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

Energy Development Corporation Limited (EDCL)

March, 2026

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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. 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 access up from the current level of 78.9% by ensuring that electricity is accessible in all cells 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 the Accelerating Sustainable and Clean Energy Access Transformation (ASCENT), under the Rwanda Universal Energy Access Program (RUEAP). The Program Development Objective aims at enhancing 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.

From the above perspectives, the 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 activities planned under the project for 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 Southern 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 environmental and social sound manner, consistent with established environmental regulations. This ESIA Report also 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 and the city of Kigali with the aim to improve the rate of access to electricity supply countrywide. This ESIA is for the southern province covering all 8 districts of southern province namely Kamonyi, Muhanga, Ruhango, Nyanza, Huye, Gisagara, Nyaruguru and Nyamagabe.

The project implementation is designed as Engineering, Procurement, and Construction (EPC), thus the design is not yet done to provide detailed information. However, the feasibility study indicate that project activities will consist at three 3 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 are as follow:

- Construction of MV and LV electrical lines;
- Erection of distribution transformers for network reinforcement;
- Upgrading of identified single phases lines to three phases lines;
- Clearing of the lines right-of-way;
- Transportation of project materials and personnel;
- 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 operation phase.

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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 Implementing Entity preferred option', as presented in the preliminary route design and drawings, the environmental and social baseline. Alternative are proposed to ensure that anticipated impacts are avoided and eliminated, easy access to facilitate the transportation of project materials etc. Alternatives factors considered included:

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

Based on the above aspects alternatives identified for the project are:

- No project option;
- Overhead power lines consideration;
- Underground power lines consideration;
- Alternatives sources of energy generation;
- Construction methods and;
- 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 proposed project 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.

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Positive Impacts

Regarding social impacts, the assessment 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 of 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 expert

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

- Temporally job opportunities to project workers
- Income generation
- the creation of income because of the temporary jobs that will be created for local workers.
- the creation of income for local traders selling food items along the construction sites
- knowledge transfers during construction and operation phases of the project

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

- 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 of during the decommissioning phase are:

- Job opportunities

<u>Negative Impacts during planning and construction phase</u>

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

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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 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.
- Occupational 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 topsoils, 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 pole's 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.

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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 and Social 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 restrictions 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, landowners 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 higher than 3 meters, etc.as per RURA Guidelines. Fair compensation will be ensured for crops and trees to be affected by the project activities. 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 restauration, PAPs will be guaranteed jobs during the project implementation.

Environmental and Social Management Plan (ESMP)
Mitigation measures have been identified through considering each impact identified 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 Environmental and Social 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 their mitigation measures with a detailed Environmental and Social Management Plan (ESMP) that provides a way forward for their implementation. Project benefits are found to outweigh the negative impacts and for which a mitigation plan has been prepared. To this extent, the consultant is the view that the project be implemented with careful implementation of proposed measures. Given that detailed design is not yet available assess site specific impacts, it is recommended the contractor contracts includes the provision to prepare and implement contractor's

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Environmental and Social Management Plan(C-ESMPs) once the detailed design is finalised. Further, it is recommended to prepare a Resettlement Plan for assets and properties 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 **610,000US$** including compensation funds estimated at **320,000** US$ and will be updated based on the final detailed design and C-ESMPs.

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ACRONYMS

ASCENT	: Accelerating Sustainable and Clean Energy Access Transformation
AIIB	: Asian Infrastructure Investment Bank
BESST	**:** Bureau for Engineering and Environmental Studies
7YGP	**:** 7-Year Government Program
CO_2	**:** Carbon Dioxide
CFR	: Critical Forest Reserves
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
ESF	: Environmental and Social Framework
ESS	**:** Environmental and Social Standards
ESSP	**:** Energy Sector Strategic Plan
GBV	: Gende Based Violence
GOR	**:** Government of Rwanda
ICT	**:** Information & Communication Technology
LMP	: Labour Management Procedures
LV	**:** Low Voltage
MININFRA	**:** Ministry of Infrastructure
MoE	**:** Ministry of Environment
MDPs	: Multiple Development Partners
MV	**:** Medium Voltage
MW	**:** Mega Watts
NGOs	**:** Non-Governmental Organizations
NST1	**:** National Transformation Strategy – Phase 1
OHS	: Occupational Health and Safety Plan
OS	**:** Operational Standards
RDB	**:** Rwanda Development Board
REG	**:** Rwanda Energy Group
REMA	**:** Rwanda Environment Management Authority
RoW	**:** Right-of-Way
RPF	: Resettlement Policy Framework
RUEP	**:** Rwanda Universal Energy Access Program
RURA	**:** Rwanda Utility Regulatory Agency
SEP	: Stakeholder Engagement Plan
SDGs	**:** Sustainable Development Goals
WB	: World Bank

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1. INTRODUCTION

Rwanda is undergoing remarkable 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. 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 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 to support the Government of Rwanda's energy access objectives and 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 3 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, Kayonza, 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 Southern Province namely Gisagara, Huye, Muhanga, Nyamagabe, Nyanza, Nyaruguru, Ruhango, and Kamonyi. The map below indicates the administrative District allocation of each development partner whereby the co-financing has the same colour as shown below:

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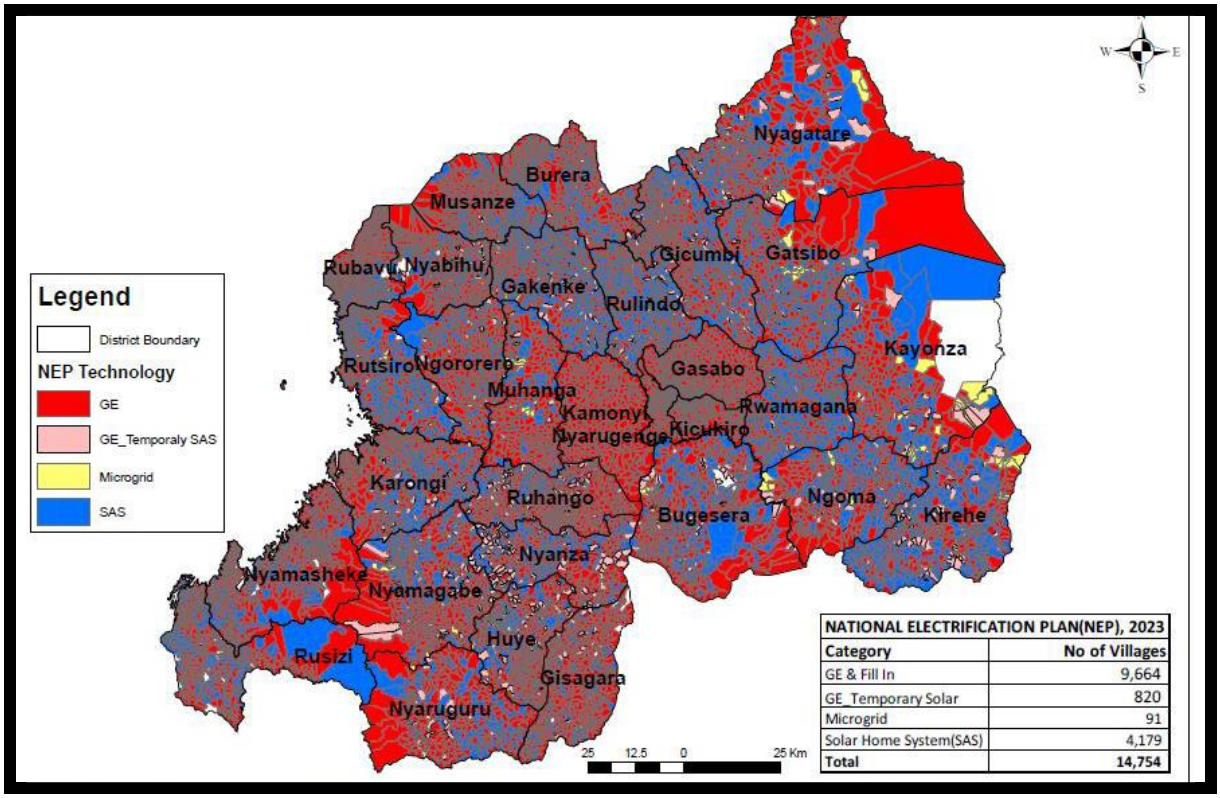

Figure 1: Proposed map indicating the project location and scope.
Source: REG-EDCL, 2024

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	**Pillar 2:** 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	**Pillar 3:** 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	**Pillar 1:** Platform to accelerate energy access through development of institutional capacity and mobilization of funding, including scaling up climate funding	15	5	20
Total financing			**300**	**100**	**400**

Source: RUEAP, ESMF-ASCENT, 2024.

1.2. 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

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development, transport, and water supply.

1.3. Implementing Entity

The Rwanda Energy Group (REG) is responsible for project implementation. 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 analyze 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.

1.4. Objectives of the ESIA study

The overall objective of this assignment is to develop an Environmental and Social Impacts Assessment (ESIA) including an Environmental and Social Management Plan and Environmental and Social Monitoring Plan (ESMMP) 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 Standards/policies. 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 and to the World Bank/AIIB for clearance.

1.5. 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 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 phase's lines in the Southern 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

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- 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.

1.6. 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 especially the World Bank Environmental and Social Standards. It involves several stages from scoping to understanding and establishing boundaries of the study, the desk review, consultations with stakeholders and local residents, field visits to sampled locations, analysis existing data (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 it in tender documents and information collected during field visits in sample location in in districts of Southern Province of Rwanda namely Huye, Ruhango, Nyamagabe, Gisagara, Muhanga, Kamonyi, Nyanza, and Nyaruguru. 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 including community members and various institutions, were consulted during the preparation of this ESIA report and the annex 3 indicates the contacted stakeholders. Views, concerns and suggestions from stakeholders have been considered as part of this ESIA Report.

1.6.1. 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);
- Stakeholder engagement Plan(SEP) for ASCENT, World Bank Environmental and Social standards;
- Fifth Population and Housing Census – 2023;
- District Developments Strategies; etc

1.6.2. Socio-Economic baseline data collection

Socio-economic baseline data used were mainly drawn from the recent 5th Population and Housing Census conducted by the National Institution of Statistics (NISR) as published in 2023completed in 2022 and additional information were obtained in districts and through interviews with local resident. Primary data were collected during the sites visit conducted in sample locations from 29th April up to 5th June 2024. Data collection used interviews, key informants and focus group discussions. The presented data covers the Southern province and only indicators related to the project were selected and are presented in chapter 4 of this ESIA Report.

1.6.3. Environmental and biological baseline information

Information collected during the field surveys includes those related to the fauna and flora of the project sites. The project is not expected to affect any high value biodiversity ecosystem given that this is only distributions line that are implemented in existing settlements. 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) and the new law No 064/2021 of 14/10/2021 governing biological diversity was consulted to identify plant and

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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 highlighted and recorded in the project areas as most of the line routes will be passing along the existing roads of the project areas. The list of typical surveyed flora and fauna and collected from interviews with local residents is provided in annex 13 of the report.

For physical environment, field observations and documentary review and photo interpretation ere used. It included the review of daily, monthly, annual and historical records. These data will be analysed through statistical tools to produce graphs. The Consultant will consider meteorological station located in the project area especially available at Rwanda Meteorology Agency. The information collected during the feasibility study was also considered and updated as appropriate. Available historical hydrometric data as well as meteorological data recorded at station close to the project area were gathered from Rwanda meteorological services and data and Rwanda water Board and analysed.

1.6.4. Stakeholders' consultation

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.

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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 second National Transformation Strategy (NST2, 2024-2029) 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 this sub-project implementation in southern 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, and 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).

- ✓ **The National Strategy for Transformation (NST2)**

The National Strategy for Transformation (NST2), which is the Seven Year Government Programme (7YGP), comes at a unique moment in the country's development trajectory which will see the crossover from Vision 2020 towards Vision 2050. This strategy is expected to lay the foundations for decades of sustained growth and transformation that will accelerate the move toward achieving high standards of living for all Rwandans.

The NST 2 will pick up from where NST1 left off and continue to accelerate the transformation and economic growth with the private sector at the helm. With this new strategy, Rwanda's public policy will focus on developing and transforming Rwandans into capable and skilled people ready to compete in a global environment. 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

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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 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.

- ✓ **The 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.

- ✓ **The 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.

- ✓ **The 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 endeavours to identify which elements of the biodiversity could be affected by the project and establish the relevant mitigation measures.

- ✓ **The 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. Restauration of affected trees will be done through repletion of the same affected tree species.

- ✓ **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**

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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 ed 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 governing land in Rwanda (2021)**

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

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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 biological diversity. 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 states 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. This is because the project activities will be implanted in existing settlements and no activity that will be implemented in protected, sensitive or high value ecosystems.

- ✓ **Law regulating labour in Rwanda N° 66/2018 of 30/08/2018**

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 that project 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

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2.2.1 Institutional framework for energy and Environment 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 EUCL 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 neighboring 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: − 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; − 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; − Put in place measures designed to prevent climate change and cope with its impacts;	REMA will be responsible for the environmental audits and project implementation environmental compliance.

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Institution	Objective/ Vision	Roles/ Responsibilities
	- Conduct studies, research, investigations, and other relevant activities in the field of environment and publish the findings; - Closely monitor and assess development programs to ensure compliance with the laws on environment during their preparation and implementation; - Participate in the preparation of activities strategies designed to prevent risks and other phenomena which may cause environmental degradation and propose remedial measures; - Provide, where it is necessary, advice and technical support to individuals or entities engaged in natural resources management and environmental conservation; - Prepare, publish and disseminate education materials relating to guidelines and laws relating to environmental management and protection and reduce environmental degradation risks; - 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.	
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)	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: - Put in place mechanisms which procure security of land tenure for the promotion of investments in land. - Promote proper allocation of land, and proper use of land resources, according to their potential. - Avoid the splitting up of plots and promote their regrouping to bring about optimum production. - Establish mechanisms which facilitate an optimum exploitation of land, targeting the social-economic development of the country. - Orient land management towards a more profitable and sustainable production, by making good choices among methods of land development. - Develop methods that protect land resources from various types of land degradation. - Establish institutional frameworks, which enable land to become more valuable in the economy or at the market. - Promote research as well as the education of the public on all aspects concerning land tenure, management, and transactions. - 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. - Involve and sensitize the public at all levels to ensure protection of the environment and good management of the land. - Ensure the sustainable use of wetlands	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 prosperity for all. This a one stop institution bringing together several government bodies in Rwanda focused at	RDB in this project is a key partner as it will be responsible for reviewing the ESIA report and issuing

Institution	Objective/ Vision	Roles/ Responsibilities
	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: - Receive and register ESIA Applications (Project Briefs) submitted by developers; - Identify relevant Lead Agencies to review Project Briefs and provide necessary input during screening, - Review Project Briefs and determine project classification at screening stage, - Transmit Project Briefs to relevant Lead Agencies and concerned Local Governments to provide input on Terms of Reference (ToRs), - Publicize Project Briefs and collect public comments during development of ToRs, - Receive ESIA documents submitted by a developer and verify that they are complete, - Transmit copy of ESIA Reports to relevant Lead Agencies, Local Governments and Communities to review and make comments, - 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, - Appoint the Technical Committee and its representative to the Technical Committee, - Forward ESIA Documents (ESIA Report, Environment Monitoring Plan and Public Hearing Report) to the Technical Committee, - Chair the Executive Committee which makes final decision on approval of a project, - Communicate decision on whether a proposed project is approved, - Issue developers ESIA Certificate of Authorization if their projects are approved.	the EIA certificate before project implementation.
Districts and their decentralized entities	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: - ensuring activities related to better management of land, especially controlling soil erosion and tap rainwater; - afforestation, protection, and proper management of forests; - efficient management of rivers, lakes, sources of water and underground water; - efficient management and effective use of swamps; - Protection and proper management of reserved areas, historical sites, endangered animal and plant species.	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 related to social protection, child protection, and 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 related to 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 No child employment will be allowed on the project. .
Rwanda National Police (Child	To prevent and combat child abuse and exploitation, ensure the safety	The unit will play role in handling cases related to child abuse, neglect, and exploitation, investigate cases of child abuse,

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Institution	Mission	Role/ Responsibilities
Protection Unit)	and security of children.	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.

2.2. 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	**ESS1: Assessment and Management of Environmental and Social Risks and Impacts**	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	**ESS2: Labor and Working Conditions**	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 disabilities, children (of working age, by this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate; Prevent the use of all forms of forced labour and child labour; Support the principles of freedom	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 labour and forced labour, ensuring Occupational Health and Safety, in keeping with the World Bank Group's Environmental,

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SN	World Bank ESS	Objectives	Borrower Requirements
		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.	Health, and Safety Guidelines (EHSG).
3	**ESS3: Resource Efficiency and Pollution Prevention and Management**	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. EHSGs
4	**ESS4: Community Health and Safety**	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	**ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**	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 assets 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	**ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**	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 conservation needs and development priorities.	Implement requirements related to primary suppliers, where a project is purchasing natural resource commodities, including food, timber, and fiber.
7	**ESS8: Cultural**	Protect cultural heritage from the adverse	Put in place a chance-finds procedure. Ensure

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SN	World Bank ESS	Objectives	Borrower Requirements
	Heritage	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.	people's continued access to culturally important sites, as well as the need for confidentiality when revealing information about cultural heritage assets that would compromise or jeopardize their safety or integrity. Putin places 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	**ESS10: Stakeholder Engagement and Information Disclosure**	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.

2.3. 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
Terrestrial Habitat Alteration	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.
Right-of-Way Maintenance	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.
Aquatic Habitat Protection	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.
Electric and Magnetic Fields (EMF)	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.
Hazardous Materials Management	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.

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Occupational Health and Safety	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.
Community Health and Safety	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 project is conducted in an environmentally responsible manner, safeguarding both ecosystems and human health.

2.4. 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 EHSGs and the EHSGs 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

EHS Guideline	Summary	Relevance
Occupational Health and Safety	Addresses worker safety, PPE usage, fall protection, electrical hazards, and training requirements.	Ensures safe working conditions during pole erection, line stringing, and equipment installation.
Community Health and Safety	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.
Waste Management	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.
Noise and Vibration	Recommends limiting construction noise through timing, equipment maintenance, and community notification.	Helps prevent noise disturbance in quiet rural environments during construction activities.
Air Emissions and Dust Control	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.
Soil Erosion and Sediment Control	Provides methods to control soil disturbance and runoff during excavation or pole setting.	Protects farmland and sensitive habitats from degradation during line construction.
Biodiversity Conservation	Aims to prevent disturbance to natural habitats and endangered species.	Important when lines pass through or near forests, wetlands, or protected areas in Rwanda.
Use of Pesticides and PCBs	Avoids use of hazardous substances like PCBs in transformers and recommends proper disposal.	Ensures new installations avoid legacy pollution and hazardous materials.
Electric and Magnetic Fields (EMF)	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.
Emergency Preparedness and Response	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.
Visual Impacts and Land Use	Recommends minimizing visual disruption and negotiating land access with communities.	Helps maintain aesthetics of rural landscapes and avoids conflict over land acquisition.
Worker Accommodation and Welfare	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.
Traffic Management	Provides guidance for vehicle movement and road safety near construction zones.	Reduces risk of accidents on narrow or unpaved rural roads.

2.5. 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 Tran boundary 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.

2.6. 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 of signature	Date of ratification
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.

2.7. 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's Environmental and Social Framework/Standards/ESF/ESSs

ESF requirements	National Legal requirements	Gaps	Recommended Actions
Standard 1: Assessment and Management of Environmental and Social Risks and Impacts			
(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 vulnerable 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 deprivation. In the context of this strategy key vulnerable groups in Rwanda include low income and/or labour-constrained individuals or households	The vulnerability will be assessed based on country context and best practices and special attention will be provided to those identified as vulnerable

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
		such as older people, people with disabilities, 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.
Standard 2: Labour and Working Conditions			
(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 of budgeting and staffing, as well as the high unemployment in the country, which facilitates the exploitation of workers.	With the budgeting allocated for this 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	Article 39 of Rwandan Constitution as revised in 2015 suggests that the	The casual nature of employment affects	The World Bank ESS 2 that is stronger in

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
collective bargaining of project workers in a manner consistent with national law.	right to freedom of association is guaranteed and does not require prior authorization. This right is exercised under conditions determined by law.	unionization, as employees paid per day are unable to make the monthly check off in support of union activities.	terms of supporting the freedom of association will be adopted
Standard 3: Resource Efficiency and Pollution Prevention and Management			
(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.
(iv) To avoid or minimize generation of hazardous and non-hazardous waste.	Article 19: Management of hazardous and toxic waste 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.
Standard 4: Community Health and Safety			

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
(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
Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement			
Compensation should be provided to all Affected persons who: a) Have formal legal rights to land or assets; 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 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 assets and properties 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 their standards of living or livelihoods.	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 caused by expropriation.	Loss of income is not covered under national regulations and regulations are silent on livelihood measures or assistance to vulnerable people	ESS5 will apply
ESS 5 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.

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
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 ESS 5 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 opportunistic settlers, from claiming benefits.	Article 10 of expropriation law requires the project developer to only prepare application that shall indicate: **1°** the nature of the project; **2°** the indication that the project aims at the public interest; **3°** the master plan of land where the project will be carried out; **4°** the document indicating that the project has no detrimental effect on the environment; **5°** the document confirming the availability of funds for fair compensation; **6°** the explanatory note detailing that such land or place suits the project; **7°** the minutes indicating that the concerned population was sensitized about the project and its importance;	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 assets will be part of the Resettlement Plan.
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 the local recognized administration entity or REG/ EDCL 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.

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
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 2021 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
Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
(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.
(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 ESS 6 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 ESS 6 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 ESS 6 will be applied
Standard 8: Cultural Heritage			
(i)To protect cultural heritage from the adverse impacts of project	The protection and preservation of culture heritage is governed by the	Chance finds procedures are not included in national	ESS8 will apply and chance finds

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
activities and support its preservation.	Law Nº 28/2016 of 22/7/2016 on The Preservation of Cultural Heritage and Traditional Knowledge 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 neighboring area.	regulations	procedure.
Standard 10: Stakeholder Engagement and Information Disclosure Consultants			
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 since it considers mainly environmental risks.	The ESS10 will be employed during project implementation.
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	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	The ESS10 will be applied to promote effective inclusion of project affected parties in the implementation

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ESF requirements	National Legal requirements	Gaps	Recommended Actions
	by the project shall be paid by the initiator of the project before any commencement of activities.	meetings and visits.	
(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

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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_2 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 in the Southern Province will be implemented in different sectors making the district of the Southern Province. The districts of intervention are respectively Kamonyi, Muhanga, Ruhango, Ruhango, Nyanza, Huye, Gisagara, Nyaruguru, and Nyamagabe. 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 centers of the districts. The line routes along the existing roads were selected 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 2 of the report).

