grounding and safety of power lines interfering with line of work and equipment;
- Use of PPE to climb and work on supports, special awareness of permanent attachment;
- Call the attention of the operator to the coil and wait for your consent before starting the stringing of conductors;
- Use of one radiotelephone for operators at the puller, and at any location deemed as acting as obstacles to the signal;
- Placement of scaffolding in the case of crossing facilities, roads, housing, etc;
- Use of lifting equipment and accessories (ropes, slings, hooks, etc.) loads adapted to their capacities;
- Use of adequate means for their characteristics;
- Use of service ropes to provide the operator with tools and materials required;
- Check the stability of supports before climbing and using any bracing;
- Use carrying bags to store tools when working in a high position;
- Before starting the stringing operation briefing on the work phase shall be performed;
- All personnel involved have to be continuously in radio contact.

### **5.6. Earthing**

When earthed, new lines or equipment may be considered de-energized and worked upon as such. Earthing should be applied in all cases, even when the hazard of induced voltages is not present and adequate clearances or other means are implemented to prevent contact with energized lines or equipment. Earthing equipment shall be placed upstream and downstream of the working location of the transmission line.

Earthing equipment may be temporarily removed only when necessary for test purposes and caution shall be exercised during the test procedures. The lines or equipment from which earthing equipment has been removed shall be considered energized due to induction current.

An earthing device shall be installed between the tensioning reel setup and the first structure, e.g. tubular pole. The earthing device shall be installed at each conductor, groundwire, or OPGW during stringing operations. During stringing operations counting from the first structure, each bare conductor and overhead ground wire shall be earthed starting from the first pole adjacent to both the tensioning and pulling setup.

## 5.7. Barricades and traffic control plans

The contractor will properly erect and maintain barricades and barriers in such a manner that they provide adequate protection. Barricades and barriers erected will have appropriate signs and tags indicating the nature of the hazard and the responsible supervisor. Barricades left after dark on or near roadways will be properly equipped with flashing amber lights.

The contractor will provide and use appropriate barrier devices to identify the nature of the job hazard involved (i.e., yellow and black for "CAUTION" or red and black for "DANGER"). Barrier devices, including barrier tape, will not be used as a substitute for a barricade as they do not offer adequate protection from falls. Barrier devices will be used only in those applications where temporary identification of a hazard is needed; but not as a primary means of protecting employees from exposure. It will be ensured that employees understand and comply with barricade and barrier procedures (i.e. prohibited entry into red barrier taped areas). Where hazards are expected to exist for more than 24 hours (e.g., excavations), it will be ensured that a physical barricade is erected using wooden, mounted plastic or metal guardrails.

The contractor will ensure that barricades are complete (i.e., the work area is entirely isolated and identified). The barricaded area will be of sufficient size to afford appropriate protection. It will be ensured that required safety signs will be posted (e.g., prohibition signs, warning signs, mandatory action signs, fire safety signs, etc.).

## 6. EMERGENCY PREPAREDNESS REQUIREMENTS

### 6.1. Initial actions

First Aid is defined as:

- ✓ Treatment to preserve life and minimize the effect of the injury/illness, until the arrival of paramedic assistance via the Emergency Services;
- ✓ Treatment of minor injuries that would otherwise receive no treatment or are not sufficiently serious to require the services of a medical practitioner;
- ✓ First aid aims to reduce the effects of injury or illness suffered at work. It does not include giving medication.

### 6.2. Emergency procedures

The general procedures applicable in emergencies must be followed to implement the appropriate response against unexpected events that may injure people and/or goods. The measures to be followed are described in the table below:

| INCIDENT WITH NO PERSONAL                                                         | INCIDENT WITH LIGHT PERSONAL                                                                                                                        | INCIDENT WITH SERIOUS PERSONAL INJURY                                                                                                                                                             |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report</b> to supervisor;<br><b>Restore</b> all working and safety conditions. | <b>Report</b> to supervisor;<br><b>Provide</b> first aid and send the injured to the Hospital;<br><b>Restore</b> all working and safety conditions. | <b>Report</b> to supervisor;<br><b>Provide</b> first aid; In case of emergency communicate with external means of relief for intervention;<br>Indicate the correct location and number of victims |

The contractor will implement procedures and will provide all emergency equipment and supplies needed to support the work and each work location. The enclosure above illustrates the procedures and guidelines in case of an accident. This documentation must be complete for each line.