3.2. Project justification

The Government of Rwanda recognizes the vital role that electricity access plays in accelerating economic development, improving health, and raising standards of living. Access to electricity is a key priority in national development policy, reflected in long-term plans NEP (first approved 2018, Revised in 2019) that aim to expand both grid and off-grid connections. A national electrification plan was developed with the goal of achieving universal household access, initially targeting 100 % by 2024. In parallel, installed generation capacity increased steadily from approximately 228 MW in 2020 to about 406 MW by mid-2024, reflecting substantial expansion in power generation projects. Significant investments have been made in expanding generation capacity and distribution infrastructure to support this objective. As of March 2024, around 76.7 % of Rwandan households had access to electricity, and this share has continued to rise.

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 Southern 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

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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. 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 of the 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 CO2 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 Southern Province namely Kamonyi, Muhanga, Ruhango, Nyanza, Huye, Gisagara, Nyaruguru, and Nyamagabe. 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 Southern province are summarized in the table below. More details will be available after the detailed design and will be considered in the preparation of the contractor environmental and Social Management Plans before construction and installation activities. The presented information was drawn from the preliminary studies and specification included in the tender documents for EPC contractor.

Table 9: Project key main components

S/N	Item	Data
1	Capacity of the MV	• 30kV
2	Capacity of the LV lines	• 0.4 kV
3	Height of the wooden/concrete poles to be used for stringing conductors,	• Height of LV poles is 9m • Height of MV wooden poles is 12m • Height of MV concrete and steel poles is 14m
	Land area required for the installation of a single pole	• Required land area for pole installation is 0.5 m^2 for LV lines and 1m^2 for MV lines
	Distance to be maintained between two poles	• Distance between two poles is 35m for LV lines and 70m for MV lines

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4	Vertical and horizontal clearance requirements for MV and LV lines	• Horizontal clearance is 12m • Vertical clearance is 3m
6	Type of transformers to be installed	Only poles mounted transformers will be installed

The length of Medium Voltage (MV) and Low Voltage (LV) lines to be constructed in the southern 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

S/N	District	Planned MV line (Km)	Planned LV line (Km)	Transformers
1	Huye	64	264	44
2	Nyamagabe	62	189	41
3	Nyaruguru	74	229	52
4	Gisagara	56	400	78
5	Ruhango	22.022	280.4	24
6	Muhanga	38 km	195 km	52
7	Nyanza	138	450	118

3.3. Project activities

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. 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 concrete 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;

3.3.1. 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 routes, and site selection of transformers locations to avoid sensitive ecosystems. There is no land acquisition for MV and LV lines as there 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.

a. Clearance of the ROW

During the construction phase, it will requires clearing the Right of Way (ROW 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 centre 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 workers 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 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 route design and 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 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. The design study will define the type and size of poles foundation based on standards established by REG as presented in the next table.

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Table 11: Standard Pole Sizes

Application	Pole length	Min Diam. at 1.5m from Butt (mm)	Min Diam. at Pole Top (mm)	Planting Depth	Construction	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. 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.

3.3.2. Activities of the project during the operation phase

During the operation phase, and the project will mainly focus of electricity supply and maintenance of the transformers and the lines that will have been installed during the construction phase. It is important to note that both EDCL will no longer use/ install 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 a permanent clearing of the ROW. Its width generally is 12 m wide for MV lines (6 m each side). Trees along the ROW must 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, tress and high crops. 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 replacement of coolants and lubricants for transformers. However, this is not frequently done unless where it is required to be and in case of defects. EDCL indicated that the transformers containing PCBs are no longer used and permitted in Rwanda because of their toxicity against the environment and human beings.

3.3.3. Activities of the project during decommissioning phase

During the decommissioning phase, project activities will be dismantling and removing structures from project construction sites, dismantling the supporting infrastructures and all those structures that were associated with the project implementation. 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. The project also will rehabilitate the damaged sites to their former status or near what they were before the project was commissioned.

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4. PROJECT ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

4.1. General overview

The southern province is made of the Central plateau covers entirely Southern Province including parts of Nyaruguru and Gisagara, Nyanza, Huye, Ruhango, Muhanga, Kamonyi districts and the small part of the Northern provinces especially in Gakenke and Rulindo Districts (Nyandwi et al., 2016; Republic of Rwanda, 2018). The central plateau is a crystalline mountainous terrain, adjoining to the eastern plateau. It is defined by the east-facing edge of the Central African Rift Valley, which peaks from 1800 meters at the Burundi border to over 3000 m in the central part of the country. This zone is covered by worn gneisses and granites. The smaller streams moving out of the mountains lead to highly fractured surface areas, exacerbated by the steep gradient. The tremendous relief intensity, particularly in this central plateau zone, has earned Rwanda the moniker "Land of a Thousand Hills" (Henninger, 2013).

The central plateau region enjoys the rainfall ranging between 1,100 mm and 1,300 mm, received in 90 to 150 days, with an annual mean temperature of between 18 °C and 20 °C. Like in the entire country, the southern province experiences four climatic seasons in which the long rainy (March-April-May) and short rainy (September-October-November) seasons alternate with long dry (June-July-August) and short dry seasons (December-January-February) throughout the year. The four seasons are largely controlled by the position and intensity of anticyclones such as Mascarenes, Saint Helena, Açores and Siberian (Anyah and Semazzi, 2007; Kizza et al., 2009). In 2022 Southern province has a population of is 3,002,699 people on an area of 5,963 km².

In general, in all districts of the project in southern province, project areas have no specific natural flora and are mainly characterized by grown flora. Noticeable flora includes trees that are exotic to the project sites mainly the eucalyptus trees planted in the hillsides and play a vital role in controlling soil runoff that is prevalent in the sleep hillside. Other floral species that can be observed in the project areas include Grevillea, Jacaranda, Cyprus, and Pine. Also present in the project areas and hence can be termed as flora are crops planted by local communities making an important component of the vegetation cover. These crops include beans, coffee, bananas, passion fruits, yams, and cassava.

Vegetation found along t steep hills include Eucalyptus trees (Eucalyptus sp.), *Cupressus spp*. Other plant species included *Grevillea robusta*, *Markhamia lutea, Pinus patula,* etc. As you move down toward the valley, the moderate slopes of these hills are covered by mostly banana plantations and cassava, coffee, etc. Seasonal crops are also present in this area such as beans, maize, and sorghum.

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Figure 2: Typical flora characteristics of the southern province

- **Flora Species**

The project area is located in an area modified by agriculture and human settlement. Surrounding hills are dominated by eucalyptus and grevillea woodlots. As you move down the hills towards the valley, banana plantations take the stage with scattered human settlements. During the field data collection, a total of a hundred and twenty (120) plant species were recorded in the project area. These are classified into 30 orders and 50 families.

Forest cover in Southern Province is with about 177,537ha forests corresponding to 29.8% of the total province land. The results show that Nyaruguru is the highest forested with 55,759ha of forest cover (i.e. 52.6% of the total district land), followed by Nyamagabe District with forested area about 54,018ha covering 49.5% of the total district land. These two districts are largely covered by Nyungwe natural forest covering 21,801 ha in Nyaruguru (22% of the district land) and 21,046ha in Nyamagabe (19% of the district land). Forest plantations in Nyaruguru and Nyamagabe represent 30% of the district land. Gisagara, Kamonyi, Nyanza, and Ruhango districts are least forested in the Southern Province with an average of 13% for forest cover.

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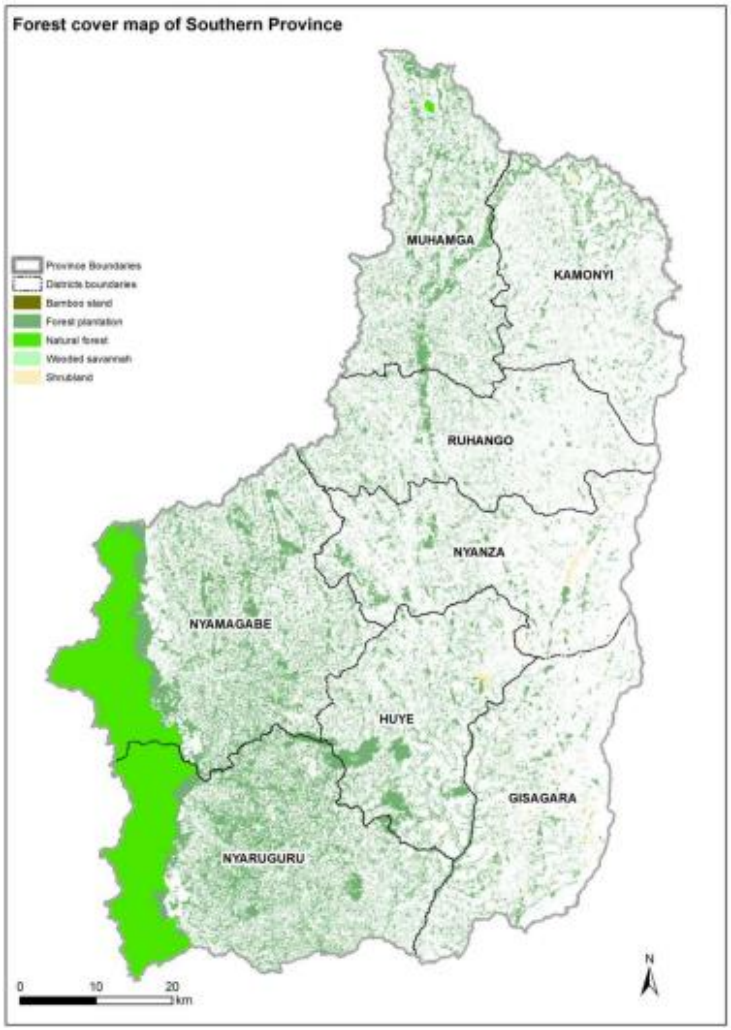

Figure 3: Forest cover in Southern province
Source: Ministry of Environmnt, 2019

There are no wildlife species and/ and avifauna that are expected to be adversely impacted by the project implementation. However, domesticated animals like goats, chickens, pigs, and cows are kept by the local communities at small scale level. It was not easy and practical to mention all animal and vegetation species accounted in the project area and in each district however, typical fauna and flora mostly frequent in the project areas and their conservation status are presented in annex 13. The next sections summarize baseline characteristics including both physical and socio-economic indicators.

- **Birds**

Twenty-seven (27) bird species were recorded in the whole project area among these, twenty-two (22) species were common to all areas, and only five (5) species were common to Muhanga and Ruhango Districts (they are however common to other parts of the country). All recorded bird species are distributed in 12 orders and 22 families. Passeriformes were the most represented.

The Slender-Billed Weaver (*Ploceus pelzelni*) was the most recorded. Among other species recorded included Sacred Ibis (*Threskiornis aethiopicus*), Hadada Ibis (*Bostrychia Hagedash*) and the Grey Crowned Crane (*Balearica regulorum*) observed on rare occasions.

On the other birds recorded include Grey-Headed Sparrow (*Passer griseus*), African-Pied Wagtail (*Motacilla aguimp*), African Firefinch (*Lagonosticta rubricata*), Speckled Mousebird (*Colius striatus*), Cape sparrow (*Passer melanurus*), etc. Among recorded birds, one (1) species is categorized as Endangered on the IUCN Red List (IUCN, 2023). This is the Grey Crowned Crane (*Balearica regulorum*), locally known as Umusambi. In addition, six species are on the list of protected species in Rwanda as presented in annexes of this report.

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Figure 4: Birds species of the project area

- **Reptiles**

No reptile species was encountered during the field data collection. Species recorded are those mentioned by community members during interviews. According to them, eight (8) species are found in the project area. Five among them were snake species including the African Green Snake (*Philothamnus heterolepidotus*) which is the most widely spread species in the project area. Other species recorded included the Puff Adder Viper (*Bitis arietans*), Forest cobra (*Naja melanoleuca*), etc.

- **Amphibians**

During the field data collection, only one species was recorded. This is the African common toad (*Sclerophrys regularis*) mostly found in Southern province. However, community members mentioned the presence of 2 new other species. To identify them, they were shown pictures along with a clear description of species found in similar areas and they confirmed the presence of the Four-lined Spiny Reed Frog (*Afrixanus quadrivittatus*) and the Kisolo Toad (*Amietophrynus kisoloensis*).

- **Mammals**

Ten (10) mammal species were recorded in southerm province including seven (7) carnivore species, two (2) species of rodent, and an African hare (*Lepus victoriae*). Among these recorded species 1 species is categorized as Vulnerable on the IUCN Red List (IUCN, 2023) and it is on the list of protected species in Rwanda. This is a Leopard (*Panthera pardus*) (see Annex 3.4). It is important to mention that the information about the occurrence of these species in the project area was obtained through interviews with local community members.

- **Fish**

According to local community interviews, 3 species of fish are found are found in rivers in southern Province and in a few ponds. These include African Catfish, Lungfish and the Nile Tilapia that have been introduced for fish farming purposes.

Except in Ruhango where the large plantations of greater than 2ha represent 46.3%, South Province is generally dominated by large plots at 81% (Table 17). The highest proportion is registered in Nyamagabe District where large plantations account for 92% of the total district forest plantations, followed by Nyaruguru District where large plantations

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account for 90%. Except for public forests buffering Nyungwe Natural Forest under a co-management license with New Forest Rwanda Ltd (NFC) Company, other public forests should also have management plans according to the forestry law of 2013 to ensure sustainable management of forestry resources in Rwanda.

The next sections provide environmental and social baseline information for each district of Southern Province

4.2. Gisagara district

Gisagara District is in Southern Province and covers an area of 678.9sqkm. It is subdivided into 13 Sectors: Gikonko, Gishubi, Kansi, Kibilizi, Kigembe, Mamba, Muganza, Mugombwa, Mukindo, Musha, Ndora, Nyanza and Save, into 59 Cells and into 524 villages. It is bordered in the South and East by the Republic of Burundi, in the North by Nyanza District, and in the West by Huye and Nyaruguru Districts. Its headquarters is Ndora and its urban master plan covers a surface that links three Sectors: Save (Gatoki and Rwanza Cells), Ndora (Cyamukuza and Gisagara cells) and Kibilizi (Kibilizi, Ruturo and Muyira cells).

4.2.1. Physical and biological Environmental

a. Topography

The topography of Gisagara district is mainly characterized by a steeply dissected hill area with an altitude varying 1,300 m to 1,700 m. Almost 90% of southern province is mountainous. Therefore, the project will be implemented in mountainous area. Parameters involved in land environment are physiographic, geology and soils and land use pattern.

b. Climate and Rainfall

District presents a temperate climate with succession of irregular seasons which vary to rainy to dry seasons: Season A starts in September and ends in December, is characterized by many rains especially in December. Season B that starts in January and ends in June has many rains in April. Season C which is a dry season starts with July and ends with September. Average annual temperatures generally oscillate around 200c with amplitudes changing between 150c and 200c and annual rainfalls of about 1200 mm.

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c. Geology and Soils

The regional geology consists of Quartz-Phyllites (Cyurugeyu Superformation), Granites to Granite-Gneisses, Quarzites and Mica-Schists, Amphibolites and Mylonites (Butare Complex) as well as Quartz-Phyllites and Meta-Volcanics. The greater part of the geological structure is occupied by lithological varieties of Rocks22. The region shows well developed drainage pattern that belongs to dendritic and trellis types. Metamorphic rocks form the major part of the rock mass and some magmatic rocks are also present.

Generally, the soils identified along the feeder roads are: a) Alluvial Clay to Silt Clay Soil; b) Red Silt; c) Black Clay; d) Black Hard Silt; e) Red Hard Silt Soil; and f) Sandy Silt Soil. Disruption of drainage due to tectonic movements of the Pleistocene caused the formation of soils. These are the result of the erosion and available in the valleys around the rivers. The soils of the top of the mountains are products of granite and gneiss and have resisted erosion. Over the project area most of the valley slopes extending from river banks to the top of the ridges are cleared for cultivation of various crops of a seasonal nature. As a result, soil cover is well exposed for observation. Soils have been degraded due to high rainfall, uneven relief conducive to erosion and agricultural over farming. The main destructive agent of the soil is rain erosion. On few roads active erosion has been observed. Other than that, erosion has also formed gully through the slopes on roads. The banks of the Rivers are composed of alluvial soils. Thus, the project activities may increase erosion and landslides rates along the river banks and in some ravines where soil erosion has already made important damages.

d. Hydrography

The district hydrography is made up two rivers: Akanyaru rivers which countours Gisagara on distance of 80km on the boarder of Rwanda and Republic of Burundi and Migina that boarders the District with Nyaruguru and Huye Districts on west side. In District, springs give stream that flow down to these rivers.

e. Physiographic and land use of district

The southern part of the project area is located on the Burundi border. The river Akanyaru forms the border between Rwanda and Burundi in this region. Feeder roads are planned up to river from Gitega and Mukindo. Land use and land

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covers patterns are important in environmental impact assessment study from the point of view that land use describes the present use such as agriculture, settlement, etc and land cover, describes the material on it such as forest, vegetation, rocks or building etc. The average size of people in the household is 4.6 and average holding is 0.56 ha/household. Hence the land under agriculture is 39,298 ha. Regarding soil protection against erosion on one hand, statistics unveil that the percentage of land that has been reported as protected against soil erosion in Gisagara District is 60 to 80%. Around 78% of cultivated land nationally is reported as being protected against erosion. The percentage of agricultural households incurring expenditure on chemical fertilizer in Gisagara District is 28% (national average is around.

f. Soil Erosion

Extensive deforestation for fuel wood and agriculture has reduced the soil ability to withstand the scouring effects of rain in the upland watersheds, which has had serious downstream implications such as water pollution, turbidity in water and silting of water bodies. The slopes in the districts are over 25% which indicates the risk of high erosion. Erosion is of relevance to slope stability, which is in turn relevant to the design of the project and the conduct of operations such as excavation and drilling. Specific measures need to be taken to address these considerations.

g. Ecological Environment

Gisagara District has relatively limited forest cover compared with many other Rwandan districts. According to national forest data, about 9,021 hectares of forest were identified in the district (around 13 % of its land area), with the vast majority being forest plantations and only a small portion classified as natural woody vegetation. While natural forest remnants are very limited, they are not completely absent. The district's natural vegetation has been under pressure from agricultural expansion and other land-use changes, and current forestry planning emphasizes afforestation, reforestation, and sustainable forest management. The steep topography affects the formation and distribution of vegetation in the project area. These disturbances have resulted in the appearance of secondary formations of plants and countless seasonal or perennial species alternating with crops. Observations revealed that there are trees and various species are likely to be impacted due to proposed improvement. The tree species comprise of Eucalyptus sp, Pinus sp, and Grevillea robusta; Fiucus sp, Mengifera indica (Mango), Parsia Americana (Avacoda), Jacaranda mimosifolia etc. The majority of significant wildlife species have either been eliminated from the project area either due to the habitat losses through agricultural cultivation which have been for generations a significant part of livelihood of local people.

4.2.2. Socio-economic baseline information

a. Population

The results of the 5th Rwanda Population and Housing Census[1], indicates that Gisagara has a total population of 397,051 residents, and its population share is 13.2 % of the total population of the Southern Province. The population of Gisagara district is predominantly female: 208,086 are female corresponding to 52.4 % of its population. Females predominant in all thirteen sectors of Gisagara district. The most populous sectors in the district are Mamba (45,283 residents), Muganza (36,530 residents) and Mugombwa (36,469 residents). They represent respectively 11.4% and 9.2% (for each between Muganza and Mugombwa) of the total population of Gisagara district. The least populated sectors are Nyanza (19,627 inhabitants), Kansi (22,310 inhabitants) and Kigembe (22,488 inhabitants). They are representing 4.9%, 5.6% and 5.7% of the total resident population of Gisagara. The below presents the number of the population of Gisagara district by sector, by sex, the percentage of female and their shares across sectors to the total population of Gisagara District.

Table 12: Population of Gisagara 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**	
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	
Gisagara District	**397,051**	**188,965**	**208,086**	**100**	**47.6**	**52.4**	**100**
Gikonko	28,772	13,776	14,996	100	47.9	52.1	7.2
Gishubi	31,860	15,366	16,494	100	48.2	51.8	8
Kansi	22,310	10,465	11,845	100	46.9	53.1	5.6
Kibirizi	31,445	14,806	16,639	100	47.1	52.9	7.9

[1]NISR; 2022

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District and Sector	Frequency			Percent			Share of the population
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
Kigembe	22,488	10,611	11,877	100	47.2	52.8	5.7
Mamba	45,283	21,896	23,387	100	48.4	51.6	11.4
Muganza	36,530	17,358	19,172	100	47.5	52.5	9.2
Mugombwa	36,469	17,116	19,353	100	46.9	53.1	9.2
Mukindo	32,393	15,621	16,772	100	48.2	51.8	8.2
Musha	28,762	13,856	14,906	100	48.2	51.8	7.2
Ndora	30,171	14,121	16,050	100	46.8	53.2	7.6
Nyanza	19,627	9,281	10,346	100	47.3	52.7	4.9
Save	30,941	14,692	16,249	100	47.5	52.5	7.8

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

The population of Gisagara district is predominantly rural: 96.6% versus urban representing 3.4%. The sectors of Gisagara district which have urban areas are Gikonko, Ndora and Save while Gishubi, Kansi, Kibirizi, Kigembe, Mamba, Muganza, Mugombwa, Mukindo, Musha and Nyanza that are entirely rural.

b. Household and size

The results of the 5th RPHC 2022 indicate that the average household size in Gisagara District is 3.9 persons per household. At the Sector level, the highest size is found in Mugombwa sector (4.2 persons/household). The smallest household size is found in Kibirizi sector (3.6persons/household). In Gisagara district, private households headed by females are 35.2%. At sector level, the highest percentages of households headed by women are found in Mugombwa (42.7%) and Ndora (39.6%) while the lowest are found in Mukindo (29.1%) and Mamba (29.8%).

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

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4.0	71.1	28.9
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Gisagara District	101,145	396,181	3.9	64.8	35.2
Gikonko	7,201	28,610	4.0	66.2	33.8
Gishubi	7,805	31,857	4.1	66.5	33.5
Kansi	5,883	22,254	3.8	61.6	38.4
Kibirizi	8,623	31,406	3.6	60.9	39.1
Kigembe	5,842	22,479	3.8	66.1	33.9
Mamba	11,224	45,215	4.0	70.2	29.8
Muganza	9,182	36,494	4.0	66.1	33.9
Mugombwa	8,693	36,402	4.2	57.3	42.7
Mukindo	8,055	32,350	4.0	70.9	29.1
Musha	7,411	28,755	3.9	66.6	33.4
Ndora	7,872	29,988	3.8	60.4	39.6
Nyanza	5,058	19,582	3.9	65.9	34.1
Save	8,296	30,789	3.7	62.7	37.3

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

c. Housing characteristics

The most common type of habitat in Gisagara district is Umudugudu (Planned rural settlement) housing (77.3%) followed by Dispersed/ isolated housing (17.7%). The type of habitat varies across sectors. Umudugudu (Planned rural settlement) housing is most prevalent (more than 80%) in almost all sectors of Gisagara District except in Save, Kibirizi and Kansi sectors (31.6%, 40.1% and 42.5% respectively) where they are the high percentages of dispersed/isolated housing units: 62.2% in Save, 53.6% in Kibirizi and 42.9% in Kansi**.** By area of residence, in urban and rural areas, the predominant types in both urban and rural areas, are umudugudu/Planned rural settlement (65.1 % and 77.7% respectively) and followed by dispersed/isolated housing (24.0% and 17.5% respectively).

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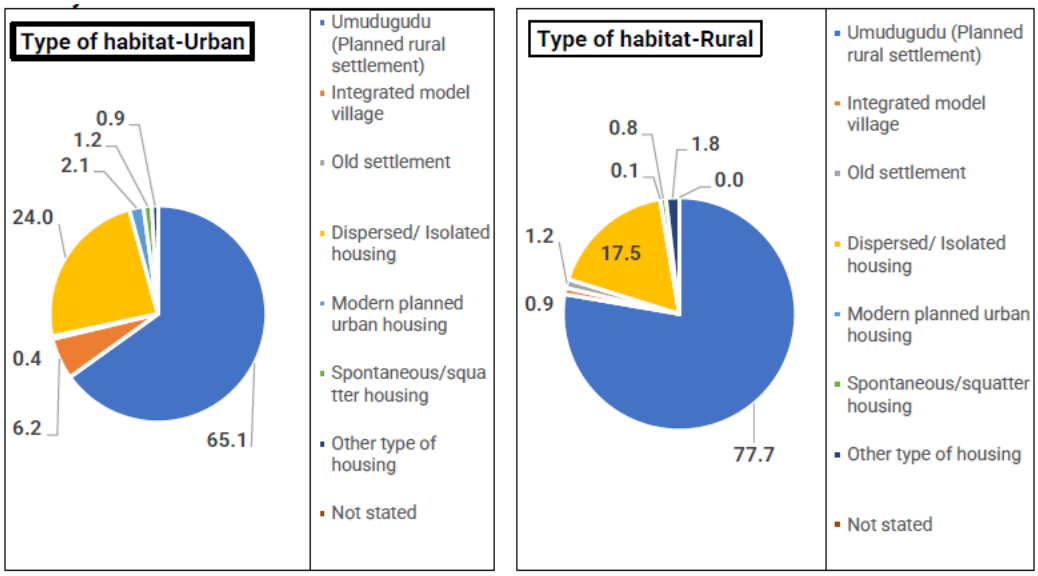

Figure 5: Distribution of households in Gisagara District by type of habitat and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

d. Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Gisagara district is 357,651. In Gisagara District, 20.7% of the population has never attended school, while 2.0% have attended nursery, and 63.8% have attended primary school. Other education levels include 0.8% for INGOBOKA/Vocational, 7.7% for lower secondary, 3.7% for upper secondary, 1.3% 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, Gishubi has a higher percentage (26.7%) of individuals who have never attended school compared to other sectors, while Save, Kansi and Mugombwa Sectors have a higher percentage (5.1% and 4.5% and 4.5% respectively) of individuals attended upper secondary school. Each sector has its own unique distribution of education levels attended by the population.

Table 10: Population of Gisagara District by highest level of school attended by sector.

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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Gisagara District	357,651	100	20.7	2.0	63.8	0.8	7.7	3.7	1.3	0.0
Gikonko	25,938	100	20.7	2.8	63.9	1.2	7.0	3.2	1.2	0.0
Gishubi	28,804	100	26.7	1.7	63.6	0.4	5.1	2.0	0.5	0.0
Kansi	20,034	100	16.2	2.0	66.6	0.9	8.4	4.5	1.4	0.0
Kibirizi	28,382	100	17.9	1.9	65.5	1.2	8.2	4.0	1.3	0.0
Kigembe	19,971	100	18.3	1.8	66.3	0.8	8.1	3.6	1.1	0.0
Mamba	40,659	100	23.2	1.2	62.8	0.9	7.0	3.7	1.2	0.0
Muganza	32,904	100	24.1	2.1	62.8	0.4	7.0	3.0	0.6	0.0
Mugombwa	32,930	100	19.4	3.3	59.7	0.5	10.5	4.5	2.1	0.0
Mukindo	29,168	100	21.6	2.0	62.9	0.8	8.6	3.4	0.8	0.0
Musha	25,953	100	21.7	1.6	65.2	0.5	7.0	3.1	1.0	0.0
Ndora	27,167	100	20.3	2.1	62.5	1.1	7.6	4.3	2.1	0.0
Nyanza	17,857	100	21.6	2.2	63.9	0.7	6.6	4.0	1.0	0.0
Save	27,884	100	13.7	2.0	67.2	1.1	8.6	5.1	2.2	0.0

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

e. Means of livelihood and income

The results of 5th RPHC 2022 revealed that in Gisagara district, crop farming and animal husbandly are on large scale. Agricultural households represent 86.4% with 82.0% of households engaged in crop farming and 63.1% in Livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Nyanza (90.7%) and Kansi (90.5%). Households engaged in crop farming are more represented in Kigembe (89.9%), Kansii (88.1%) and

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Mukindo (86.4%) while those engaged in livestock husbandry are in Mukindo (71.6%) and Kigembe (71.2%). The results of 5th census shows that the employment to population ratio is 43.5 percent among people residing in Gisagara districts, it is higher in urban areas of Gisagara (48.7%) than in rural areas of Gisagara (43.3%).

Table 14: Distribution of household engaged in livestock husbandly in Gisagara District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,928	62.6	1,669,273	**50.4**
Southern Province	760,173	618,452	81.4	574,842	75.6	483,203	**63.6**
Gisagara district	101,145	87,353	86.4	82,956	82.0	63,869	**63.1**
Gikonko	7,201	6,117	84.9	5,606	77.9	4,641	**64.4**
Gishubi	7,805	6,844	87.7	6,542	83.8	5,087	65.2
Kansi	5,883	5,323	90.5	5,185	88.1	3,937	66.9
Kibirizi	8,623	7,415	86.0	7,079	82.1	5,084	59.0
Kigembe	5,842	5,426	92.9	5,250	89.9	4,161	71.2
Mamba	11,224	9,397	83.7	8,881	79.1	6,829	60.8
Muganza	9,182	8,169	89.0	7,790	84.8	5,656	61.6
Mugombwa	8,693	6,496	74.7	6,260	72.0	4,299	49.5
Mukindo	8,055	7,350	91.2	6,957	86.4	5,766	71.6
Musha	7,411	6,537	88.2	6,233	84.1	4,944	66.7
Ndora	7,872	6,691	85.0	6,207	78.8	4,968	63.1
Nyanza	5,058	4,586	90.7	4,277	84.6	3,585	70.9
Save	8,296	7,002	84.4	6,689	80.6	4,912	59.2

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

f. Health, water supply and sanitation facilities

In Gisagara District 94.9% are using Mutuelle as main health insurance, 2.2% using RSSB or RAMA, 0.1% using private insurance, none using school insurance, 2.3% using NGOs insurance and 0.5% using employer insurance.

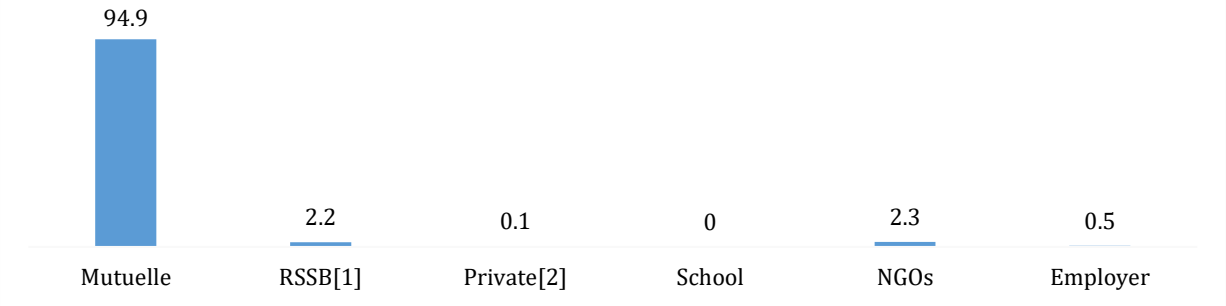

Figure 6: Population who have a medical insurance by main type of insurance in Gisagara District (%)
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of the 5RPHC 2022 reveal that improved drinking water sources is the most water sources in Rwanda that represent (82.3%). In Gisagara district, 78.4% 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 Save (90.2%), and the lowest in Mukindo (58.6%).

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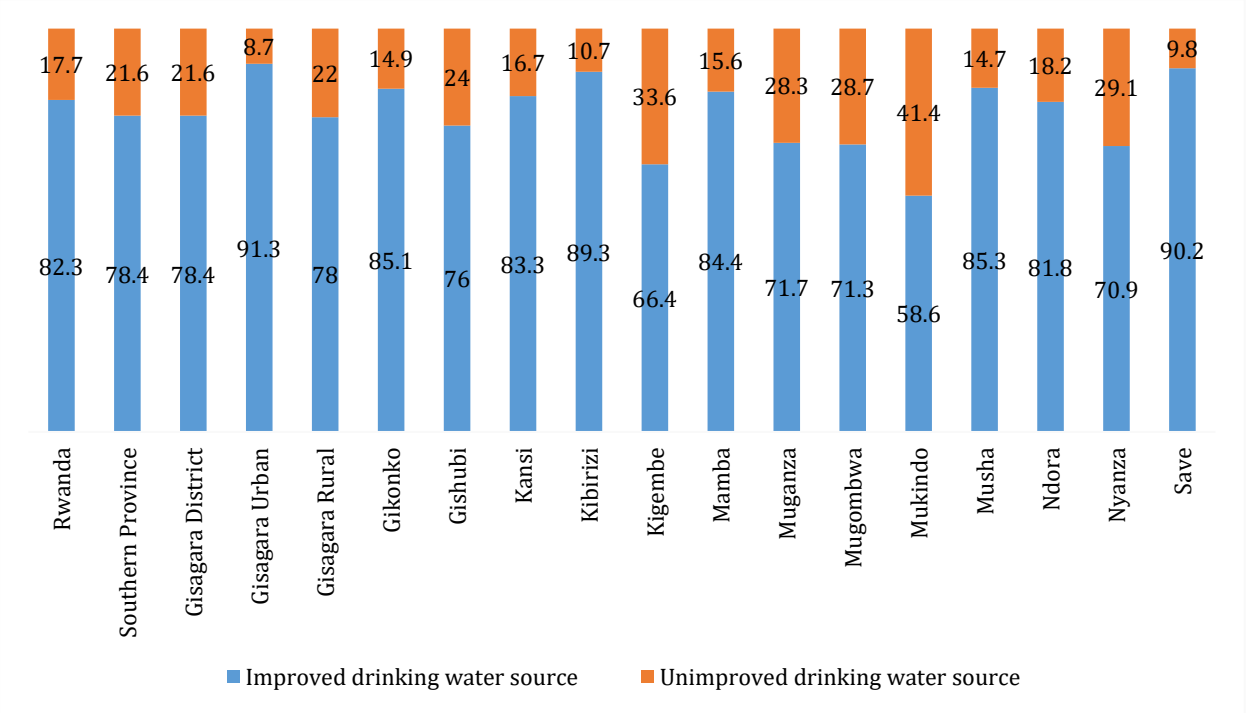

Figure 7: Percentage of households of Gisagara District by main source of drinking water
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

In Gisagara District, both urban and rural areas of Gisagara district, private households use mainly improved drinking water source (91.3% in urban and 78.0% in rural). The percentage of private households using unimproved drinking water source is higher in rural (22.0%) than in urban (8.7%).

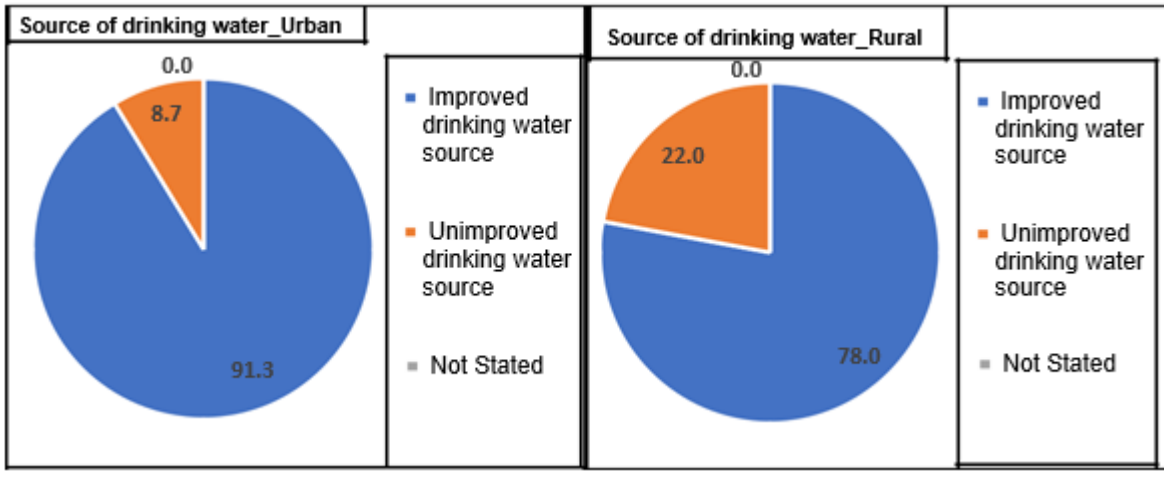

Figure 8: Households of Gisagara District by main source of water and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

g. Appliance and assets ownership

At the district level, 70.0% of private households possess a radio, 66.5% a mobile phone, 9.4% a smartphone, 3.7% a TV and less than 1% of households in Gisagara district possess a computer. The percentage of private households possessing a radio is high in Mukindo (80.5%), Kansi (76.7%), and Mugombwa (75.7%). The percentage of private households possessing a television is high in Save (7.3%). Mobile phone[2] is mostly possessed by private households of Kibirizi (83.1%) and Mukindo (82.8%). The sectors with high percentage of households with smartphone are Mugombwa (13.5%) and Save (12.7%) while the percentage of households possessing this asset is low in Gishubi (5.1%). The computer is mostly possessed in Save (2.1%).

[2] Mobile phone includes all type of mobile phone and smart phones

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Table 15: Percentage households in Gisagara 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[10]	Smart Mobile	Computer
Rwanda	**3,312,743**	**81.5**	**12.3**	**78.1**	**20.8**	**4.2**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Gisagara District	**101,145**	**70**	**3.7**	**66.5**	**9.4**	**0.9**
Gikonko	7,201	69.4	4.3	60.7	8.5	1
Gishubi	7,805	60.7	1.5	52.1	5.1	0.3
Kansi	5,883	76.7	3.7	77.4	10.9	0.9
Kibirizi	8,623	72.5	6	83.1	11.4	1
Kigembe	5,842	68.5	2.5	60.3	7.5	0.7
Mamba	11,224	66.3	3.5	58.3	8.5	1.1
Muganza	9,182	74.8	2.6	76.1	6.8	0.5
Mugombwa	8,693	75.7	3.1	73	13.5	0.7
Mukindo	8,055	80.5	3.3	82.8	8.5	0.7
Musha	7,411	66.6	3.8	57.4	7.6	0.9
Ndora	7,872	65.7	3.9	60.5	11	1.3
Nyanza	5,058	62.6	2.6	56.5	9.1	0.8
Save	8,296	68.1	7.3	62.5	12.7	2.1

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

h. Access to energy for lighting and cooking

In Gisagara district, the main source of energy for lighting used by households is electricity (52.6%) followed by Flashlight/Phone Flashlight (37.5%). At the sector level, the percentage of households using electricity for lighting is high in Mukindo Sector and Kansi Sector (62.6% and 61.9% respectively). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Gishubi (46.2%) and Ndora (43.8%).

According to the area of residence, the main source of energy for lighting is electricity (52.4%), followed by flashlight/phone flashlight (37.8%) and firewood (4.6%) in rural areas. In urban areas, 58.9% of private households use electricity as main source of energy for lighting while 30.3% of private households use flashlight/phone flashlight.

Table 16: Distribution of households of Gisagara 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	Not stated
Rwanda	**3,312,743**	**100**	**61**	**0.4**	**0**	**3**	**4**	**1.1**	**28.4**	**0.1**	**1**	**0.5**	**0**
Southern Province	**760,173**	**100**	**55**	**0.3**	**0**	**2**	**5**	**1.6**	**34.6**	**0.2**	**1**	**0.6**	**0**
Gisagara District	**101,145**	**100**	**53**	**0.2**	**0**	**2**	**5**	**1.9**	**37.5**	**0.1**	**1**	**0.7**	**0**
Gisagara Urban	**3,395**	**100**	**59**	**0.4**	**-**	**5**	**3**	**0.2**	**30.3**	**0.1**	**1**	**0.4**	**-**
Gisagara Rural	**97,750**	**100**	**52**	**0.2**	**0**	**2**	**5**	**2**	**37.8**	**0.1**	**1**	**0.7**	**0**
Gikonko	7,201	100	54.4	0.1	0	2	4	0.6	37.4	0.2	0.3	1	-
Gishubi	7,805	100	44.5	0.2	-	0.2	6.9	1.1	46.2	0.1	0.2	0.8	-
Kansi	5,883	100	61.9	0.4	0	1.7	1.6	0.5	32.8	0.1	0.4	0.6	-
Kibirizi	8,623	100	55.4	0.7	-	3.2	2.6	1.3	35.1	0.2	1	0.5	-
Kigembe	5,842	100	57.7	0.4	-	2.1	8.3	0.7	29.2	0	1.1	0.4	-
Mamba	11,224	100	52.1	0.1	0	0.5	3.2	3.2	40	0.2	0.2	0.4	-
Muganza	9,182	100	53.5	0.2	0	1.1	3.3	3.4	37.6	0.1	0.3	0.4	-
Mugombwa	8,693	100	50.4	0.1	0	1.6	2.8	2.8	39.4	0.3	1.2	1.3	0
Mukindo	8,055	100	62.6	0.1	-	0.5	2.3	2.8	30.9	0.1	0.1	0.6	-
Musha	7,411	100	52.4	0.1	0	1	3.5	0.9	41	0.1	0.6	0.5	-
Ndora	7,872	100	44	0.1	-	1	5.8	3.4	43.8	0.1	0.8	0.9	-
Nyanza	5,058	100	49.8	0.3	-	1.3	15	1.5	30.2	0.1	0.5	0.9	-
Save	8,296	100	48.1	0.3	0	6.9	4.2	0.6	37.8	0.1	1.1	0.9	-

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 (94.1%)

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followed by charcoal (2.9%) and gas (1.3%). At the sector level, firewood is the most used source of cooking energy by private households where it is more than 90% in all sectors except in Mugombwa with 77.5% and the high percentages are found in Kigembe (98.0%) and Nyanza (97.5%) followed by Muganza and Gishubi (97.2% each). Sectors with the high percentage of private households using charcoal as main source of cooking energy are Save (5.6%), Kibirizi (5.2%) and Ndora (5.1%). Gas is less than 1% in all sectors but it represents 17.5% in Mugombwa. By area of residence, private households use mostly firewood in urban as well as in rural (84.7% and 94.5% respectively). In urban areas, private households which use charcoal as main source of energy for cooking are 11% of the total Households, while this percentage is only 2.6% in rural areas. The gas is used by 2.2% in urban while it is 1.8% in rural areas.

Table 17: Distribution of households of Gisagara District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafine	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	3,312,743	100	76.1	17.3	4.6	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.4	0.0
Southern Province	760,173	100	88.5	8.8	1.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Gisagara District	101,145	100	94.1	2.9	1.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Gisagara Urban	3,395	100	84.7	11.0	2.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.9	0.0
Gisagara Rural	97,750	100	94.5	2.6	1.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Gikonko	7,201	100	96.3	2.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	1.2	0.0
Gishubi	7,805	100	97.2	1.7	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.7	0.0
Kansi	5,883	100	96.2	2.5	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.9	0.0
Kibirizi	8,623	100	93.1	5.2	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Kigembe	5,842	100	98.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0
Mamba	11,224	100	95.6	2.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
Muganza	9,182	100	97.2	1.8	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0
Mugombwa	8,693	100	77.5	3.7	17.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Mukindo	8,055	100	97.4	1.4	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.0
Musha	7,411	100	96.6	2.0	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Ndora	7,872	100	92.4	5.1	0.9	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	1.2	0.0
Nyanza	5,058	100	97.5	1.7	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Save	8,296	100	92.6	5.6	0.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.9	0.0

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

i. Vulnerability

In Gisagara district, the Vulnerability prevalence rate is 3.4% also. At sector level, the highest prevalence rates of the resident population aged 5 years and above with disability are in Kigembe sector (4.2%). The lowest is in Mukindo and Nyanza sectors (2.4% each).

Table 18: Persons with vulnerability of Gisagara District by Sector of residence and sex

Sectors of residence	Total resident population	Vulnerabilty by sex			Prevalence of vulnerable
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Gisagara District	342,458	11,499	5,055	6,444	3.4
Gikonko	24,753	829	364	465	3.3
Gishubi	27,402	909	422	487	3.3
Kansi	19,290	762	308	454	4
Kibirizi	27,262	894	411	483	3.3
Kigembe	19,495	816	345	471	4.2
Mamba	38,809	1,118	492	626	2.9
Muganza	31,145	984	453	531	3.2

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Sectors of residence	Total resident population	Vulnerabilty by sex			Prevalence of vulnerable
	Both sexes	Both sexes	Male	Female	Both sexes
Mugombwa	31,258	1,075	489	586	3.4
Mukindo	27,833	678	308	370	2.4
Musha	24,903	798	352	446	3.2
Ndora	25,880	1,196	474	722	4.6
Nyanza	17,190	412	185	227	2.4
Save	27,238	1,028	452	576	3.8

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

4.3. Huye District

Huye District is one of the eight Districts comprising the southern province of Rwanda. It has a total area of 581.5 square kilometers. Huye District borders with Nyanza District in the North, Gisagara in the East and South, Nyaruguru in the South West and Nyamagabe in the North West. Huye District is located on the main road between Kigali and the Southern Province towards the Republic of Burundi and is connected to 7 urban centres (Ruyenzi, Muhanga, Ruhango, Nyanza, Gisagara, Nyaruguru and Nyamagabe), which puts it in a strategic location to provide goods and services among those urban centres as well as a transit point for the cross-border business with the Republic of Burundi. Huye District is composed of 14 administrative Sectors namely Mbazi, Kinazi, Simbi, Maraba, Rwaniro, Rusatira, Huye, Gishamvu, Mukura, Ruhashya, Tumba, Kigoma, Ngoma and Karama.