### 6.3. Notifications procedure

Serious incidents will be reported to the Engineer promptly and accurately. The incidents involving employees, subcontractors, and/or property will be properly investigated to determine the causes and the corrective measures necessary to prevent their recurrence. For serious incidents, a complete incident report will be filled out.

Near misses that had the potential to have resulted in an injury, fire, spill, motor vehicle accident, or other incident will be investigated, and corrective measures will be taken.

### 6.4. Emergency equipment and tools

#### 6.4.1. First aid kit

All construction sites shall have first aid kit stations. Also, each vehicle, including Contractors' vehicles, shall have a first aid kit. The first aid kits should contain the following material:

- Material Containment;
- Betadine Solution Dermal;
- Sterile compresses;
- Bandages;
- Adhesive Anti-Allergic;
- Quick dressings;
- Saline solution;
- Scissors with curved tips;
- Sterile Gloves.
- 

#### 6.4.2. Fire extinguisher.

Fire extinguishers will be provided and suitably located, distinctly marked, readily accessible, and maintained in a fully charged and operative condition.

Inspections should be recorded on the inspection tag attached to each extinguisher or on a log documenting the extinguisher's location and/or number.

Work areas shall be kept free from combustibles and flammable liquids. Fire extinguishers shall be provided by the contractor for hot work and any use of flammable or combustible liquids. All flammable liquids shall be stored in approved Flammable Liquid Storage Cans. Only the quantity necessary for the job should be present in the work area. The site manager shall ensure that the proper number and location of fire extinguishers are present for any occupancy or type of work.

### 6.5. Medical Emergency Response Procedures

#### Stage 1: In the event of Serious injury or illness

- ✓ **Stay calm** – Assess the situation and make the area safe before attempting any rescue. Do not endanger yourself.
- ✓ **Take control of the situation** – Immediately call for assistance, and safeguard against further danger to others if possible. If there are victims, and if the scene is immediately life-threatening to them, it may be necessary to remove them from danger before attempting first aid. If no life threat is present, do not move the victim until the condition is known to be safe to move or instructed by the paramedic.
- ✓ **Preserve life** – If you can give First Aid without risk of injury to yourself or the patient – begin treatment. If not, contact the nearest source of medical attention, either a trained first aider nearby or the project paramedic. In either case, control bleeding and reassure the victim that everything is under control until help arrives.
- ✓ **Get assistance** – The first person present at the scene must inform the Site Manager, who has the overall OHSP responsibility, giving the following:
  - 1) Location of injured personnel;
  - 2) Name and number of injured persons;
  - 3) Nature of injuries;
  - 4) Brief description of what has happened.
  - 5) Details of any resources already near the scene, such as first aid personnel, ambulance, etc.
- ✓ After receiving the emergency call from the scene, The Site Manager will inform the following personnel:
  - 1) Paramedic;

2) Ambulance driver.

The Paramedic/ Site Manager will advise personnel at the emergency scene about what action is to be taken and determine if a medical evacuation will be necessary.

If no further treatment or action is necessary, this procedure will end. If a medical evacuation is required, Stage 2 will be implemented immediately.

When a working site is too far from nearby medical facilities site personnel with medical experience or training will be located at the site and equipped with a vehicle to transport the injured to a medical facility.

**Stage 2: When a medical evacuation is required.**

The Paramedic/The Site Manager monitoring the situation will determine the type and method of evacuation to be conducted, and to which destination the injured/ill person should be evacuated. The degree, severity, and nature of the injury or illness will be the sole basis for his decision. Casualties with suspected fractures of the Skull, Spine, or Upper Leg(s) are in severe danger. They are NOT to be moved until the paramedic arrives at the scene UNLESS a further life-threatening condition exists, such as loss of limb, heart attack, head injury, internal bleeding, etc.