4.3.1. Physical and Biological Environment

a) Topography

Huye District is situated in the central plateau. The hilly landscape protrudes from East to West and develops into a steep hilly and mountainous area as one move towards the West and Northwest. These hills are with an average altitude of 1700m which decreases to 1450m towards Songa farm. In the western part of the district are high undulating mountains including the famous Huye Mountain with an altitude of more than 2.000 metersASL.

b) Climate and Rainfall

Huye District is characterized by sub equatorial temperate climate with an annually average minimum temperature estimated at 13.7^{o}C and the average maximum temperature being 24.6^{o}C. As in the rest of the country, the rainfall Huye District 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. However, due to some climatic fluctuations, the district may experience changes in terms of rainfall durations and periods. The average rainfall of the area is estimated at 1,182 mm throughout the year

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c) Geology and Soils

The soils in Huye City are generally humic Kaoli soils derived from Schistone, sandstone and quartzite rocks. These soils area susceptible to erosion (GoR- ESMF, 2020). More attention should be paid to disposal of waste materials in lowlands and/or wetlands that may negatively affect the soil, surface water and human health.

d) Hydrography

The water network of Huye District comprises various streams. In the West is Kadahokwa stream which flows from the North to South; in the central region is Rwamamba. There is also Rwasave valley which is drained by Kihene stream. All these streams flow towards Migina River which is a tributary of Akanyaru River. In the North-West, there is a Mwogo river which discharges into Nyabarongo River. Some of the road sections are located in the wetland, and these might be affected by project activities.

e) Fauna and flora

Natural vegetation has disappeared due to agricultural pressure and has been replaced by the man-made vegetation dominated by food plant. The largest part of the land is under cultivation for food plants such as rice, banana, beans, maize, cassava and coffee.

Generally, Huye District has insufficient forest cover where up to date forest is estimated to cover 10% of the district surface, while the arboretum forest around the University of Rwanda (UR) plays an important role. However, some of the existing forests require reforestation. Wild animals are found only in RAB Songa Station zone.

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4.3.2. Socio-economic environment in Huye District

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 381,900 residents in Huye district, which represent 12.7 % of the total population of Southern Province. The population distribution is slightly more females (193,041) than male (188,859) in Huye District (i.e., 50.5% versus 49.5%).

Results in the table below, Indicates the number of the population of Huye district by sector, by sex, the percentage of female and their shares across sectors to the total population of Huye district and further show a similar pattern of higher number of females than Male in all sectors of Huye district apart from Ngoma Sector which have more males mainly because of rural-urban migration with (24,499) male out of (11,079) Female which represent 68.9% and 31.1% respectively.

Table 19: Population of Huye 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**	**-**
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	**-**
Huye District	**381,900**	**188,859**	**193,041**	**100**	**49.5**	**50.5**	**100**
Gishamvu	14,676	6,931	7,745	100	47.2	52.8	3.8
Huye	28,232	13,395	14,837	100	47.4	52.6	7.4
Karama	18,323	8,597	9,726	100	46.9	53.1	4.8
Kigoma	25,455	12,050	13,405	100	47.3	52.7	6.7
Kinazi	33,114	15,708	17,406	100	47.4	52.6	8.7
Maraba	26,807	12,850	13,957	100	47.9	52.1	7
Mbazi	35,807	17,049	18,758	100	47.6	52.4	9.4
Mukura	26,340	12,302	14,038	100	46.7	53.3	6.9
Ngoma	35,578	24,499	11,079	100	68.9	31.1	9.3
Ruhashya	24,050	11,369	12,681	100	47.3	52.7	6.3
Rusatira	29,842	14,211	15,631	100	47.6	52.4	7.8
Rwaniro	23,239	11,058	12,181	100	47.6	52.4	6.1
Simbi	23,284	11,053	12,231	100	47.5	52.5	6.1
Tumba	37,153	17,787	19,366	100	47.9	52.1	9.7

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

The results from the census show that 79.1 % of the population of Huye live in rural areas while 20.9% live in urban areas. Compared to the previous census, this represents a continuous increase regarding the population living in urban areas, as this proportion was 16.1 % in 2012(NISR, PHC 2012). The sectors of Huye district which are entirely rural are Gishamvu, Karama, Kigoma, Kinazi, Maraba, Ruhashya, Rusatira, Rwaniro and Simbi other sectors like Mbazi, Mukura, Huye have more Resident live in rural areas compared to the Urban areas while Ngoma and Tumba have more Residents live in Urban areas compared to the rural areas respectively.

b) Household and size

The results of the 5th RPHC 2022 indicate the total of 3,312,743 private households in Rwanda. In the Southern Province, they are 760,173 and 96,037 in Huye District. The average household size in Huye district is 3.8 persons per household. At the Sector level, the highest household size is found in Karama (4.1 persons/household). The smallest household sizes are found in Ngoma, Ruhashya and Tumba (3.7 persons/household each). The results of the 5th RPHC 2022 revealed that 28.9% of private households are headed by women at national level. In Huye district, private households headed by females are 34.9%. At sector level, the highest percentages of households headed by women are found in Gishamvu (39.8%) and Rusatira (37.0%) while the lowest are found in Maraba (30.4%).

Table 3: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4.0	71.1	28.9

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Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Huye District	96,037	365,741	3.8	65.1	34.9
Gishamvu	3,743	14,642	3.9	60.2	39.8
Huye	7,437	28,138	3.8	65.1	34.9
Karama	4,452	18,295	4.1	64.2	35.8
Kigoma	6,647	25,434	3.8	66.5	33.5
Kinazi	8,551	33,099	3.9	63.3	36.7
Maraba	6,906	26,802	3.9	69.6	30.4
Mbazi	9,375	35,453	3.8	64.5	35.5
Mukura	6,992	26,245	3.8	63.9	36.1
Ngoma	5,542	20,570	3.7	67.7	32.3
Ruhashya	6,494	24,041	3.7	63.1	36.9
Rusatira	7,934	29,765	3.8	63.0	37.0
Rwaniro	6,036	23,237	3.8	65.2	34.8
Simbi	6,051	23,230	3.8	66.9	33.1
Tumba	9,877	36,790	3.7	66.8	33.2

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

c) Housing characteristics

The results of the 5th Population and Housing Census 2022 revealed that in Southern Province, the predominant type of habitat is Umudugudu Planned Rural settlement (72.3%) and dispersed /isolated housing (20.2%). The most common type of habitat in Huye district is Umudugudu Planned Rural settlement (82.0%) followed by Dispersed /isolated housing (11.6%) and squatter housing (2.8%). The type of habitat across sectors in Huye district tend to be the same with Umudugudu Planned Rural settlement where is most prevalent in Rusatira, Kinazi, Simbi, Maraba and Kigoma with (96.1%, 92.0%, 91.4%, 91.2%, and 91.1 respectively). The sectors with the high percentages of dispersed/isolated housing units are Huye (42.1%) and Mbazi (16.8%).

Table 20: Distribution of households in Huye 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 urban housing	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**
Southern Province	**760,173**	**100**	**72.3**	**1.0**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**	**0.0**
Huye District	**96,037**	**100**	**82.0**	**1.6**	**1.0**	**11.6**	**0.6**	**2.8**	**0.4**	**0.0**
Huye Urban	**17,208**	**100**	**80.2**	**1.1**	**2.2**	**1.8**	**3.5**	**9.8**	**1.5**	
Huye Rural	**78,829**	**100**	**82.4**	**1.7**	**0.7**	**13.7**	**0.0**	**1.3**	**0.2**	**0.0**
Gishamvu	3,743	100	88.3	1.9	0.0	9.3	-	0.4	0.1	-
Huye	7,437	100	49.8	0.8	0.1	42.1	0.1	7.0	0.2	0.0
Karama	4,452	100	83.1	1.5		15.3	-	0.1	0.0	-
Kigoma	6,647	100	91.1	0.1	0.0	8.6	-	0.1	0.1	-
Kinazi	8,551	100	92.0	1.1	0.1	6.6	0.0	0.1	0.1	-
Maraba	6,906	100	91.2	2.7	0.7	4.6	-	0.7	0.1	-
Mbazi	9,375	100	72.6	1.1	3.0	16.8	1.3	4.5	0.6	-
Mukura	6,992	100	84.4	1.7	0.1	10.9	0.1	2.7	0.1	-
Ngoma	5,542	100	70.6	5.4	6.2	9.7	5.0	2.8	0.2	-
Ruhashya	6,494	100	87.0	2.2	0.8	8.4	0.0	0.9	0.7	-
Rusatira	7,934	100	96.1	0.3	1.1	2.1	0.0	0.3	0.2	-
Rwaniro	6,036	100	79.9	4.4	0.2	13.5	-	1.4	0.5	-
Simbi	6,051	100	91.4	0.4	0.1	7.5	0.0	0.6	0.0	-
Tumba	9,877	100	77.2	0.4	0.6	6.5	1.9	11.4	2.1	-

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

By area of residence, the predominant types are Umudugudu/Planned rural settlement (80.2%) and

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spontaneous/squatter housing (9.8%) but in rural areas, the predominant type are Umudugudu/Planned rural settlement (82.4%) followed by dispersed/isolated housing (13.7%).

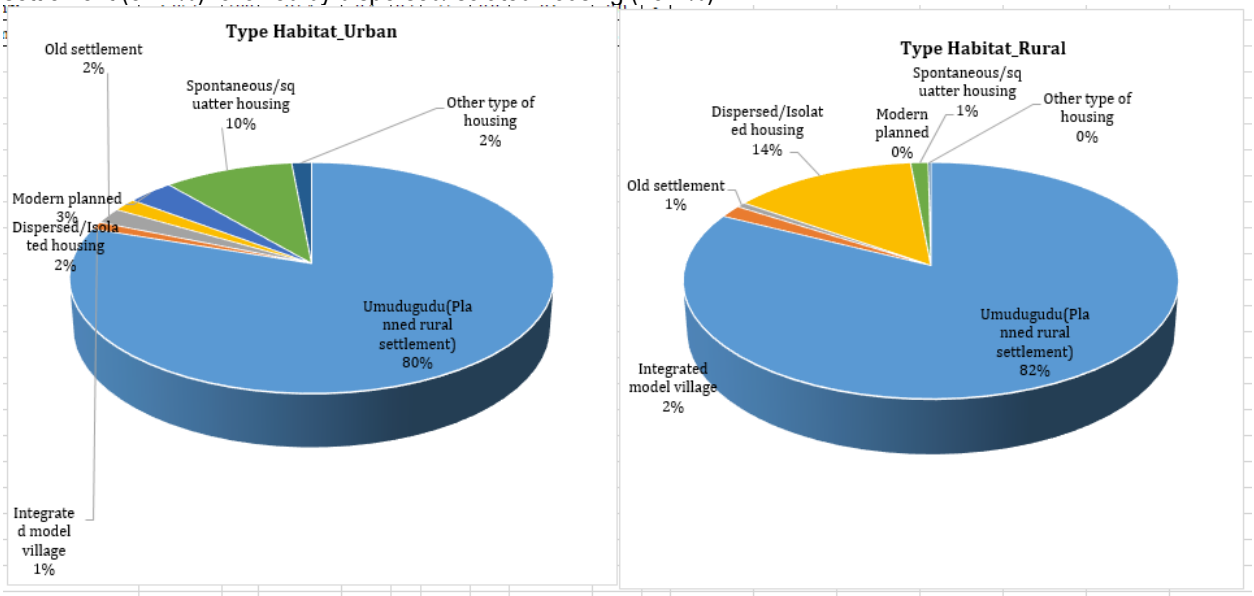

Figure 9: Distribution of households in Huye District by type of habitat and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

d) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Huye district is 343,338. In Huye District, 15.6 % of the population has never attended school, while 2.4 % have attended nursery, and 61.8 % have attended primary school. Other education levels include 1.2% for INGOBOKA/Vocational, 9.1 % for lower secondary, 6.8 % for upper secondary, 3.9 % 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, the percentage of individuals who attended primary school is more than 60% in all sectors except in Tumba (48.6%) even if it is Simbi which has a higher percentage (71.3%). Ngoma has a higher percentage (21.0%) of individuals who have never attended school compared to other sectors, Tumba has a higher percentage (10.7%) of individuals who attended upper secondary school while Mukura has a higher percentage (10.7%) of individuals who attended university school (4.7%). Each sector has its own unique distribution of education levels attended by the population.

Table 21: Population of Huye District by highest level of school attended by sector

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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Huye District	343,338	100	15.6	2.4	61.8	1.2	9.1	6.0	3.9	0.0
Gishamvu	13,091	100	16.9	1.7	66.6	1.1	8.7	3.8	1.2	0.0
Huye	25,034	100	13.7	2.8	63.4	1.3	8.8	6.2	3.7	0.0
Karama	15,916	100	17.1	1.4	63.6	1.0	11.0	4.9	1.0	0.0
Kigoma	22,617	100	14.2	1.5	67.0	1.4	9.6	4.4	1.8	0.0
Kinazi	29,321	100	17.2	2.1	64.4	1.0	9.1	4.6	1.5	0.0
Maraba	23,673	100	17.0	1.4	66.2	1.1	9.0	4.2	1.2	0.0
Mbazi	31,865	100	13.4	2.9	64.9	1.3	8.7	5.9	3.0	0.0
Mukura	24,155	100	16.8	2.8	58.9	1.5	9.3	6.0	4.7	0.0
Ngoma	34,006	100	21.0	2.3	46.9	1.0	8.9	9.8	10.0	0.1
Ruhashya	21,724	100	14.9	2.1	67.4	0.9	8.0	5.1	1.7	0.0
Rusatira	26,837	100	17.7	2.6	62.7	1.1	8.0	5.6	2.3	0.0
Rwaniro	20,572	100	15.9	1.3	69.6	1.3	7.8	3.6	0.7	0.0
Simbi	20,362	100	12.9	1.1	71.3	1.5	8.2	3.9	1.2	0.0
Tumba	34,165	100	10.9	4.9	48.6	1.3	11.9	10.7	11.7	0.1

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

e) Means of livelihood and income

In Huye district, crop farming and animal husbandly are on good scale. Agricultural households represent 78.0% with 72.4 % of households engaged in crop farming and 59.3 % in Livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Simbi (93.4%) and Karama (92.4%). Households engaged in crop farming are more represented in Karama (90.4%) and Simbi (89.9%) while those engaged in livestock husbandry are in Simbi (79.7%) and Kigoma (76.7%). It was also revealed that the employment to population ratio is 44.5 percent among people residing in Huye districts, it is higher in urban areas of Huye (56.7 percent) than in rural areas of Huye (41.7 percent).

Table 22: Distribution of household engaged in livestock husbandly in Huye District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,928	62.6	1,669,273	50.4
Southern Province	760,173	618,452	81.4	574,842	75.6	483,203	63.6
Huye district	96,037	74,948	78.0	69,507	72.4	56,971	59.3
Gishamvu	3,743	3,282	87.7	3,057	81.7	2,557	68.3
Huye	7,437	5,330	71.7	4,792	64.4	3,850	51.8
Karama	4,452	4,113	92.4	4,023	90.4	3,229	72.5
Kigoma	6,647	6,043	90.9	5,727	86.2	5,095	76.7
Kinazi	8,551	7,289	85.2	6,904	80.7	5,026	58.8
Maraba	6,906	6,268	90.8	6,013	87.1	5,169	74.8
Mbazi	9,375	7,593	81.0	7,046	75.2	5,737	61.2
Mukura	6,992	4,971	71.1	4,540	64.9	3,365	48.1
Ngoma	5,542	2,440	44.0	1,998	36.1	1,556	28.1
Ruhashya	6,494	5,564	85.7	5,123	78.9	4,332	66.7
Rusatira	7,934	6,537	82.4	6,125	77.2	4,957	62.5
Rwaniro	6,036	5,540	91.8	5,279	87.5	4,575	75.8
Simbi	6,051	5,649	93.4	5,439	89.9	4,822	79.7
Tumba	9,877	4,329	43.8	3,441	34.8	2,701	27.3

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

f) Health, water supply and sanitation facilities

In Huye District 93% are using Mutuelle as main health insurance, 5.5% using RSSB or RAMA, 0.4% using private insurance, 0.1% using school insurance, 0.1% using NGOs insurance and 0.8% using employer insurance.

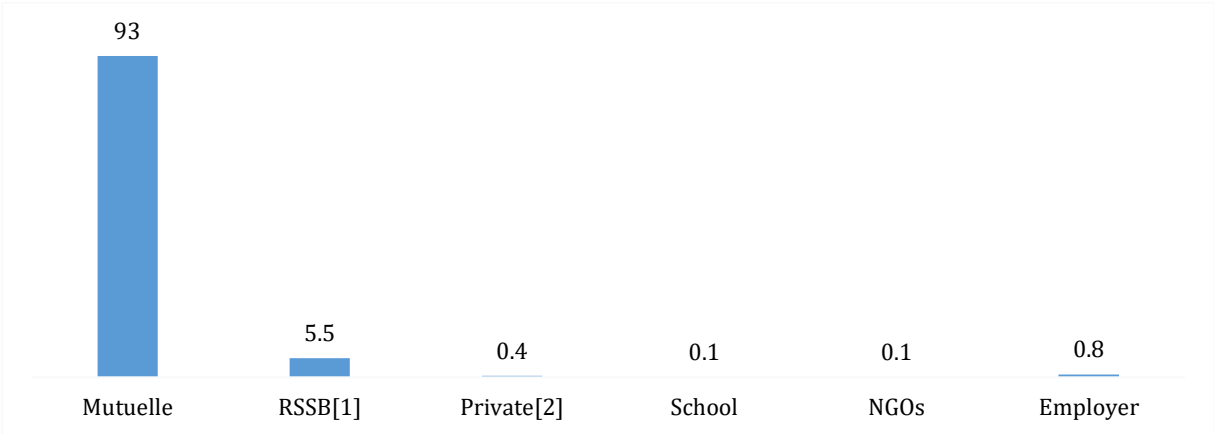

Figure 10: Population who have a medical insurance by main type of insurance in Huye District (%)
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of the 5RPHC 2022 reveal that improved drinking water sources is the most water sources in Rwanda that represent (82.3%). In Huye district, 88.5% of private households use improved drinking water sources. At the sector

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level, the percentage of the private households using water from improved drinking sources is highest in Ngoma (97.7%), Mukura (96.7%), Tumba (96.5%) and Mbazi (91.1%). It is low in Karama (71.3%) and Rwaniro (74.2%).

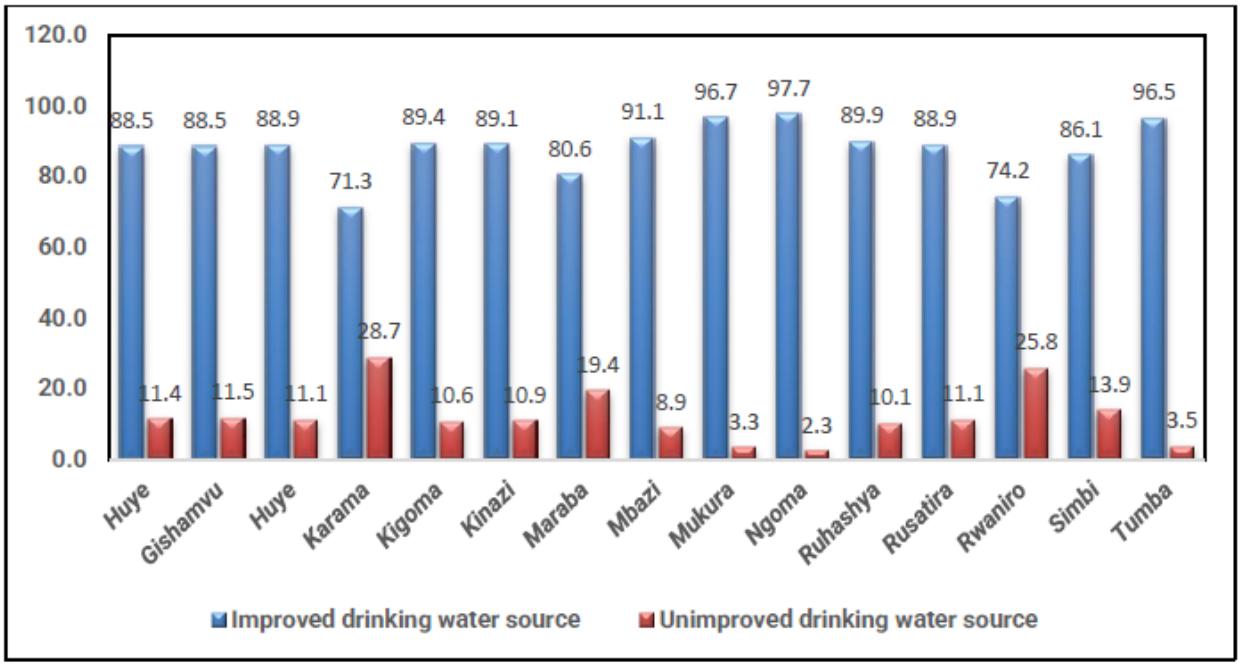

Figure 11: Percentage of households of Huye District by main source of drinking water
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

In both urban and rural areas of Huye district, private households use mainly improved drinking water sources (97.7% in urban and 86.6% in rural). The percentage of private households using unimproved drinking water source is higher in rural areas (13.4%) than in urban areas (2.3%).

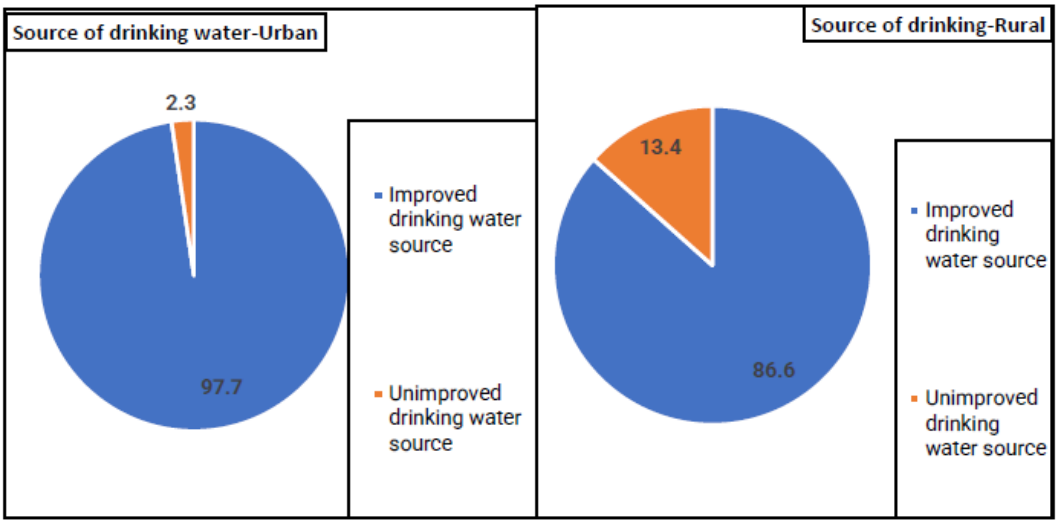

Figure 12: Households of Huye District by main source of water and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

g) G) Appliance ad assets ownership

At the district level, 75.2% of private households possess a radio, 70.1% a mobile phone, 18.1% a smartphone, 10.0% a TV and 4.1% a computer. The percentage of private households possessing a radio is high in Ngoma (91.2%) and Tumba (85.7%) while it is low in Rwaniro (64.9%). The percentage of private households possessing a television is high in Ngoma (34.6%) and while it is low in Rwaniro (1.5%). Mobile phone is mostly possessed by private households of Ngoma and Tumba (89.1% and 83.0% respectively). The sector with high percentage of households with smartphone is Ngoma (54.1%) while the percentage of households possessing this asset is low in Rwaniro (5.2%). The computer is mostly possessed in Ngoma (20.1%).

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Table 23: Percentage of private households and of Huye 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[10]	Smart Mobile	Computer
Rwanda	**3,312,743**	**81.5**	**12.3**	**78.1**	**20.8**	**4.2**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Huye District	**96,037**	**75.2**	**10**	**70.1**	**18.1**	**4.1**
Gishamvu	3,743	71.3	3.7	65.8	10.6	0.6
Huye	7,437	77.7	11	73.1	20.2	2.9
Karama	4,452	71	2.8	65.7	7.9	0.4
Kigoma	6,647	72	3	65	9.4	0.9
Kinazi	8,551	75	6.2	70.8	12	1.3
Maraba	6,906	76.2	3.7	69.9	9.8	0.9
Mbazi	9,375	75.9	9.4	71.4	16.3	3.1
Mukura	6,992	72.8	11.2	68.5	21.7	4.1
Ngoma	5,542	91.2	34.6	89.1	54.1	20.1
Ruhashya	6,494	69.2	5.4	63.6	10.6	1.7
Rusatira	7,934	72.5	7.6	66.8	13.3	2.4
Rwaniro	6,036	64.9	1.5	57.3	5.2	0.3
Simbi	6,051	70.4	2.3	62.7	7.3	0.7
Tumba	9,877	85.7	28.2	83	43.4	13.7

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

h) H) Access to energy for lighting and cooking

In Huye district, the main source of energy for lighting used by households is electricity (56.4%) and Flashlight or Phone flashlight (31.6%). At the sector level, the percentage of households using electricity for lighting is high in Ngoma and Tumba (89.8% and 82.1% respectively). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Rwaniro (55.9%) and Simbi (50.8%). According to the area of residence, the main source of energy for lighting is electricity (49.8%), followed by flashlight/phone flashlight (37.2%) and Firewood (4.8%) in rural areas. In urban areas, 86.4% of private households use electricity as main source of energy for lighting while 5.9 % use flashlight or phone flashlight and 4.4% use candles.

Table 24: Distribution of households of Huye 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	Not stated
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**	**0.0**
Southern Province	**760,173**	**100**	**55.1**	**0.3**	**0.0**	**2.0**	**4.7**	**1.6**	**34.6**	**0.2**	**0.9**	**0.6**	**0.0**
Huye District	**96,037**	**100**	**56.4**	**0.6**	**0.0**	**3.2**	**4.1**	**1.9**	**31.6**	**0.1**	**1.5**	**0.5**	**0.0**
Huye-Urban	**17,208**	**100**	**86.4**	**0.5**	**0.0**	**4.4**	**1.0**	**0.2**	**5.9**	**0.1**	**1.2**	**0.3**	**-**
Huye-Rural	**78,829**	**100**	**49.8**	**0.6**	**0.0**	**2.9**	**4.8**	**2.2**	**37.2**	**0.2**	**1.5**	**0.6**	**-**
Gishamvu	3,743	100	60.2	0.3	0.1	4.8	6.3	0.7	26.1	0.0	1.3	0.2	-
Huye	7,437	100	66.0	1.0		4.6	3.9	0.5	20.5	0.0	3.1	0.5	0.0
Karama	4,452	100	55.7	0.2	0.0	1.8	10.0	1.3	28.6	0.3	0.9	1.3	-
Kigoma	6,647	100	54.9	0.3		1.5	4.6	2.2	34.1	0.1	1.7	0.6	-
Kinazi	8,551	100	45.7	0.8		1.7	4.0	6.0	40.0	0.1	1.0	0.7	-
Maraba	6,906	100	46.0	0.3	0.0	1.5	5.4	3.7	39.3	0.1	3.2	0.4	-
Mbazi	9,375	100	53.9	1.4	0.0	6.2	4.4	1.4	30.0	0.3	1.9	0.6	-
Mukura	6,992	100	64.1	0.4		5.4	5.2	0.5	22.6	0.1	1.6	0.2	-
Ngoma	5,542	100	89.8	0.3		3.8	0.7	0.0	3.8		1.0	0.5	-
Ruhashya	6,494	100	41.7	0.4	0.0	3.1	4.5	1.3	47.4	0.2	0.7	0.7	-
Rusatira	7,934	100	50.5	0.4		1.7	3.4	0.8	41.9	0.2	0.5	0.6	-
Rwaniro	6,036	100	33.2	0.3		0.8	4.2	3.7	55.9	0.3	0.5	1.1	-
Simbi	6,051	100	40.4	0.4	0.0	0.7	3.0	3.5	50.8	0.2	1.0	0.1	-
Tumba	9,877	100	82.1	1.0	0.1	5.5	2.0	0.1	7.4	0.0	1.5	0.3	-

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

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At the district level, the main sources of energy for cooking used by the private households are firewood (82.8%) followed by charcoal (13.7%) and gas (1.9%). At the sector level, firewood is the most used source of cooking energy by private households where over 90% of private households in 9 Sectors out of 14 use it (Simbi, Rwaniro, Gishamvu, Karama, Maraba, Kigoma, Ruhashya, Kinazi and Rusatira). Sectors with the highest percentages of private households using Charcoal and gas as main sources of cooking energy are Ngoma (52.3% and 13.6% respectively) and Tumba (49.3% and 6.5% respectively). By area of residence, private households use mostly firewood (93.9%) and charcoal (4.5%) in rural areas. In urban areas, private households use most charcoal (55.8%), firewood (32.1%) and gas (9.0%).

Table 25: Distribution of the private households of Huye District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage														
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafine	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	3,312,743	100	76.1	17.3	4.6	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Southern Province	760,173	100	88.5	8.8	1.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Huye District	96,037	100	82.8	13.7	1.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Huye-Urban	17,208	100	32.1	55.8	9.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0
Huye-Rural	78,829	100	93.9	4.5	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Gishamvu	3,743	100	96.9	2.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0
Huye	7,437	100	79.2	16.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
Karama	4,452	100	96.8	2.1	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Kigoma	6,647	100	96.2	1.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Kinazi	8,551	100	93.3	5.1	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.7	0.0
Maraba	6,906	100	96.6	1.9	0.2	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	1.5	0.0
Mbazi	9,375	100	88.4	9.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.6	0.0
Mukura	6,992	100	75.8	21.2	1.2	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	1.4	0.0
Ngoma	5,542	100	30.7	52.3	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
Ruhashya	6,494	100	93.8	4.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Rusatira	7,934	100	92.4	5.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Rwaniro	6,036	100	97.9	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Simbi	6,051	100	98.1	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Tumba	9,877	100	41.6	49.3	6.5	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	2.6	0.0

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

i) Vulnerability

In Huye district, the disability prevalence rate is 4.1 %. At sector level, the highest prevalence rates of the resident population aged 5 years and above with disability are in Kinazi (5.0%), Ruhashya (4.9%) and Ngoma (4.8%). The lowest is in Simbi (3.0), Rwaniro (3.4%) and Kigoma (3.5%).

Table 11: Persons with vulnerability in of Huye District by Sector of residence and sex

Sectors of residence	Total resident population	Vulnerable people			Prevalence of vulnerabity
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Huye district	335,123	13,675	6,572	7,103	4.1
Gishamvu	12,823	497	208	289	3.9
Huye	24,419	1,036	449	587	4.2
Karama	15,868	750	331	419	4.7
Kigoma	22,496	796	367	429	3.5
Kinazi	28,412	1,408	588	820	5
Maraba	23,565	1,046	478	568	4.4
Mbazi	31,280	1219	535	684	3.9
Mukura	22,858	845	386	459	3.7
Ngoma	33,149	1,584	1,272	312	4.8
Ruhashya	21,093	1,024	431	593	4.9
Rusatira	25,851	968	422	546	3.7

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Rwaniro	20,454	695	323	372	3.4
Simbi	20,458	606	295	311	3
Tumba	32,397	1,201	487	714	3.7

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

4.4. Kamonyi district

Kamonyi District is one of the eight Districts that make up the Southern Province. It is composed of 12 Sectors (Imirenge) namely Gacurabwenge, Karama, Kayenzi, Kayumbu, Mugina, Musambira, Ngamba, Nyamiyaga, Nyarubaka, Rugarika, Rukoma and Runda. The district accounts 2; 59 Cells (Utugari) and 317 Villages (Imidugudu) covering a total surface area of 655.5 km². The District of Kamonyi shares its borders with Ruhango District in the South, Muhanga District in the West, Bugesera and Nyarugenge Districts in the East, Gakenke and Rulindo Districts in the North.

4.4.1. Physical Environment

Kamonyi district is made of low-lying plateau. The district is between 1.500 and 2.000 m of altitude. The Eastern and Northern part of the district are occupied by the large valley of Nyabarongo. The high land peaks of the district are the following: Ijuru rya Kamonyi and "Cubi na Marenga" while Mukunguri and Kona ka Mashyuza are the lowest points.

a. Climate and Rainfall

The District of Kamonyi enjoys a moderate climate. The frequency of rainfall is rather sufficient. Humidity varies between 1.200 and 1.400 mm and the average temperature is 20ºC. Its relief is made of low-lying plateau, except in the western part which is more mountainous.

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b. Geology and Soils

The soil of Kamonyi District is largely humus, permeable and fertile. The agricultural productivity increases year by year due to modern techniques of land use management. However, the District is facing soil erosion and overexploitation due to demographic pressure. Parts of the District are occupied by a granite ridge and a sandy loam.

c. Hydrography

Kamonyi District is drained by river Nyabarongo along the east and north of the District and Akanyaru River which border the district in north and eastern part. There are also a number of small water sources, such as Kayumbu, Bakokwe, Gikoro, Mukunguri, Nyabuvomo, Bishenyi, Gatimbazi and Ruvubu. The district has approximately 843 water sources including rivers and strems, marshlands etc.

d. Fauna and flora

The fauna in the district has been progressively depleted following the clearing and destruction of natural forests. We have witnessed the disappearance of several animal species such as gazelle, jackal and hare. Despite, there are still some amphibians, reptiles, butterflies and birds. The vegetation of Kamonyi District which was originally a shrub savanna has been endangered due to high population pressure which favored agriculture. Flora is characterized by natural and planted forestry and agro forestry species such as grevillea robusta, coffee, avocado, erythrina and pinus. There are also some natural flora species and the natural forestry of Rukaragata in Muganza-Karama. Rukaragata forests cover is estimated to be between 160ha-170ha, however, precise numbers are not established yet.

4.4.2. Socio-economic baseline information in Kamonyi District

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 450,849 residents in Kamonyi district, which represent 15% % of the total population of the southern Province (3,002,699 residents). The population of Kamonyi District is predominantly female: 233,279 are women corresponding to 51.7 % of the total population Kamonyi District. The results indicate that; the population share of Kamonyi District is 15% of the total Population of southern Province. Runda (727,779 population) and Rugarika (59,952 population) are the most populated sectors. They represent 16.1% and 13.3% of the total population of Kamonyi District, respectively. The two less populated sectors are Ngamba (16,416 inhabitants) and Kayumbu (17,106 inhabitants). They represent 3.6% and 3.8% of the total resident population of Kamonyi district, respectively. The table below indicates the number of the population of Kamonyi district by sector, by sex and their shares across sectors to the total population of Kamonyi district.

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Table 26: Population of Kamonyi 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**	
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	
Kamonyi District	**450,849**	**217,570**	**233,279**	**100**	**48.3**	**51.7**	**100**
Gacurabwenge	36,859	17,625	19,234	100	47.8	52.2	8.2
Karama	20,879	9,926	10,953	100	47.5	52.5	4.6
Kayenzi	25,209	12,289	12,920	100	48.7	51.3	5.6
Kayumbu	17,106	8,262	8,844	100	48.3	51.7	3.8
Mugina	45,894	21,913	23,981	100	47.7	52.3	10.2
Musambira	42,198	20,013	22,185	100	47.4	52.6	9.4
Ngamba	16,416	7,991	8,425	100	48.7	51.3	3.6
Nyamiyaga	45,645	21,804	23,841	100	47.8	52.2	10.1
Nyarubaka	28,225	13,363	14,862	100	47.3	52.7	6.3
Rugarika	59,952	29,280	30,672	100	48.8	51.2	13.3
Rukoma	39,688	19,409	20,279	100	48.9	51.1	8.8
Runda	72,778	35,695	37,083	100	49	51	16.1

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

The results of Rwanda Population and housing census 2022 revealed that, the total population of Rwanda are spatially distributed in rural area that represent 72.1% and urban area represent 27.9%. The southern Province is predominantly by the rural area (85.2%) and urban area (14.8%). Kamonyi district population is predominantly by rural area 68.4% while urban represents 31.6%. The sectors of Kamonyi District which are entirely Rural are Gacurabwenge, Karama, Kayenzi, Kayumbu, Mugina, Musambira, Ngamba, Nyamiyaga, Nyarubaka, Rugarika and Rukoma and while Runda is entirely urban.

b) Household and size

The results of 5th RPHC 2022 indicate the total of 3,312,743 households in Rwanda, 760,173 in the Southern Province and 116,378 in Kamonyi District. The average household size in Kamonyi District is 3.9 persons per household. At the Sector level, the highest sizes are found in Gacurabwenge, Karama, Mugina, Musambira, Nyamiyaga, Rukoma and Runda (3.9 persons/household each). The smallest household size is found in Kayumbu and (3.7persons/household). The table below indicates number of households and size of household members per sector. In Kamonyi District, private households headed by females are 28.1%. At sector level, the highest percentages of households headed by women are found in Mugina sector, Musambira sector (31.9% each) while the lowest is found in Runda sector (21.5%).

Table 27: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number households	Total Population	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4	71.1	28.9
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Kamonyi District	116,378	450,061	3.9	71.9	28.1
Gacurabwenge	9,537	36,742	3.9	69	31
Karama	5,317	20,869	3.9	71.3	28.7
Kayenzi	6,587	25,172	3.8	75.6	24.4
Kayumbu	4,574	17,098	3.7	73.5	26.5
Mugina	11,759	45,849	3.9	68.1	31.9
Musambira	10,901	42,143	3.9	68.1	31.9
Ngamba	4,291	16,393	3.8	74.9	25.1
Nyamiyaga	11594	45,629	3.9	67.8	32.2
Nyarubaka	7,362	28,208	3.8	68.5	31.5
Rugarika	15,597	59,926	3.8	73.3	26.7
Rukoma	10,216	39,397	3.9	72.1	27.9
Runda	18,643	72,635	3.9	78.5	21.5

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

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C) Housing characteristics

The results of 5th Population and Housing Census 2022 revealed that in the southern Province the predominant type of habitat is Umudugudu (Planned rural settlement) (72.3%) and dispersed/ Isolated housing (20.2%). It is in same as in Kamonyi District as one of districts of the southern Province. The most common type of habitat in Kamonyi District is Umudugudu (Planned rural settlement) (70.3%) followed by Dispersed/ Isolated housing (21.9%) and Modern planned urban housing (2.4%). The type of habitat varies across sectors. Umudugudu (Planned rural settlement) is most prevalent in Rukoma (78.0%) and Musambira (74.8%) and low in Kayumbu (58.4%) and Kayenzi (58.5%). The sectors with the high percentages of dispersed/isolated housing units are Kayenzi (40.0%) and Kayumbu (36.9%).

Table 28: Distribution of households in Kamonyi 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	**3312743**	**100**	**65.4**	**0.8**	**2**	**14.9**	**6.9**	**8.9**	**0.8**	**0**
Southern Province	**760173**	**100**	**72.3**	**1**	**1**	**20.2**	**0.7**	**3.7**	**0.9**	**0**
Kamonyi District	**116,378**	**100**	**70.3**	**1.1**	**1**	**21.9**	**2.4**	**2.4**	**0.6**	**0**
Urban	**36,574**	**100**	**71.7**	**1.1**	**2**	**14.3**	**7.4**	**2.7**	**0.9**	**0**
Rural	**79,804**	**100**	**69.6**	**1.2**	**1**	**25.3**	**0.2**	**2.2**	**0.5**	**0**
Gacurabwenge	9537	100	70.3	1.2	0	25.3	0.7	1.5	0.6	0
Karama	5317	100	69.7	0.3	0	26.3	-	3	0.5	0
Kayenzi	6587	100	58.5	0.1	0	40	0	1	0	-
Kayumbu	4574	100	58.4	0.7	1	36.9	0	3.1	-	-
Mugina	11759	100	72.2	0.3	1	22.5	0	3.2	1.1	-
Musambira	10901	100	74.8	3	1	19	0.1	1.7	0.4	0
Ngamba	4291	100	66.6	1.1	2	25.6	0	4.5	0	-
Nyamiyaga	11594	100	74.5	1.4	1	20.9	0	1.8	0.5	-
Nyarubaka	7362	100	74.9	1.3	3	18.1	0	1.6	0.6	0
Rugarika	15597	100	73.5	0.9	0	22	0.5	2.3	0.6	0
Rukoma	10216	100	78	0.4	0	18.7	-	2.4	0.2	-
Runda	18643	100	63.2	1.5	4	12.9	14	3.1	1.4	0

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

According to the area of residence. In urban areas, the predominant types are umudugudu/ (Planned Rural settlement) (71.7%) and dispersed/isolated housing (14.3%). In rural areas, the predominant type is umudugudu/ (Planned Rural settlement) (69.6%) followed by dispersed/isolated housing (25.3).

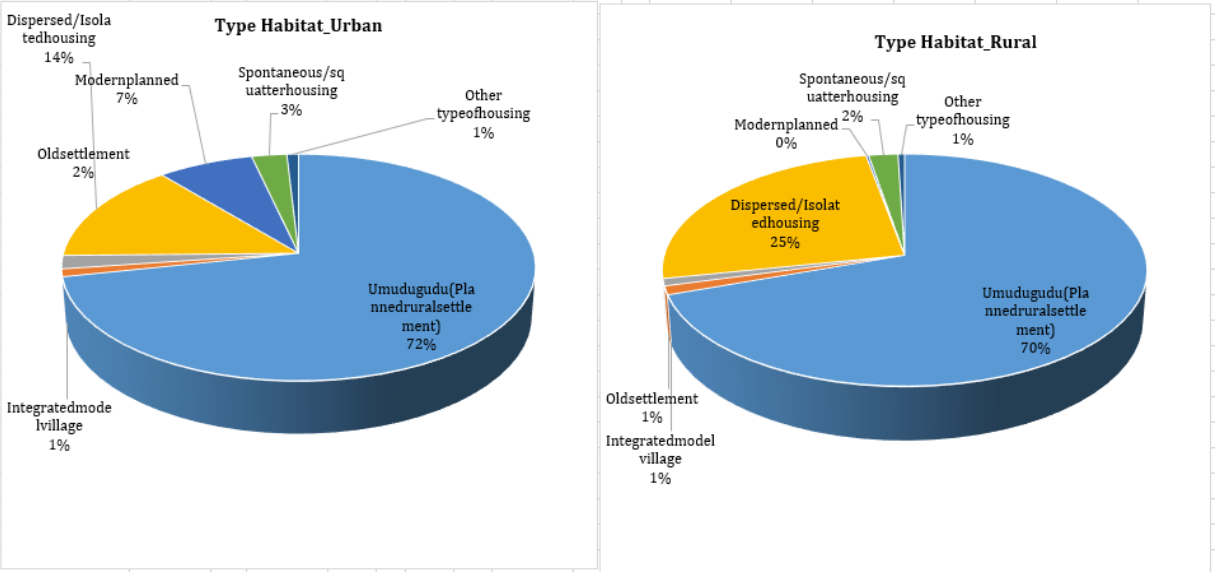

Figure 13: Distribution of households in Kamonyi District by type of habitat and by area of residence.
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

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e) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Kamonyi district is 411,386, The highest level of education attended is categorized into several levels: Never attended School, Nursery, Primary, INGOBOKA/Vocational, Lower secondary, Upper secondary, University, and Not stated 13.1% of them has never attended any formal school, 62.6% attained the primary level, 9.9% attained lower secondary level, 6.7 % has attained upper secondary and 3.1% attained university level. The level of educational attainment varies across sectors, Nyamiyaga is highest percentage of primary school attainment (67.9%), Runda is highest in upper secondary school attainment (11.6%), and Runda has a high percentage of 8.9% of the population attained University than other sectors.

Table 29: Population of Kamonyi District by highest level of school attended by sector (both sexes)

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
Southern Province	2,720,038	100	17.1	2	63	1.2	9	5.5	2	0
Kamonyi District	411,386	100	13.1	3	63	1.6	9.9	6.7	3	0
Gacurabwenge	33,689	100	11.5	3	59	2.1	11.5	9.1	4	0
Karama	19,079	100	11.2	3	67	2.1	10	5.8	1	0
Kayenzi	23,429	100	11.8	3	68	1.9	8.9	5.2	2	-
Kayumbu	15,873	100	15.3	2	66	1.9	9.2	4.4	1	-
Mugina	41,790	100	15.8	2	67	1.5	8.3	4.5	1	0
Musambira	38,244	100	12.7	4	64	1.7	9.3	6.6	2	0
Ngamba	15,270	100	15	2	65	1.5	9.6	4.7	2	0
Nyamiyaga	41,037	100	14.9	2	68	1.5	8.8	4.1	1	0
Nyarubaka	25,631	100	15.3	2	68	0.9	8.8	4.1	1	0
Rugarika	54,023	100	13.8	3	62	1.5	9.7	6.7	3	0
Rukoma	36,690	100	12.7	3	64	2.3	9.8	6.5	2	0
Runda	66,631	100	10.1	5	52	1.4	12	11.6	9	0

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

f) Means of livelihoods and income

The results of 5th RPHC 2022 revealed that nationally, 2,280,854 of private households (68.9%) are engaged in agriculture, among them 62.6% are engaged in crop farming and 50.4% are engaged Livestock Husbandry in Kamonyi District, Agricultural households occupy (74.3%) with 68.1% of households engaged in crop farming and 56.5% Households engaged in Livestock husbandry. Kamonyi district has sectors located in urban areas where the agriculture activities are applied, the sectors have a high proportion of Households engaged in agriculture are Kayumbu (91.4%) and Karama (90.8%) and in crop farming Kayumbu (87.9%) and Karama (86,2%) and Households engaged in Livestock husbandry Kayumbu (79.1%) and Kayenzi (78.6%). The results of 5th census shows that the employment to population ratio stood at 45.9 in Rwanda, it is lower among females (40.2 percent) than males (52.4 percent). On the other side, it was observed that the employment to population ratio is higher in urban areas of Rwanda (53.5 percent) than in rural areas (42.7 percent). It was observed that in Southern Province, the employment to population ratio stood at 42, 9 percent, it is higher in urban areas (52.5 percent) than in rural areas of south (41.2 percent). It was also revealed that the employment to population ratio is 46.6 percent among people residing in Kamonyi districts, it is higher in urban areas of Kamonyi (52.6 percent) than in rural areas of Kamonyi (43.8 percent).