**Authority Limitations** the Paramedic and Site Manager are authorized to take any actions involving expenditures for REG/ EDCL in connection with the emergency or incident that are judged essential to save life or to relieve suffering.

**Stage 3: - Evacuation**

- ✓ Ambulances are to proceed on instructions to the nearest safe and accessible point waiting for the patient's arrival.
- ✓ Field first aiders will proceed on foot if necessary to the accident site with all necessary equipment for patient stabilization.
- ✓ Other work groups near the site of the incident are to stop work if necessary and assist medical personnel in case stretcher carriers etc are required.
- ✓ If the patient can walk or be moved safely by his companions they are to make their way towards the ambulance. The situation will continue to be monitored by the paramedic / Site Manager.

The ambulance will proceed with the patient straight to the closest clinic if deemed necessary. Care will be taken to avoid causing further injury or discomfort to injured personnel when driving over rough terrain.

In all cases where evacuation is needed, the injured/ ill person will be transferred to the closest clinic.

**6.6. Fire Response Procedures**

**Early detection**

- By personal vigilance
- Prompt reaction.
- By shouting "Fire, Fire, Fire!"

**Immediate response**

- Call 911 or the local emergency number;
- By using the nearest suitable firefighting equipment;
- By accounting for all personnel (Head Count).

**6.7. Site Waste Disposal & Management**

Bins will be provided at convenient intervals for disposal of waste within the construction site. Bins should have liner bags to allow for efficient control and storage of waste and prevent leak of material from waste containers.

Provision of separate waste receptacles for each waste will be required. Where possible recycling should be encouraged. Mixing of hazardous and non-hazardous waste will not be permitted.

Proper storage facilities shall be provided before the start of construction activities and will be distributed at the construction site areas. Liquid and hazardous waste must be stored in a fenced area on a hard surface and under cover. Storage facilities will consist of designated areas with sufficient provisions and/or containers with lids will be used for litter collection and storage on site.

Littering on site is strictly forbidden and the site shall be cleared of litter at the end of each day.

#### **6.7.1. Non-hazardous waste**

All waste will be removed from the site and transported to an approved disposal area. A certificate of safe disposal will only be required for hazardous waste; however, it must be demonstrated that the waste has been taken to an approved landfill. Construction rubble shall be disposed of at an approved disposal site and may not be buried on site. Care to be taken to avoid contamination of soil and water and nuisance to adjoining areas.

#### **6.7.2. Hazardous waste**

Hazardous waste disposal such as defective transformers shall be carried out by an approved waste contractor. A certificate of safe disposal is to be provided to the Site Manager. The disposal site must be classified for the class of waste being taken there.

All collected hazardous waste will be placed into the containers to prevent the likelihood of exposure during handling. All vehicles, reusable containers, and covers that have been in contact with hazardous waste must be cleaned and decontaminated after use in such a way that the vehicle, container, or covers do not cause a hazard. All employees involved in the collection, transport, and disposal of Hazardous substances are to be provided with suitable personal protective equipment.

### **6. REPORTING AND DOCUMENTATION**

#### **6.1. Reporting and monitoring**

This section outlines the reporting and notification associated with the implementation of the OHS plan. The Project and contractors will work closely together to identify and agree to all such Project notification and reporting requirements. It is envisaged that reporting will cover at least the following areas:

##### **6.1.1. Contractor Monthly Reporting**

Contractors will work closely with the Project before the commencement of work to define the structure, content, and format for their environmental and social monthly report. This report will contain key information about the contractors' implementation of the environmental and social requirements and mitigation measures and will cover, among others:

- environmental and social assessment and improvement findings;
- incident notifications;
- non-conformity/non-compliance and corrective actions;
- key performance indicators;
- details of any environmental or social surveys or studies; and
- Environmental and social training conducted.

##### **6.1.2. Quarterly Reporting**

The Project will prepare and submit to the relevant government departments a Project Environmental and Social Quarterly Report. The structure, content, and format will be agreed upon with the government before the commencement of work. This quarterly report will document key information on the Project's performance against the OHS requirements.