Table 30: Distribution of household engaged in livestock husbandly in Kamonyi District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,928	62.6	1,669,273	50.4
Southern Province	760,173	618,452	81.4	574,842	75.6	483,203	63.6
Kamonyi District	116,378	86,514	74.3	79,264	68.1	65,705	56.5
Gacurabwenge	9,537	6,949	72.9	6,363	66.7	5004	52.5
Karama	5,317	4,826	90.8	4584	86.2	4122	77.5

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Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Kayenzi	6,587	5,936	90.1	5640	85.6	5176	78.6
Kayumbu	4,574	4,182	91.4	4020	87.9	3618	79.1
Mugina	11,759	9,373	79.7	8,604	73.2	6494	55.2
Musambira	10,901	9,060	83.1	8,462	77.6	7030	64.5
Ngamba	4,291	3,770	87.9	3477	81	3113	72.5
Nyamiyaga	11,594	9568	82.5	8772	75.7	7317	63.1
Nyarubaka	7,362	6,306	85.7	5,861	79.6	5018	68.2
Rugarika	15,597	10,321	66.2	9,294	59.6	6910	44.3
Rukoma	10,216	8,586	84	8,162	79.9	6778	66.3
Runda	18,643	7,637	41	6,025	32.3	5125	27.5

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

g) Health, water supply and sanitation facilities

In Kamonyi District 94.4% are using Mutuelle as main health insurance, 3.9% using RSSB or RAMA, 0.6% using private insurance, none using school insurance, 0.1% using NGOs insurance and 1% using employer insurance.

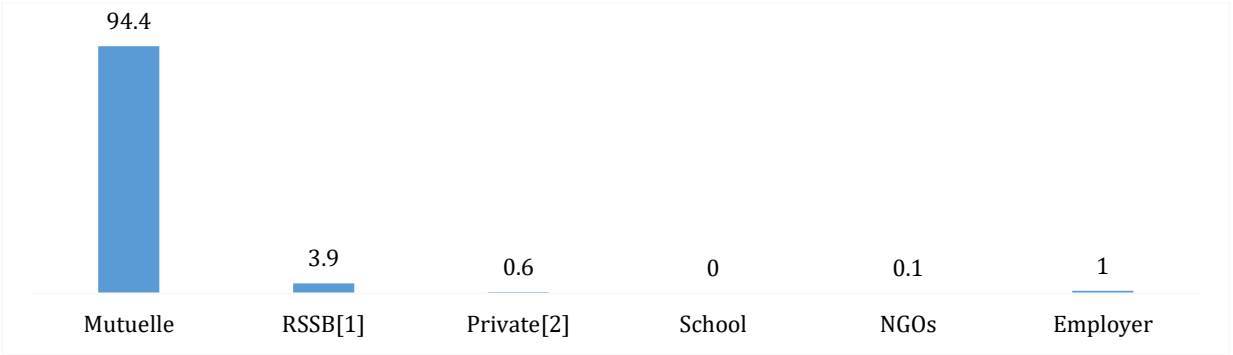

Figure 14: Population who have a medical insurance by main type of insurance in Kamonyi District (%)
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

H) Appliance and assets ownership

At the district level, 83.2% of private households possess a radio, 79.6% a mobile phone, 19.4% a smartphone, 12.9% a TV and 3.6% a computer. The percentage of private households possessing a radio is high in Runda (90.9%), Gacurabwenge (86.9%), Kimironko and Karama (85.9%). It is low in Mugina (73.9%) and Nyamiyaga (77.7%). The percentage of private households possessing a television is high in Runda (31.5%) and Gacurabwenge 16.3%) while it is low in Ngamba (4, 4%) and Kayumbu (4.9%). Mobile phone is mostly possessed by private households of Runda (88.8%), Gacurabwenge (83, 9%), and Rugarika (80.9%). The sectors with high percentage of households with smartphone are Runda (42.4%), Gacurabwenge (25.4%) and Rugarika (22.5%) while the percentage of households possessing this asset is low in Nyamiyaga (9.4%) and Ngamba (8.0%). The computer is mostly possessed in Runda (13.0%) and low in Nyamiyaga and Nyarubaka (0.6 % each).

Table 31: Percentage of private households and of Kamonyi 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**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Kamonyi District	**116,378**	**83.2**	**12.9**	**79.6**	**19.4**	**3.6**
Gacurabwenge	9,537	86.9	16.3	83.9	25.4	3.8
Karama	5,317	85.9	6.5	81.6	12.1	1.1
Kayenzi	6,587	85.1	7.4	80.7	12.9	1.5
Kayumbu	4,574	86	4.9	79.8	11.5	0.9
Mugina	11,759	73.9	6.2	70	10.7	0.9
Musambira	10,901	82.1	8.6	78.6	16	2
Ngamba	4,291	79.6	4.4	74.2	8	0.8
Nyamiyaga	11,594	77.7	5.9	74.1	9.4	0.6
Nyarubaka	7,362	79.3	6.6	73.6	10.1	0.6

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Rugarika	15,597	84	16.2	80.9	22.5	3.5
Rukoma	10,216	83.1	9.9	79.7	15.5	1.9
Runda	18,643	90.9	31.5	88.8	42.4	13,0

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

j) Access to energy for lighting and cooking

In Kamonyi District, the main source of energy for lighting used by households is electricity (61.0%). At the sector level, the percentage of households using electricity for lighting is high in Runda (76.9%), and Gacurabwenge (63.8%), the lowest is in Nyamiyaga (38.4%) and Ngamba (39.8%). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Ngamba (55.2%) and Nyamiyaga (53.8%).

Table 32: Distribution of households of Kamonyi District by main source of energy for lighting

Sectors	Total Number of Private Households	Percentage									
		Total	Electricity	Kerosene/Paraffin lamp	Biogas	Candles	Firewood	Batteries/Bulb	Flashlight/Phone Flashlight	Rechargeable Batteries	Other source of energy for lighting
Rwanda	**3,312,743**	**100**	**61**	**0.4**	**0**	**3**	**4**	**1**	**28.4**	**0.1**	**0**
Southern Province	**760,173**	**100**	**55**	**0.3**	**0**	**2**	**5**	**2**	**34.6**	**0.2**	**1**
Kamonyi District	**116,378**	**100**	**54**	**0.4**	**0**	**3**	**1**	**2**	**38.2**	**0.3**	**0**
Kamonyi Urban	**36,574**	**100**	**72**	**0.5**	**0**	**5**	**1**	**0.5**	**20.2**	**0.1**	**1.3**
Kamonyi Rural	79,804	100	46	0.4	0	2	1	2	46.5	0.3	1.1
Gacurabwenge	9,537	100	64	0.4	0	3	1	1	28.9	0.2	0
Karama	5,317	100	57	0.6	-	1	1	2	37.6	0.3	0
Kayenzi	6,587	100	48	0.5	-	1	0	3	44.8	0.7	1
Kayumbu	4,574	100	52	0.2	-	0	1	0	46.4	0	0
Mugina	11,759	100	35	0.3	-	3	2	3	53.8	0.7	1
Musambira	10,901	100	48	0.4	0	2	2	3	43.2	0.2	0
Ngamba	4,291	100	40	0.6	-	1	1	0	55.2	0.2	1
Nyamiyaga	11,594	100	38	0.2	0	2	1	3	53.8	0.2	0
Nyarubaka	7,362	100	49	0.3	-	1	1	1	45	0.2	0
Rugarika	15,597	100	63	0.2	0	4	1	1	29.1	0.2	0
Rukoma	10,216	100	47	0.8	-	2	0	1	45.9	0.4	0
Runda	18,643	100	77	0.6	-	6	1	0	13.4	0.1	0

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

According to the area of residence the main sources of energy for lighting in Kamonyi District are mainly electricity, candles, 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 (71.7%), followed by flashlight/phone flashlight (20.2%) and candles (4.7%). In rural areas, 46.5% of private households use flashlight/phone flashlight as main source of energy for lighting while 45.9% use electricity and 2.3% use candles.

At the district level, the main sources of energy for cooking used by the private households are firewood (81.3%) followed by charcoal (14.8%) and gas (2.3%). At the sector level, firewood is the most used source of cooking energy by private households in Kayumbu (96.8%) and Ngamba (96.0%) followed by Kayenzi (95.7%) and Karama (95.5%). Sectors with the high percentage of private households using charcoal as main source of cooking energy are Runda (44.9%) and Rugarika (24.2%). Sectors with the highest percentages of private households using gas as main source of cooking energy are Runda (9.8%), and Gacurabwenge (2.1%).

The main sources of energy for cooking used by private households in Kamonyi District vary by area of residence. In Rural areas, private households use mostly firewood (92.2%) and charcoal (5.2%). In urban areas, private households use most firewood (55.9%) and charcoal (35.8%).

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Table 33: Households of Kamonyi District by main source of energy for cooking

Sectors and area of residence	Total Number of Privates households	Percentage									
		Total	Firewood	Charcoal	Gas	Electricity	Biogas	Crop waste	Sawdust	Other cooking	No cooking option
Rwanda	**3,312,743**	**100**	**76.1**	**17.3**	**5**	**0**	**0**	**0.5**	**0**	**0**	**1.4**
Southern Province	**760,173**	**100**	**88.5**	**8.8**	**1**	**0**	**0**	**0.2**	**0**	**0**	**1.1**
Kamonyi District	**116,378**	**100**	**81.3**	**14.8**	**2**	**0**	**0**	**0.2**	**0**	**0**	**1.4**
Kamonyi _Urban	36,574	100	55.9	35.8	6	0	0	0.1	0	0	1.7
Kamonyi _Rural	79,804	100	92.9	5.2	0	0	0	0.3	0	0	1.2
Gacurabwenge	9,537	100	77.3	18.9	2	0	0	0.1	-	0	1.6
Karama	5,317	100	95.5	2.7	1	-	0	0.4	0	-	0.8
Kayenzi	6,587	100	95.7	2.2	0	-	-	0	-	-	1.7
Kayumbu	4,574	100	96.8	1.9	0	0	-	0	-	-	0.9
Mugina	11,759	100	93.7	4.4	0	0	-	0.6	0	0	0.9
Musambira	10,901	100	87.4	10.7	1	0	0	0.3	-	0	0.8
Ngamba	4,291	100	96	1.5	0	-	-	0	-	0	2.2
Nyamiyaga	11,594	100	95.5	3.1	0	-	0	0.3	0.1	0	0.7
Nyarubaka	7,362	100	94.5	4	0	-	-	0.1	0.1	0.1	0.9
Rugarika	15,597	100	72.4	24.2	2	0	-	0.2	0	0	1.4
Rukoma	10,216	100	92	5	1	-	0	0.1	0	-	2
Runda	18,643	100	43.1	44.9	10	0.1	0	0.1	0	0	2

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

k) Vulnerability

In Kamonyi District the vulnerability prevalence rate is 3.2%. At sector level, the highest prevalence rates of the resident population with vulnerability is in Nyarubaka (4.6) and Ngamba (4.4% each) and while the lowest is in Runda (1.8) and Kayumbu (2.2%).

Table 34: Persons with vulnerability of Kamonyi District by Sector of residence and sex

Sectors of residence	Total resident population	Vulnerabilty			Prevalence of Vulnerabilty
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Kamonyi District	394,782	12,803	5,716	7,087	3.2
Gacurabwenge	32,234	1,253	546	707	3.9
Karama	18,569	704	337	367	3.8
Kayenzi	22,348	955	408	547	4.3
Kayumbu	15,141	337	161	176	2.2
Mugina	40,273	1,416	633	783	3.5
Musambira	36,768	1,502	637	865	4.1
Ngamba	14,533	634	317	317	4.4
Nyamiyaga	39,993	1277	573	704	3.2
Nyarubaka	24,866	1,146	484	662	4.6
Rugarika	51,700	1,457	634	823	2.8
Rukoma	35,333	1,008	449	559	2.9
Runda	63,024	1,114	537	577	1.8

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

4.5. Muhanga District

Muhanga is located in the southern province of Rwanda, West of city of Kigali, it's also one of the eight districts comprising the Southern Province. It is subdivided into twelve (12) sectors, sixty-three (63) cells and three hundred and thirty-one (331) villages (Imidugudu). The district covers an area of six hundred forty-seven-point seven square kilometres (647.7 km2) and, it is neighbouring the Districts of Gakenke in the North, Kamonyi in the East, Ruhango in the South and Ngororero in the West. The district is a Secondary City located fifty Kilometres (50 km) from the City of Kigali (CoK). The district is also located at the juncture between Kigali and the Southern and Western Provinces, the Republic of Burundi and Eastern of Democratic Republic of Congo. Major towns of Southern Province connected to Muhanga Secondary City are Ruhango, Nyanza, Huye and Nyamagabe, while those of the Western Province are

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Ngororero and Karongi. It is also connected to the Mayaga, region rich in agricultural production. This strategic location makes Muhanga Secondary City an economic pole that strives for development in trade and other businesses in the Southern part of the country.

4.5.1. Environmental baseline

a) Topography

One part of Muhanga District is located in the "central plateau" of the country with topography of hills type. With high and low peaks, this part constitutes one of the best elements of the central "plateau" of the country. The other part of the district is on the high mountains of the Nil-Congo; it has peaks prancing beyond 2000 meters (Saruheshyi, Kanyarira, Mukingi and Samba). It contains a few peaks belonging to the region of the Budaha- Ndiza-Buberuka.

b) Climate and Rainfall

The district is located in an area well-watered, between 1100 mm and 1200 mm of altitude. This region enjoys a climate of four seasons of which two rainy seasons and two dry seasons: a short rainy season, which extends from October to December, a short dry season that runs from January to February, and a long rainy season from March to June and a long dry season from June to August or early September. The district is located mainly in the Agro-bio-climatic region called "Granite Ridge.

c) Geology and Soils

Muhanga soils are generally constituted by humic Kaoli soils derived from granitic rocks. However, the soil characteristics vary from one to another ecological type, which is observed from a variety of soils depending on the altitude (high and low hills or lower slopes). In addition, the district has lateritic and granite soils spread over most of the area of the district. Swamps and lowlands are characterized by clay soils rich in silt and covered in places by alluvium and colluviums.

The agricultural potential to the people of Muhanga depends mainly on the presence of the layer humifere. The humifere is still there but currently the signs of exhaustion of soils are manifested due to the overexploitation of agricultural parcels and to the limited use of manure and mineral fertilizers. The erosion reached alarming proportions. It must absolutely revive the establishment of mechanisms antierosifs. The balance soil - plant is very fragile. This fragility is a consequence of erosion during the great rain season which corresponds to the period of torrential rain and which outweigh the fields and other infrastructure. The humifere is there

f) Hydrography

The district has the following large rivers: Nyabarongo which makes the district hydrographical belt (it crosses six sectors) and collects alone more than 90% of runoff/small rivers; Its tributaries are Miguramo, Nyakabanda, Bakokwe, Birikana, Ururumanza, Sagarara, Kiryango, Base, Akabebya, Mukunguri and pours into Akanyaru. In general, water is abundant in the district, especially in its Northern part.

g) Fauna and flora

The district Natural plants or ecosystems have disappeared, leaving room for crops and artificial forests. The crops consist of large banana with the combination of avocado, sweet potatoes, cassava, etc. The majority of the current afforested consists of Eucalyptus, Pinus and and few grevilleas especially on the lines conservation tillage. The main use is the construction of houses, the firewood and the construction of bridges. This imposes the rehabilitation of damaged forests and agroforestry. However, the District has a natural forest of 40 ha called Busaga in Ndiza Mountain. Wildlife no longer exists in the region for a long time except for some birds, small mammals and reptiles encountered in the less frequented places. Thus, from the wildlife point of view, only domestic animals i.e. cattle, goats, sheep, pigs, rabbits, chickens and cats exist in the District.

4.5.2. Socio-economic baseline information in Muhanga

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 358,433 residents in Muhanga district, which represent 11.9 % of the total population of Southern Province (3,002,699residents). The population of Muhanga district is predominantly female, 184,818 are female corresponding to 51.6 % of the total population of Muhanga district. Females are predominant in eleven out of 12 sectors of Muhanga district. Nyamabuye (59,961 population) and Shyogwe (50,966population) are the most populated sectors. They represent 16.7 % and 14.2 % of the total population

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of Muhanga district, respectively. The two less populated sectors are Nyabinoni (16,253 inhabitants) and Rugendabari (17,366 inhabitants) which represent 4.5% and 4.8% of the total resident population of Muhanga district, respectively. The table below indicates the number of the population of Muhanga district by sector, by sex and their shares across sectors to the total population of Muhanga district.

Table 35: Population of Muhanga District by Sector and by 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**	**-**
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	**-**
Muhanga District	**358,433**	**173,615**	**184,818**	**100**	**48.4**	**51.6**	**100**
Cyeza	34,540	16,410	18,130	100	47.5	52.5	9.6
Kabacuzi	28,192	13,427	14,765	100	47.6	52.4	7.9
Kibangu	20,326	9,612	10,714	100	47.3	52.7	5.7
Kiyumba	23,364	11,009	12,355	100	47.1	52.9	6.5
Muhanga	28,700	13,742	14,958	100	47.9	52.1	8
Mushishiro	21,071	9,909	11,162	100	47	53	5.9
Nyabinoni	16,253	7,640	8,613	100	47	53	4.5
Nyamabuye	59,961	28,810	31,151	100	48	52	16.7
Nyarusange	28,308	13,585	14,723	100	48	52	7.9
Rongi	29,389	13,894	15,495	100	47.3	52.7	8.2
Rugendabari	17,363	8,170	9,193	100	47.1	52.9	4.8
Shyogwe	50,966	27,407	23,559	100	53.8	46.2	14.2

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

The results of Rwanda Population and housing census 2022 revealed that, the total population of Rwanda are spatially distributed in rural area that represent 72.1% and urban area represent 27.9%. The Southern province is predominantly by the rural area (85.2 %), the urban area represents 14.8%. Muhanga district population is predominantly by rural area 75.7 while urban represents 24.3%. The sectors of Muhanga district which are entirely rural are Kabacuzi, Kibangu, Kiyumba, Muhanga, Mushishiro, Nyabinoni, Nyarusange, Rongi, and Rugendabari while none is entirely urban.

b) Household and size

The results of 5th RPHC 2022 indicate the total of 93,241 households in Muhanga district. The average household size in Muhanga district is 3.8 persons per household. At the Sector level, the highest Household sizes are found in Kibangu, Nyarusange and Shyogwe (3.9 persons/household for each sector). The smallest household sizes are found in Kiyumba (3.5 persons/household), in Nyamabuye and Rugendabari (3.6 persons/household each). The results of 5th RPHC 2022 revealed that in Muhanga district, private households headed by women are 29.1%. At sector level, the highest percentages of households headed by women are found in Mushishiro sector (33.0%), Cyeza sector (30.1%) and Nyarusange (30%) while the lowest is found in Kabacuzi sector (27.9%).

Table 36: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3 312 743	13 100 600	4.0	71.1	28.9
Southern Province	760 173	2 963 528	3.9	68.1	31.9
Muhanga District	93 241	349 960	3.8	70.9	29.1
Cyeza	8 956	34 462	3.8	69.9	30.1
Kabacuzi	7 641	28 168	3.7	72.1	27.9
Kibangu	5 274	20 310	3.9	71.7	28.3
Kiyumba	6 709	23 330	3.5	71.5	28.5
Muhanga	7 413	28 414	3.8	71.4	28.6
Mushishiro	5 465	21 030	3.8	67	33
Nyabinoni	4 332	16 235	3.7	70.4	29.6
Nyamabuye	16 424	59 598	3.6	71.4	28.6
Nyarusange	7 212	28 278	3.9	70	30

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Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rongi	8 012	29 375	3.7	71.8	28.2
Rugendabari	4 772	17 359	3.6	70.7	29.3
Shyogwe	11 031	43 401	3.9	71.5	28.5

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

c) Housing characteristics

The results of 5th Population and Housing Census 2022 revealed that Muhanga district as one of districts of the Southern Province; the most common type of habitat is Umudugudu (planned rural settlement) at 67.5% followed by dispersed/Isolated housing and Spontaneous/squatter (14.3% each type). Across sectors, the common types of habitats are the same as at district level: Umudugudu (planned rural settlement) type is the most prevalent in all sectors, followed by dispersed/Isolated housing and Spontaneous/squatter. Umudugudu (planned rural settlement) type is most found in Kibangu (94.6%), Mushishiro (92.2%) and Rugendabari (90.0% while it is less in Nyamabuye (21.1%). Dispersed/Isolated housing type predominates in Kabacuzi (31.3%), Nyarusange (26.6%) and Kiyumba (24.6%). The type of habitat that predominates in Nyamabuye district is Spontaneous/squatter at 66.9%.

Table 37: Distribution of households in Muhanga 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**	**-**
Southern Province	**760,173**	**100**	**72.3**	**1**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**	**-**
Muhanga district	**93,241**	**100**	**67.5**	**1.2**	**1.3**	**14.3**	**0.7**	**14.3**	**0.6**	**-**
Muhanga-Urban	**21,089**	**100**	**36.9**	**1.4**	**1.4**	**2.8**	**2.6**	**54.4**	**0.5**	**0**
Muhanga-Rural	**72,152**	**100**	**76.5**	**1.2**	**1.3**	**17.6**	**0.1**	**2.6**	**0.6**	**0**
Cyeza	8,956	100	78.5	2.8	0.5	13.2	0	4.7	0.3	0
Kabacuzi	7,641	100	65.5	0.1	0.4	31.3	0	2.3	0.4	0
Kibangu	5,274	100	94.6	0.4	0	3.9	0	0.3	0.8	0
Kiyumba	6,709	100	69.3	0.6	4.2	24.6	0	0.9	0.5	0
Muhanga	7,413	100	73.2	1.6	3.7	19.1	0	1.9	0.3	0
Mushishiro	5,465	100	92.2	0.4	0.3	5.6	0	0.7	0.8	0
Nyabinoni	4,332	100	82.5	0.1	0.2	16.3	0	0.2	0.6	0
Nyamabuye	16,424	100	21.1	0.1	1.4	9.3	0.7	66.9	0.6	0
Nyarusange	7,212	100	67.4	2.4	1.2	26.6	0	1.4	0.9	0
Rongi	8,012	100	89.6	1.5	0.5	7.5	0	0.2	0.7	0
Rugendabari	4,772	100	90	1.4	0.3	7.7	0	0.1	0.5	0
Shyogwe	11,031	100	67.7	2.6	2	9.5	4.8	12.7	0.7	0

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

By area of residence, the predominant types are spontaneous/squatter housing (54.4%) and Umudugudu/planned rural settlement (36.9%) in urban areas. In rural areas, the predominant type is Umudugudu (planned rural settlement) (76.5%) followed by dispersed/isolated housing (17.6%).