#### **6.2. Managing Changes**

Changes in the Project may occur due to unanticipated Project developments. This OHS plan, for example, is being undertaken before the completion of the design stage of the Project. Wherever possible, the environmental, social, Health, and safety mitigation measures should be updated depending on final designs. As the project planning progressed, certainty regarding the nature and magnitude of impact sources became clearer to the Project and the relevant changes should be made in the ESMP, and OHS plans. Adaptive changes may also occur during Project commissioning and operations. The Project will implement a formal procedure to manage changes that will apply to all Project activities. The process for dealing with Project changes and uncertainty recognizes three levels of change/uncertainty:

- **Level One: Minor Significance**, where the change or uncertainty is largely deemed to be immaterial to the OHS findings and does not affect the Project's ability to meet environmental and social performance requirements outlined in the OHS. This change may require additional but limited environmental or social study or survey activities.
- **Level Two: Moderate Significance**, where the change or uncertainty is deemed to be material to the OHS findings but is within the boundaries of the defined Project base case covered by the OHS. This may require minor changes to the OHS and additional surveys or environmental and social assessments.

- **Level Three: Higher Significance**, where a future significant change or uncertainty leads to a departure from the base or a key aspect of it. An addendum to the ESMP/OHS plan, or a new OHS and formal submission and approval process, is then required.

### 6.3. Documentation and document control

The abovementioned process will ensure that the Project can adapt to changes whilst meeting the relevant environmental and social performance requirements. In its OHS report, OIA will include the following documentation:

- environmental and social policy, objectives, and targets;
- description of the scope of the OHS plan;
- description of the main elements of the OHS plan and their interaction, and reference to related documents;
- documents including records consistent with the requirements of lenders; and
- Documents, including records, determined by the EPC contractor to be necessary to ensure the effective planning, operation, and control of processes that relate to its significant environmental and social aspects.

### 6.4. Control of Documents

Documents required by the OHS plan will be controlled by the EPC Contractor and will establish, implement, and maintain procedures to:

- approve documents for adequacy before issue;
- review and update as necessary and re-approve documents;
- ensure that changes and the current revision status of documents are identified;
- ensure that relevant versions of applicable documents are available at points of use;
- ensure that documents remain legible and readily identifiable;
- ensure that documents of external origin determined by the organization to be necessary for the planning and operation of the OHS Plan are identified, and their distribution controlled (e.g., government guidance, permits); and
- Prevent the unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.

## 7. STAKEHOLDERS ENGAGEMENT AND GRIEVANCE MECHANISM

This section of the OHS Plan provides an overview of implementing entity plans and commitments to provide ongoing opportunities for stakeholder and community engagement while implementing the electrification project. It also provides plans to advance sustainability initiatives during Project Construction and Operation and through Decommissioning. The objective of this engagement is to:

- identify parties with an interest in the Project, understand their interests and concerns, and ensure opportunities for their participation;
- build long-term and mutually-beneficial relationships;
- establish effective communication processes;
- allow for meaningful input into the Project planning, design, and development activities; and
- Ensure effective tracking and documentation of engagement activities and issues.

### 7.1. Engagement Dimensions

There will be several dimensions of the engagement program as described below.

#### ❖ Site committee

A key component of the engagement program will be a field team that will collaborate with nearby communities, local authorities, affected Persons, and perhaps other stakeholder groups for the engagement committee. The purpose of the Committee is expected to be to:

- Disseminate and discuss information about Project activities;
- Provide community review of environmental monitoring and performance of the Project;
- Provide a forum for the exchange of information and discussion regarding issues they arise, and for developing effective means for addressing such issues.

#### ❖ EPC contractor offices

Furthermore, During Construction, there will be significant interest in the on-site activities as well as business, contracting, and employment opportunities. OIA has established a temporary office in the project and another office in Kigali. These offices provide information on the Project, answer questions, and collect any comments or questions

from members of the public. This office will provide the public with information about employment, procurement, and contracting opportunities.

#### ❖ **Site Tours**

During the Construction and Operation of the Project, the Contractor will provide guided tours (pre-arranged) and conduct open houses at key milestones to keep the public informed about the Project.

#### ❖ **Presentations and Meetings**

As appropriate, the contractor will conduct meetings and presentations of the Project and updates to some individuals, stakeholder groups, individuals representing stakeholder groups, business groups, and federal, provincial, and District officials.

#### ❖ **E-mail and Phone calls.**

The contractor will explore the possibility of creating a project Email and provide phone contact that can be used by stakeholders to express their views, and concerns, and request information.

### **7.2. Communication**

The Contractor shall implement communication mechanisms to ensure that all internal and external stakeholders are made aware of OHS hazards that may affect their health and welfare.

Methods used to communicate OHS hazards on the project shall include:

- Toolbox talks;
- Pre-work briefing;
- Safety messages of the week;
- Safety alerts;
- OHS and other project meetings;
- OHS training including OHS induction;
- Site posters, noticeboards, and signage.

### **7.3. Participation and consultation**

To ensure that all project stakeholders are invested in OHS management, the following key OHS procedures mandate the active participation of, and consultation with multiple internal and external stakeholders (as required):

- Environmental aspects& impacts;
- Internal audit;
- Emergency preparedness& response;
- Hazard identification& risk assessment;
- Incident report& investigation –HSE;
- Legal HSE and other requirements;
- Management review;
- Method statement development;
- Monitoring HSE performance;
- Organization objectives;
- Permit to work;
- Internal and external project communications;
- Pre-work briefing.

Additional participation and consultation methods employed on the project shall include:

- Establishment of a project OHS committee;
- Open door policy of all management;
- Continuous improvement and lessons learned submission;

### **7.4. Grievance Mechanism**

EPC contractor together with stakeholders will establish and implement a Grievance Procedure based on existing structure in the project's areas. The GRM includes all stakeholders such as representatives of affected communities, local authorities, and contractor and Client staff. The establishment of GRM considers both Men and Women, youth and vulnerable people. The Grievance Procedure describes how community members can raise grievances regarding the Project's activities. The Grievance Procedure addresses verbal or written grievances, which must include sufficient

information about the complaint or claim so that a proper and informed evaluation of the grievance can be made. When a grievance is filed, it will be logged and evaluated. All grievances will be tracked for monitoring and reporting purposes and to ensure timely and proper resolution. The OHS Officer serves as the project liaison person for GRM and coordinates with the GRM committee and Local authorities.

The GRM will be made by:

- EDCL/RUEAP Environmental and Social team;
- District representatives (land officer/in charge of infrastructure and district environment officer);
- PAPs representatives (Women and Man);
- Contractor OHS PLAN specialist.

For complaints that are not solved by this committee then, the case will be referred to the existing administration structure up to the relevant court.

The first level of the Grievance redress mechanism is the GRM committee and if the complainant is not satisfied, they can appeal to their local leadership starting at the Cell level, then the Sector, and finally the district leadership. If the grievance is not resolved via the local leadership structure, the complainant's final resort shall be to file the case with the competent Court of Law. To ensure that the affected parties are fully aware and to reduce the possible backlog of complaints, it should be noted in advance that most members of the rural communities take time to decide to complain within the 30 days required to file their complaints. As per international standards, grievances logged outside this timeframe may still be valid and legitimate. Customarily, the government authorities ensure that all affected people are fully informed and will issue warnings about the consequences of failure to lodge their complaints in time. Within this customary procedure, affected people will be informed of the procedures during public consultation. EDCL will follow up with the aggrieved PAP at each level to ensure that the grievances are resolved.

## **8. CONCLUSION**

The implementation of the planned projects in the northern province has social and economic benefits for people living in the districts of intervention. However, the project might induce negative impacts, if protection and mitigation measures are not considered during its implementation. Fortunately, all negative impacts likely to occur can be prevented and/or mitigated as detailed in the ESIA of the project.

Therefore, it is crucial that all set OHS measures proposed in this plan be properly implemented to assure sustainable safety conditions for both bio-physical and social environments in the project areas. Some of the key recommendations to consider are: (i) provide safety equipment to all workers and enforce their effective use during the construction phase; (ii) increase worker's awareness regarding EHS requirements; (iii) subcontract approved local companies for solid wastes disposal; (iv) Collaborate and involve of local administration (district & sectors) and other connected stakeholders in the project implementation.