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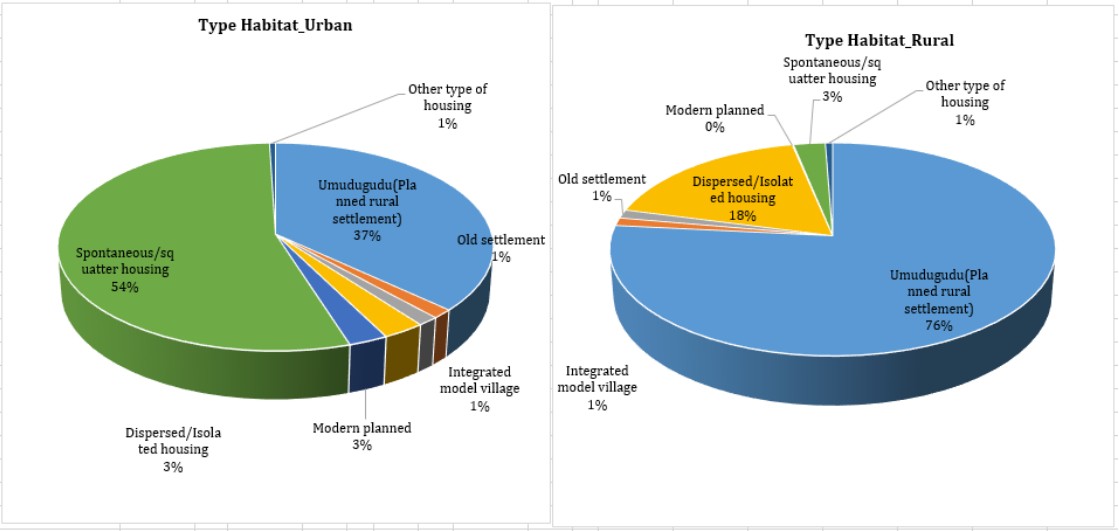

Figure 15: Distribution of households in Muhanga District by type of habitat and by Area of residence.
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

d) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Muhanga district is 326,624, 12.7% of them has never attended any formal school, 2.6% have attended nursery school, 63.4% have attended the primary level, 9.6% a have attended lower secondary level, 6.8% have attended upper secondary and 3.5% have attended university level. The distribution of the highest level of education attended varies among sectors with differences in the percentage of individuals at each education level, Nyabinoni (16.6%), Nyarusange (16.4%) and Rongi (16.3%) have the highest percentages of individuals who have never attended school compared to other sectors while Kabacuzi has a higher percentage (70.9%) of individuals attended Primary school, Nyamabuye is highest in upper secondary school attended (13.2%) and in university (9.6%) than other sectors.

Table 38: Population of Muhanga District by highest level of school attended by sector

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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Muhanga district	326,624	100	12.7	2.6	63.4	1.4	9.6	6.8	3.5	0.0
Cyeza	31,782	100	13.5	2.9	64.5	2.3	8.1	6.1	2.5	0.0
Kabacuzi	25,355	100	11.1	1.9	70.9	1.6	9.0	4.8	0.8	0.0
Kibangu	18,313	100	11.6	2.8	66.0	0.9	11.0	6.4	1.3	0.0
Kiyumba	21,421	100	11.5	2.5	69.2	1.7	8.9	5.1	1.1	0.1
Muhanga	25,763	100	12.1	2.4	69.4	1.2	9.3	4.3	1.3	0.0
Mushishiro	19,050	100	15.3	1.4	65.4	1.2	10.1	5.0	1.6	0.0
Nyabinoni	14,796	100	16.6	1.9	69.1	0.4	7.6	3.7	0.8	0.0
Nyamabuye	54,904	100	7.9	4.2	51.6	1.7	11.7	13.2	9.6	0.1
Nyarusange	25,738	100	16.4	1.8	66.2	1.2	8.9	4.5	1.0	0.0
Rongi	26,645	100	16.3	2.1	68.3	0.5	8.1	4.2	0.6	0.0
Rugendabari	15,510	100	12.6	1.7	68.8	1.0	10.0	4.9	0.9	0.0
Shyogwe	47,347	100	13.7	2.8	56.7	1.8	9.7	8.1	7.3	0.0

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

e) Means of livelihood and income

The results of 5th RPHC 2022 revealed that nationally, we have 3,312,743 Households where we have 2,280,854 of private households (68.9%) are engaged in agriculture, and 2,074,928 (62.6%) are engaged in crop farming and 1,669,273 (50.4%) are engaged in livestock husbandry with respecting to the total households at national level. Muhanga District is one of districts of the Southern Province where crop farming and animal husbandly are at moderate

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level: agricultural households occupy (79.5%) with 74.0% of households engaged in crop farming and 67.1% of households engaged in livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Kibangu (95.7%) and Rugendabari (95.3%. Households engaged in crop farming are more represented in these sectors: Kibangu (93.6%) and Rugendabari (91.7%) while those engaged in livestock husbandry are more represented in Kibangu (86.1%) and Kabacuzi (85.9%).

The results of 5th census shows that the employment to population ratio stood at 45.9 in Rwanda, it is lower among females (40.2 percent) than males (52.4 percent). On the other side, it was observed that the employment to population ratio is higher in urban areas of Rwanda (53.5 percent) than in rural areas (42.7 percent). It was observed that in Southern Province, the employment to population ratio stood at 42,9 percent, it is higher in urban areas (52.5 percent) than in rural areas of south (41.2 percent). Labour force participation rate in Muhanga district is higher in urban than in rural (57.0% and 35.4%) and it is also higher among males than females in both urban (65.4% and 49.7 %) and rural areas (42.5% and 29.4%).

Table 39: Distribution of household engaged in livestock husbandly in Muhanga District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	69	2,074,928	63	1,669,273	50
Southern Province	760,173	618,452	81	574,842	76	483,203	64
Muhanga district	93,241	74,147	80	69,003	74	62,568	67
Cyeza	8,956	7,569	85	6,929	77	6,309	70
Kabacuzi	7,641	7,198	94	6,913	91	6,566	86
Kibangu	5,274	5,049	96	4,934	94	4,542	86
Kiyumba	6,709	6,190	92	5,918	88	5,463	81
Muhanga	7,413	6,557	89	6,139	83	5,649	76
Mushishiro	5,465	5,111	94	4,846	89	4,616	85
Nyabinoni	4,332	4,009	93	3,808	88	3,440	79
Nyamabuye	16,424	6,451	39	5,227	32	4,322	26
Nyarusange	7,212	6,635	92	6,250	87	5,722	79
Rongi	8,012	7,482	93	7,144	89	6,544	82
Rugendabari	4,772	4,549	95	4,378	92	4,031	85
Shyogwe	11,031	7,347	67	6,517	59	5,364	49

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

f) Health, water supply and sanitation facilities

In Muhanga District 92.9% are using Mutuelle as main health insurance, 5.4% using RSSB or RAMA, 0.4% using private insurance, none using school insurance, 0.1% using NGOs insurance and 1.1% using employer insurance

g) Appliance ad assets ownership

At the district level, 82.7% of private households possess a radio, 77.9% a mobile phone, 19.5% a smartphone, 11.7% a TV and 3.6% a computer. The percentage of private households possessing a radio is high in Nyamabuye (92.6%) and Shyogwe (87.1%). It is low in Nyabinoni (71.3%). The percentage of private households possessing a television is high in Nyamabuye (31.3%), while it is low in Nyabinoni (1.6%) and Rongi (1.8%). Mobile phones are mostly possessed by private households of Nyamabuye (90.5%) and Shyogwe (83.9%) while it is low in Nyabinoni (71.3%). The sectors with the highest percentage of households with smartphone are Nyamabuye (46.5%) and Shyogwe (33.0%) while the percentage of households possessing this asset is low in Rongi (5.9%), Nyabinoni (6.0%). The computer is mostly possessed in Nyamabuye (10.0%) and Shyogwe (9.1%) while it is at a rate less than 3% in the remaining sectors at each.

Table 40: Percentage of private households and of Muhanga 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**

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Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Muhanga District	**93,241**	**82.7**	**11.7**	**77.9**	**19.5**	**3.6**
Cyeza	8,956	83.2	9.8	78.7	17.6	2.4
Kabacuzi	7,641	81.9	4.1	76.2	9.1	0.7
Kibangu	5,274	78.6	2.6	71.4	10.4	0.8
Kiyumba	6,709	79.9	3.5	74.9	9.1	0.9
Muhanga	7,413	83.6	7.8	78.7	12.5	1.2
Mushishiro	5,465	80.7	4.8	75.6	11.5	1.3
Nyabinoni	4,332	71.3	1.6	64.1	6.0	0.4
Nyamabuye	16,424	92.6	31.3	90.5	46.5	10.0
Nyarusange	7,212	75.9	4.0	70.5	9.7	0.7
Rongi	8,012	76.3	1.8	68.9	5.9	0.5
Rugendabari	4,772	80.4	4.3	73.8	10.3	0.6
Shyogwe	11,031	87.1	23.8	83.9	33.0	9.1

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

h) Access to energy for lighting and cooking

In Muhanga District, the main source of energy for lighting used by households is electricity (57.2%). At the sector level, Nyamabuye sector is the sector with the high percentages of private households using electricity at 86.6%, followed by Shyogwe (72.7%), Cyeza (58.4%, Muhanga (57.7%) and Mushishiro (56.3%). Nyabinoni (31.3%) and Rongi (33.8%) are the sectors with less more private households using electricity. The second source of energy for lighting is flashlight or phone flashlight. That source is more used in Rongi (59%), Nyabinoni (55.7%) and Kiyumba (51.3%). According to the area of residence, the main source of energy for lighting is electricity (88.6%) followed by flashlight or phone flashlight (6.7%) and candles (2.4%) in urban areas. In rural areas, 48.0% of private households use electricity as main source of energy for lighting while44.3% use flashlight or phone flashlight and 2.7% use firewood.

Table 41: Distribution of households of Muhanga 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	Not stated
Rwanda	**3,312,743**	**100**	**61**	**0.4**	**0**	**3**	**4**	**1.1**	**28.4**	**0.1**	**1**	**0.5**	**0**
Southern Province	**760,173**	**100**	**55**	**0.3**	**0**	**2**	**5**	**1.6**	**34.6**	**0.2**	**1**	**0.6**	**0**
Muhanga district	**93,241**	**100**	**57**	**0.3**	**0**	**1**	**2**	**1.6**	**35.8**	**0.2**	**1**	**0.4**	**0**
Muhanga _Urban	**21,089**	**100**	**89**	**0.4**	**0**	**2**	**1**	**0.5**	**6.7**	**0**	**1**	**0.1**	**0**
Muhanga _Rural	**72,152**	**100**	**48**	**0.3**	**0**	**1**	**3**	**2**	**44.3**	**0.2**	**1**	**0.4**	**0**
Cyeza	8,956	100	58	0.4	0	2	1	1.4	35.7	0.1	1	0.4	0
Kabacuzi	7,641	100	49	0.3	0	1	1	0.4	46.8	0.3	1	0.5	0
Kibangu	5,274	100	47	0.4	0	1	4	3.5	42	0.2	1	0.3	0
Kiyumba	6,709	100	41	0.3	0	1	1	2.8	51.3	0.2	1	0.9	0
Muhanga	7,413	100	58	0.2	0	1	1	3.4	35.5	0.2	1	0.3	0
Mushishiro	5,465	100	56	0.3	0	1	2	1.1	38.7	0.1	0	0.3	0
Nyabinoni	4,332	100	31	0.2	0	1	9	1.8	55.7	0.1	0	0.6	0
Nyamabuye	16,424	100	87	0.5	0	2	1	0.5	8.1	0	1	0.2	0
Nyarusange	7,212	100	43	0.2	0	1	5	4	46.3	0.2	1	0.3	0
Rongi	8,012	100	34	0.2	0	1	4	1.3	59	0.3	1	0.2	0
Rugendabari	4,772	100	49	0.3	0	1	3	0.5	44.3	0.2	1	0.4	0
Shyogwe	11,031	100	73	0.5	0	3	1	1	20.6	0.1	1	0.5	0

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 (80.9%) followed by charcoal (15.9%) and gas (1.8% each). At the sector level, firewood is the most used source of cooking energy by private households at a rate more than 90% in 9 sectors out of 12. Sector with the high percentage of private households using charcoal as main source of cooking energy is Nyamabuye (58.2%). It is used in Shyogwe sector at 28.0% while it represents less than 20% (for each) in other sectors. Nyamabuye (6.7%) and Shyogwe (3.4%) are the sectors in which we find private households that use gas as one of source of energy for cooking at a rate more than

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1%. By area of residence, private households use mostly charcoal (58.5%), firewood (31.9%) and Gaz (7.1%) in urban areas. In rural areas, private households use mostly firewood (95.2%), charcoal (3.5%) and Gaz (0.2%)

Table 42: Distribution of the private households of Muhanga District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafi ne	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	3,312,743	100	76	17	5	0	0	0	0	1	0	0	0	0	0	1	0
Southern Province	760,173	100	89	8.8	1	0	0	0	0	0	0	0	0	0	0	1	0
Muhanga District	93,241	100	81	16	2	0	0	0	0	0	0	0	-	0	0	1	0
Muhanga _Urban	21,089	100	32	59	7	0	0	0	-	0	0		0	0	2	0	32
Muhanga _Rural	72,152	100	95	3.5	0	0	0	0	0	0	0	0	0	0	1	0	95
Cyeza	8,956	100	89	8.9	1	-	-	-	-	0	-	-	-	0	0	1	-
Kabacuzi	7,641	100	97	1.9	0	-	-	-	-	-	-	-	-	0	0	1	0
Kibangu	5,274	100	98	1.7	0	-	-	-	0	0	-	-	-	-	-	0	-
Kiyumba	6,709	100	96	3	0	-	-	-	0	0	-	-	-	0		1	-
Muhanga	7,413	100	93	5.5	0	0	-	-	0	0	0	0	--	0	0	2	-
Mushishiro	5,465	100	96	2.4	0	0	-	-	0	0	-	-	-	0	0	1	-
Nyabinoni	4,332	100	98	1.3	0	-	-	-	0	0		0	-	-	-	0	-
Nyamabuye	16,424	100	33	58	7	0	-	0		0	0	-	-	0	0	3	0
Nyarusange	7,212	100	96	2.3	0	0	-	-	0	0	-	0	-	0	0	1	-
Rongi	8,012	100	98	1.2	0	-	0	-	-		-	0	-		0	0	0
Rugendabari	4,772	100	97	2.2	0	-		0	0	0	-	-	-	0	-	1	
Shyogwe	11,031	100	67	28	3	0	0	-	-	0	-	-	-	0	-	2	0

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

i) Vulnerability

In Muhanga district the vulnerability prevalence rate is 3.7%. At sector level, the highest prevalence rates of the resident population vulnerability are in Kibangu (4.3%), Nyarusange, Shyogwe and Kiyumba (4.2% each) while the lowest is in Nyamabuye (2.4%) and Rugendabari (3.2%).

Table 43: Persons with vulnerability of Muhanga District by Sector of residence and sex

Sectors of residence	Total resident population	Population with vulnerability by sex			Prevalence Vulnerability
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Muhanga district	316,452	11,586	5,388	6,198	3.7
Cyeza	30,448	1,171	525	646	3.8
Kabacuzi	24,903	1,025	412	613	4.1
Kibangu	18,001	776	336	440	4.3
Kiyumba	20,833	878	384	494	4.2
Muhanga	25,384	854	391	463	3.4
Mushishiro	18,589	768	310	458	4.1
Nyabinoni	14,421	509	219	290	3.5
Nyamabuye	52,081	1,251	555	696	2.4
Nyarusange	24,902	1,056	484	572	4.2
Rongi	25,982	891	417	474	3.4
Rugendabari	15,400	487	231	256	3.2
Shyogwe	45,508	1,920	1,124	796	4.2

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

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4.6. Nyamagabe district

Situated in the South-West of the Southern Province, the District of Nyamagabe is one of the 8 Districts comprising the Southern Province. It is surrounded by the Districts of Karongi and Ruhango in the North, Nyanza and Huye in the East, Nyaruguru in the South, Rusizi and Nyamasheke on the West. Nyamagabe District has 1090 Km^2 subdivided into 17 administrative Sectors, 92 Cells and 536 Villages (Imidugudu).

4.6.1. Physical and Biological baseline information

a) Topography

Nyamagabe District has an average altitude varying from 1800 to 2700 meters. It has uneven altitude with some summits going beyond 3000 meters high. The altitude and rains increase as and when one approaches Congo-Nil Crater. Nyamagabe District relief is characterized by jagged and irregular slopes ranging from 60° to 120° making soils susceptible to soil erosion and degradation.

b) Climate and Rainfall

Nyamagabe district is part of Creter Congo- Nil chain with an altitude varying between 1800m and 2700m. The climate is characterized by a rainfall ranging from 1300 mm and the temperature varying between 110C and 18oC. Four main seasons occur during the year:

- 2 dry Seasons (from June to August and from mid-December to January),
- 2 rainy seasons (From September to mid-December and from February to May).

c) Geology and Soils

Nyamagabe District soils are generally acidic in nature with a PH ranging from 3.6 - 5. This generally implies a very poor soil which is saturated with aluminium cations implying its low agricultural productivity unless organic and mineral fertilizers are added. Marshlands in Nyamagabe district occupy 681.6 Ha.

d) Hydrography

The hydrograph of Nyamagabe District is subdivided into two main basins: On one hand there are Mbirurume and Rukarara rivers in the North. On the other hand, is the river Mwogo in the South with Gihimbi, Nyamugali and Nkungu as affluents. Nyamagabe District hydrography is equally characterized by several seasonal rivers.

e) Fauna and Flora

Around 44.8% (48 864 Ha/109 000 Ha) of Nyamagabe district area is covered by forests. Nyungwe National Park is a natural forest and covers a surface area of 91138 Ha and 44 900 Ha (49.2%) of which are found in Nyamagabe District. Nyungwe forest exercises considerable influence on local and regional bio-climatic conditions. It acts as a sponge, which retains water and releases it slowly during the dry season hence ensuring hydrologic functioning and regulation.

Nyungwe National Park in Nyamagabe District is home of a diversity of wild animals mainly primates and a multitude of birds. Nyungwe National Park contains a multitude of ligneous forests including Prunus Africana with Albizia gumifera (Umusebeya), Entendrophragma excelsum (Umuyove), Podocarpus Milangianis (Umuhurizi), Polyscias falva (Umwungu) and so on. None of these protected areas and forest will be affected by the proposed projects.

4.6.2. Socio-economic environment for Nyamagabe district

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 371,501 residents were enumerated in Nyamagabe district, which represent 12.37% % of the total population of the Southern Province (3,002,699 residents). The population of Nyamagabe district is predominantly female: 194,776 are women corresponding to 52.4 % of its total population. The next table below indicates the number of the population of Nyamagabe district by sector, by sex, their percentages and their shares across sectors to the total population of Nyamagabe district. Males are predominant only in one out of 17 sectors of the district (Gatare with 51.1%). Gasaka (41,558 population) and Kitabi (28,172 population) are the most populated sectors. They represent 11.2% and 7.6% of the total population of Nyamagabe district, respectively. The two less populated sectors are Mbazi (12,511inhabitants) and Kibumbwe (13,767 inhabitants). They represent 3.4% and 3.7% of the total resident population of Nyamagabe district, respectively.

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Table 44: Population of Nyamagabe 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**	**-**
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	**-**
Nyamagabe District	**371,501**	**176,725**	**194,776**	**100**	**47.6**	**52.4**	**100**
Buruhukiro	27,146	12,955	14,191	100	47.7	52.3	7.3
Cyanika	25,693	12,252	13,441	100	47.7	52.3	6.9
Gasaka	41,558	19,489	22,069	100	46.9	53.1	11.2
Gatare	19,151	9,781	9,370	100	51.1	48.9	5.2
Kaduha	22,898	10,979	11,919	100	47.9	52.1	6.2
Kamegeri	14,400	6,782	7,618	100	47.1	52.9	3.9
Kibirizi	23,287	11,185	12,102	100	48	52	6.3
Kibumbwe	13,767	6,461	7,306	100	46.9	53.1	3.7
Kitabi	28,172	13,342	14,830	100	47.4	52.6	7.6
Mbazi	12,511	5,929	6,582	100	47.4	52.6	3.4
Mugano	19,738	9,412	10,326	100	47.7	52.3	5.3
Musange	20,345	9,885	10,460	100	48.6	51.4	5.5
Musebeya	20,416	9,551	10,865	100	46.8	53.2	5.5
Mushubi	13,972	6,524	7,448	100	46.7	53.3	3.8
Nkomane	18,012	8,411	9,601	100	46.7	53.3	4.8
Tare	24,561	11,694	12,867	100	47.6	52.4	6.6
Uwinkingi	25,874	12,093	13,781	100	46.7	53.3	7

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

The results of Rwanda Population and housing census 2022 revealed that, the total population of Rwanda are spatially distributed in rural area that represent 72.1% and urban area represent 27.9%. The Southern Province is predominantly by the rural area (85.2%) and urban area (14.8%). Nyamagabe district population is predominantly by rural area 89.1% while urban represents 10.9%. The 11 out of 17 sectors of Nyamagabe district are entirely considered as rural area.

b) Household and size

The results of 5th RPHC 2022 indicate the total of 92,052 in Nyamagabe district. The average household size in Nyamagabe District is 4 persons per household. At the Sector level, the highest sizes are found in Gasaka and Kitabi (4.3 persons/household) and Kibirizi (4.2 persons/household). The smallest household sizes are found in Cyanika (3.7 persons/household). The table below indicates number of households and size of household members per sector. The results of 5th RPHC 2022 revealed that in Nyamagabe district, private households headed by females are 30.7%. At sector level, the highest percentages of households headed by women are found in Gasaka sector (39.3%) and Kibumbwe sector (35.3%) while the lowest is found in Buruhukiro sector (25.2%).

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

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4.0	71.1	28.9
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Nyamagabe District	92,052	367,419	4.0	69.3	30.7
Buruhukiro	6,817	27,139	4.0	74.8	25.2
Cyanika	6,853	25,669	3.7	65.9	34.1
Gasaka	9,098	39,052	4.3	60.7	39.3
Gatare	4,461	17,888	4.0	73.7	26.3
Kaduha	5,963	22,868	3.8	68.3	31.7
Kamegeri	3,743	14,391	3.8	68.2	31.8
Kibirizi	5,513	23,282	4.2	71.9	28.1
Kibumbwe	3,534	13,763	3.9	64.7	35.3
Kitabi	6,600	28,127	4.3	71.6	28.4
Mbazi	3,284	12,505	3.8	69.2	30.8
Mugano	5,250	19,731	3.8	70.6	29.4
Musange	5,317	20,330	3.8	68.5	31.5
Musebeya	5,115	20,404	4.0	70.2	29.8

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Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Mushubi	3,571	13,967	3.9	68.8	31.2
Nkomane	4,545	17,999	4.0	71.4	28.6
Tare	6,093	24,435	4.0	70.2	29.8
Uwinkingi	6,295	25,869	4.1	73.3	26.7

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

d) Housing characteristics

The results of 5th Population and Housing Census 2022 revealed that Nyamagabe district as one of districts of the Southern Province; the most common type of habitat is Umudugudu (planned rural settlement) at 67.5% followed by dispersed/Isolated housing and Spontaneous/squatter (14.3% each type). Across sectors, the common types of habitat are the same as at district level: Umudugudu (planned rural settlement) type is the most prevalent in all sectors, followed by dispersed/Isolated housing and Spontaneous/squatter. Umudugudu (planned rural settlement) type is most found in Kibangu (94.6%), Mushishiro (92.2%) and Rugendabari (90.0% while it is less in Nyamabuye (21.1%). Dispersed/Isolated housing type predominates in Kabacuzi (31.3%), Nyarusange (26.6%) and Kiyumba (24.6%). The type of habitat that predominates in Nyamabuye district is Spontaneous/squatter at 66.9%.

Table 46: Distribution of households in Nyamagabe 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**
Southern Province	**760,173**	**100**	**72.3**	**1**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**	**0**
Nyamagabe district	**92,052**	**100**	**69.2**	**0.4**	**0.7**	**26.2**	**0.1**	**1.5**	**2**	**0**
Nyamagabe Urban	**8,888**	**100**	**71**	**0.5**	**1**	**7.6**	**1.2**	**2.4**	**16.3**	**-**
Nyamagabe Rural	**83,164**	**100**	**69.1**	**0.3**	**0.6**	**28.2**	**0**	**1.4**	**0.4**	**0**
Buruhukiro	6,817	100	58.4	0	1.2	38.6	0	1.7	0.1	-
Cyanika	6,853	100	78.3	1.3	1.8	18.5	-	0	0.1	-
Gasaka	9,098	100	64	0.1	0.8	16.4	1.1	1.7	15.9	-
Gatare	4,461	100	75.5	0	0	23.3	-	0.9	0.3	-
Kaduha	5,963	100	67.5	0.6	0.4	26.2	0.1	3.6	1.6	-
Kamegeri	3,743	100	91.6	0	0.1	7.5	0.1	0.4	0.2	-
Kibirizi	5,513	100	89.9	0.1	-	8.8	-	1	0.2	-
Kibumbwe	3,534	100	74.5	1	0.1	22.8	-	1.4	0.1	-
Kitabi	6,600	100	68.7	0.1	0.6	29.4	-	0.9	0.2	-
Mbazi	3,284	100	94.7	0.1	1.1	3.6	-	0.5	0	-
Mugano	5,250	100	55.6	0.9	0.3	41.1	0	1	1.1	0
Musange	5,317	100	74.8	0.4	1.6	22	-	0.7	0.5	0
Musebeya	5,115	100	78.3	0	0.8	20.2	-	0.1	0.6	-
Mushubi	3,571	100	66.8	0.1	0.5	30.7	0	1.8	0.1	-
Nkomane	4,545	100	55.6	0.2	1.7	33.3	0	7.4	1.8	-
Tare	6,093	100	73	0.8	0	24.5	0	1.5	0.3	-
Uwinkingi	6,295	100	35.8	0	0	63.6	-	0.5	0	-

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

By area of residence, the predominant type is Umudugudu (Planned rural settlement) (71.1%) in urban areas. In rural areas, the predominant type is Umudugudu (Planned rural settlement) (69.1%) followed by Dispersed/ Isolated (28.2%).

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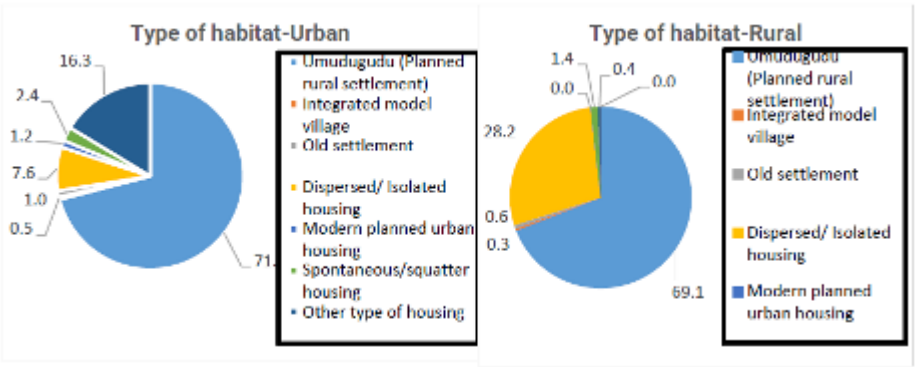

Figure 16 : Distribution of households in Nyamagabe District by type of habitat and by area of residence.
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of 5th RPHC 2022 indicate that the ownership of housing in the Southern Province represents 77.6% and tenant represent 14.5%. In Nyamagabe district, 7.6% of housing units are occupied by tenants while 83.8% are occupied by their owners. At the sector level, the percentage of owners of households' units is high in Nkomane (91.1%) and Musebeya (89.5%) and low in Gasaka (58.2%). The percentage of tenants of housing units is high in Gasaka (20.4%) and Tare (10.4%) and low in Nkomane (2.6%) and Uwinkingi (3.9%).

e) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Nyamagabe district is 339,814. In Nyamagabe District, 19.9% of the population has never attended school, while 1.9% have attended nursery, and 61.4% have attended primary school. Other education levels include 1.0% for INGOBOKA/Vocational, 8.6% for lower secondary, and 5.3% for upper secondary, 1.8% 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, Nkomane has a higher percentage (28.4%) of individuals who have never attended school compared to other sectors, while Gasaka has a higher percentage (10.6%) of individuals attended upper secondary school. Each sector has its own unique distribution of education levels attended by the population.

Table 47: Population of Nyamagabe District by highest level of school attended by sector (Both sexes)[5].

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
Southern Province	2,720,038	100	17.1	2	63	1.2	9	5.5	2	0
Nyamagabe district	339,814	100	19.9	2	61	1	8.6	5.3	2	0
Buruhukiro	24,915	100	24.9	1.2	62.2	0.6	6.7	3.3	1.1	-
Cyanika	23,354	100	14.8	1.8	64.9	1.4	10	5.7	1.4	-
Gasaka	38,270	100	15.1	4.2	50.2	1.5	12.9	10.6	5.6	0
Gatare	17,732	100	24.9	1.7	60.6	0.7	6.8	4	1.2	0
Kaduha	20,998	100	21.2	1.3	62.9	1.4	7.3	3.9	1.8	0
Kamegeri	13,229	100	18.2	3.3	61.2	1.1	10.3	4.9	0.9	-
Kibirizi	21,190	100	15.8	2.1	64.4	1.1	9.7	5.7	1.3	0
Kibumbwe	12,466	100	17.5	2.3	66.3	2	6.8	3.5	1.6	0
Kitabi	25,659	100	23.7	1.1	59.7	0.6	8.1	5.2	1.5	0
Mbazi	11,365	100	13.3	1.8	64.7	1.1	11.2	6.9	1.1	-
Mugano	18,047	100	20.3	1.1	68.1	1.1	5.9	2.8	0.7	0
Musange	18,673	100	15.7	1.8	68	1.7	7.5	4	1.3	0
Musebeya	18,636	100	21.6	1.4	61.9	0.9	8.1	4.9	1.2	0
Mushubi	12,901	100	21	1.7	61.5	0.3	8.4	5.6	1.5	0
Nkomane	16,476	100	28.4	0.5	59.4	0.5	6.4	3.5	1.3	0
Tare	22,231	100	20.3	2	58.8	0.7	9.6	6.3	2.3	-
Uwinkingi	23,672	100	22.4	1.7	62.1	0.6	7.7	4	1.5	-

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

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f) Means if livelihood and income

The results of 5th RPHC 2022 revealed that in Nyamagabe district, agricultural households represent 86.9% with 81.9% of households engaged in crop farming and 72.2% in Livestock husbandry. At the sector level, the highest percentages of agricultural households are found in Mbazi (94.5%) and Musebeya (93.8%). Households engaged in crop farming are more represented in Mbazi (92.8%) and Musange (90.5%) while those engaged in livestock husbandry are in Musebeya (82.6%) and Uwinkingi (82.0%). It was observed that in Southern Province, the employment to population ratio stood at 42.9 percent, it is higher in urban areas (52.5 percent) than in rural areas of Southern Province (41.2 percent). It was also revealed that the employment to population ratio is 45.7 percent among people residing in Nyamagabe district, it is higher in rural areas of Nyamagabe (46.3 percent) than in urban areas of Nyamagabe (40.3 percent).

Table 48: Distribution of household engaged in livestock husbandly in Nyamagabe District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,92	62.6	1,669,27	50.4
Southern	760,173	618,452	81.4	574,842	75.6	483,203	63.6
Nyamagabe	92,052	79,974	86.9	75,421	81.9	66,480	72.2
Buruhukiro	6,817	6,246	91.6	5,963	87.5	5,483	80.4
Cyanika	6,853	5,952	86.9	5,677	82.8	4,548	66.4
Gasaka	9,098	5,310	58.4	4,806	52.8	3,945	43.4
Gatare	4,461	3,914	87.7	3,546	79.5	3,289	73.7
Kaduha	5,963	5,240	87.9	4,994	83.7	4,199	70.4
Kamegeri	3,743	3,325	88.8	3,167	84.6	2,597	69.4
Kibirizi	5,513	5,051	91.6	4,824	87.5	4,202	76.2
Kibumbwe	3,534	3,265	92.4	3,126	88.5	2,678	75.8
Kitabi	6,600	5,713	86.6	5,374	81.4	4,790	72.6
Mbazi	3,284	3,105	94.5	3,047	92.8	2,664	81.1
Mugano	5,250	4,849	92.4	4,657	88.7	4,024	76.6
Musange	5,317	4,967	93.4	4,811	90.5	4,239	79.7
Musebeya	5,115	4,796	93.8	4,600	89.9	4,225	82.6
Mushubi	3,571	3,211	89.9	2,992	83.8	2,725	76.3
Nkomane	4,545	4,166	91.7	3,951	86.9	3,593	79.1
Tare	6,093	5,039	82.7	4,502	73.9	4,114	67.5
Uwinkingi	6,295	5,825	92.5	5,384	85.5	5,165	82.0

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

g) Health, water supply and sanitation facilities

In Nyamagabe District 93.6% are using Mutuelle as main health insurance, 3.5% using RSSB or RAMA, 0.2% using private insurance, none using school insurance, 2.3% using NGOs insurance and 0.3% using employer insurance.
Figure 4: Population who have a medical insurance by main type of insurance in Nyamagabe District

H) Appliance and assets ownership

At the district level, 75.5% of private households possess a radio, 70.5% a mobile phone, 10.5% a smartphone, 3.8% a TV and 1.3% a computer. The percentage of private households possessing a radio is high in Mbazi (91.3%), Musange (88.9%) and Gasaka (86.7%). It is low in Kamegeri (65.3%). The percentage of private households possessing a television is high in Gasaka (13.6%) and Tare (5.9%) while it is low in Mugano (1.2%), Gatare and Nkomane (1.6% each). Mobile phone is mostly possessed by private households of Mbazi (96.1%), Musange (95.2%), and Gasaka (84.4%). A sector with high percentage of households with smartphone is Gasaka (32.2%) while the percentage of households possessing this asset is low in Mugano (4.7%). The computer is mostly possessed in Gasaka (5.6%).

Table 49: Percentage of private households and of Nyamagabe 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[10]	Smart Mobile	Computer
Rwanda	**3,312,743**	**81.5**	**12.3**	**78.1**	**20.8**	**4.2**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**

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Sectors and area of residence	Total Number of Private Households	% of HHs owning the specified communication asserts				
		Radio	Television	Mobile phone[10]	Smart Mobile	Computer
Nyamagabe district	**92,052**	**75**	**3.8**	**70.5**	**10.5**	**1.3**
Buruhukiro	6,817	70.1	2.2	63.9	6	1
Cyanika	6,853	76.5	4	69.7	10.3	1.1
Gasaka	9,098	86.7	13.6	84.4	32.2	5.6
Gatare	4,461	69.9	1.6	62.9	5.6	0.6
Kaduha	5,963	70.4	3.7	64.4	9.7	1.4
Kamegeri	3,743	65.3	2.8	59.4	7.6	0.5
Kibirizi	5,513	74.8	3.8	69.3	10.3	0.8
Kibumbwe	3,534	66.3	1.8	57.9	6.1	0.3
Kitabi	6,600	74	2.6	68.2	8.4	0.7
Mbazi	3,284	91.3	2.9	96.1	10	0.5
Mugano	5,250	71.6	1.2	72.1	4.7	0.4
Musange	5,317	88.9	1.9	95.2	8.4	0.6
Musebeya	5,115	71.9	2.3	63.5	8.1	0.5
Mushubi	3,571	73.5	2.4	67.7	7.5	0.6
Nkomane	4,545	68.3	1.6	63.8	5.3	0.6
Tare	6,093	72.9	5.9	66.6	12.1	2.2
Uwinkingi	6,295	74.2	2.4	67.5	7.4	0.3

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

j) Access to energy for lighting and cooking

In Nyamagabe district, the main source of energy for lighting used by households is electricity (46.7%). At the sector level, the percentage of households using electricity for lighting is high in Mbazi (74.7%), Gasaka (67.6%), and Musange (65.8%). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Nkomane (47.4%) and Kaduha (44.1%). According to the area of residence, the main source of energy for lighting is electricity (43.9%), followed by flashlight/phone flashlight (37.7%) and firewood (1.9%) in rural areas. In urban areas, 72.5% of private households use electricity as main source of energy for lighting while 15.9% use flashlight or phone flashlight and 5.4% use candles.

Table 50: Distribution of households of Nyamagabe 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	Other source of energy for lighting
Rwanda	**3,312,743**	**100**	**61.0**	**1.6**	**0.0**	**2.9**	**4.2**	**1.1**	**28.4**	**0.1**	**0.5**
Southern Province	**760,173**	**100**	**55.1**	**1.3**	**0.0**	**2.0**	**4.7**	**1.6**	**34.6**	**0.2**	**0.6**
Nyamagabe district	**92,052**	**100**	**46.7**	**0.8**	**0.0**	**2.2**	**12.0**	**1.4**	**35.6**	**0.3**	**0.5**
Nyamagabe urban	**8,888**	**100**	**72.5**	**0.3**	**-**	**5.4**	**3.9**	**0.6**	**15.9**	**0.1**	**0.9**
Nyamagabe rural	**83,164**	**100**	**43.9**	**0.2**	**0.0**	**1.9**	**13.0**	**1.5**	**37.7**	**0.3**	**0.5**
Buruhukiro	6,817	100	37.5	0.3	-	1.4	21.0	1.6	36.8	0.9	0.2
Cyanika	6,853	100	54.6	0.7	-	1.2	4.3	1.6	37.1	0.1	0.4
Gasaka	9,098	100	67.6	1.6	0.0	6.0	2.6	0.9	20.0	0.5	0.7
Gatare	4,461	100	32.3	0.7	-	2.5	17.0	4.6	41.6	0.3	0.3
Kaduha	5,963	100	44.8	0.5	-	0.4	9.5	0.2	44.1	0.2	0.3
Kamegeri	3,743	100	37.4	1.7	-	2.8	11.0	1.9	43.8	0.2	0.5
Kibirizi	5,513	100	37.9	1.7	-	3.8	13.0	2.4	39.9	0.3	0.5
Kibumbwe	3,534	100	42.2	0.5	-	1.7	13.0	0.9	40.0	0.2	0.9
Kitabi	6,600	100	36.9	0.7	-	3.0	24.0	0.6	34.1	0.3	0.4
Mbazi	3,284	100	74.7	0.3	-	2.4	0.7	1.0	20.6	0.1	0.2
Mugano	5,250	100	47.0	0.4	-	0.4	8.9	0.8	41.7	0.1	0.6
Musange	5,317	100	65.8	0.2	-	0.2	0.9	1.3	31.3	0.1	0.2
Musebeya	5,115	100	41.7	0.5	-	1.4	14.0	1.3	38.4	0.1	1.8
Mushubi	3,571	100	47.9	0.5	-	1.4	8.8	4.6	36.1	0.4	0.3
Nkomane	4,545	100	31.2	0.8	-	1.5	16.0	1.7	47.4	0.2	0.9
Tare	6,093	100	46.0	1.3	0.0	3.2	18.0	0.8	29.3	0.1	0.5
Uwinkingi	6,295	100	39.7	0.6	-	2.3	21.0	0.5	34.8	0.3	0.2

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

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At the district level, the main sources of energy for cooking used by the private households are firewood (92.3%) followed by charcoal (6.2%). At the sector level, firewood is the most used source of cooking energy by private households in Nkomane (98.6%) and Uwinkingi (98.4%) followed by Buruhukiro (97.9%) and Kibumbwe (97.3%). Sectors with the high percentage of private households using charcoal as main source of cooking energy are Gasaka (35.8%), Tare (7.2%) and Kaduha (5.6%). Sector with the highest percentage of private households using gas as main source of cooking energy is Gasaka (2.5%). By area of residence, private households use mostly firewood (96.6%) in rural areas. In urban areas, private households use most firewood (52.3%) and charcoal (42.7).

Table 51: Distribution of the private households of Nyamagabe District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Paraffin e	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	**3,312,743**	**100**	**76.1**	**17.3**	**4.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.4**	**0.0**
Southern Province	**760,173**	**100**	**88.5**	**8.8**	**1.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**
Nyamagabe District	**92,052**	**100**	**92.3**	**6.2**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.9**	**0.0**
Nyamagabe urban	**92,052**	**100**	**52.3**	**42.7**	**3.1**	**0.1**	**-**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**0.1**	**-**	**1.6**	**-**
Nyamagabe rural	**8,888**	**100**	**96.6**	**2.3**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.8**	**0.0**
Buruhukiro	6,817	100	97.9	1.3	0.1	0.1	0.0	-	0.0	0.1	-	-	-	0.0	-	0.4	-
Cyanika	6,853	100	94.1	4.2	0.2	-	-	-	-	0.1		-	-	0.0	-	1.4	-
Gasaka	9,098	100	60.0	35.8	2.5	0.1	-	0.0		0.0	0.0	0.0	-	0.0	-	1.5	-
Gatare	4,461	100	97.2	2.1	0.0		-	-	0.0	0.0	-	0.0	-		-	0.7	-
Kaduha	5,963	100	93.0	5.6	0.6	0.0	-	0.0	0.1	0.0	-	-	-	-	-	0.7	-
Kamegeri	3,743	100	96.8	1.4	0.1	-	-	-	-	0.1	-	-	-	0.0	-	1.7	-
Kibirizi	5,513	100	95.7	3.1	0.1	0.0	-	-	0.0	-	-	-	-	-	0.0	1.0	0.0
Kibumbwe	3,534	100	97.3	1.9	0.0	-	-	-	0.0	-	-	-	-	0.1	0.0	0.6	-
Kitabi	6,600	100	95.6	3.1	0.3	0.1	-	-	0.0	0.0	-	-	-		-	0.8	-
Mbazi	3,284	100	95.1	4.0	0.1	0.0	0.0	0.1	0.0	-	-	-	-	0.0	--	0.6	0.0
Mugano	5,250	100	96.7	2.0	-	-	0.0	-	0.1	0.3	0.3	-	-	0.1		0.4	0.0
Musange	5,317	100	96.3	3.0	0.1	-	-		0.0	0.0	0.0	-	-	-	0.1	0.5	0.0
Musebeya	5,115	100	96.8	2.3	0.1	-	-		0.0	0.0	-	-	0.0		0.0	0.8	-
Mushubi	3,571	100	95.8	2.9	0.1	0.0	-		0.0	0.1	-	-	-	0.1	-	1.1	-
Nkomane	4,545	100	98.6	0.6	0.0	-	-		0.1	0.1	0.0	0.1	-	-	-	0.5	-
Tare	6,093	100	90.7	7.2	0.3	-	-	0.0	0.0	-	-	0.0	-	0.1	-	1.5	-
Uwinkingi	6,295	100	98.4	1.0	0.0	-	0.0	-	-	0.0	-	-	-	0.0	-	0.5	-

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

k) Vulnerability

In Nyamagabe district the vulnerability prevalence rate is 3.6%. At sector level, the highest prevalence rates of the resident population aged 5 years and above with vulnerability are in Mushubi and Nkomane (5.7% and 4.9%) respectively and while the lowest is in Mbazi and Musange (2.2% and 2.3%%) respectively.

Table 52: Persons with Vulnerability in Nyamagabe District by Sector of residence and sex

Sectors of residence	Total resident population	People 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
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Nyamagabe district	327,504	11,813	5,175	6,638	3.6
Buruhukiro	23,953	1,145	487	658	4.8
Cyanika	22,591	815	357	458	3.6
Gasaka	36,762	1284	569	715	3.5
Gatare	16,914	559	264	295	3.3
Kaduha	20,054	621	283	338	3.1
Kamegeri	12,780	605	248	357	4.7
Kibirizi	20,654	892	385	507	4.3

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Sectors of residence	Total resident population	People with vulnerability			Prevalence of Vulnerability
	Both sexes	Both sexes	Male	Female	Both sexes
Kibumbwe	12,024	386	159	227	3.2
Kitabi	24,841	785	362	423	3.2
Mbazi	11,152	246	113	133	2.2
Mugano	17,423	509	219	290	2.9
Musange	18,047	413	190	223	2.3
Musebeya	17,920	488	224	264	2.7
Mushubi	12,276	697	275	422	5.7
Nkomane	15,778	769	313	456	4.9
Tare	21,470	940	404	536	4.4
Uwinkingi	22,865	659	323	336	2.9

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

4.7. Nyanza District

Nyanza District is one of the eight Districts which constitute the Southern Province. It is subdivided into 10 Sectors, 51 Cells and 420 villages (Imidugudu). The district shares borders with: district of Ruhango to the North, district of Gisagara and the Republic of Burundi to the South, districts of Huye and Nyamagabe to the West and district of Bugesera to the East.

4.7.1. Environmental Baseline

a) Topography

The relief of Nyanza District is inclined from West to East. Its highest point is in Nyagisozi Sector on Shyunda hill situated at 2,112 meters of altitude and the lowest point is located at 1,300 metres of altitude in the Akanyaru valley. More precisely, the Sectors of Busoro, Muyira, Kigoma, Ntyazo and Kibirizi, are located in the lowest altitudes whereas those of Nyagisozi, Mukingo, Rwabicuma, Cyabakamyi and Busasamana, lie on an altitude between 1,300 and 1,800 metres.

b) Climate and Rainfall

Nyanza District is situated within a tropical region and has humid climate. This region experiences alternate seasons; the rainy season alternates with the dry season. The Western part which is mountainous registers relatively low temperatures and plenty of rainfall compared to the eastern part which has low altitude and an average annual temperature of about 20°C.

c) Hydrography

The hydrography network of Nyanza district comprises the most important running water of the country, that is, Akanyaru and Mwogo rivers. Several other streams which are relatively less important are the affluent of the latter. Apart from permanent rivers, Nyanza District has several intermittent running streams especially in the Eastern part.

d) Fauna and Flora

The district natural vegetation has over the years, progressively disappeared due to human activities. However, there have been efforts to re-afforest the district especially with trees like Eucalyptus, Pinus, Cypress and Grevillea. As regards fauna, there are a number of wild small animals and insect species.

4.7.2. Socio-economic baseline information for Nyanza

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 365,718 residents in Nyanza district, which represent 12.2 % of the total population of the Southern Province (3,002,699 residents). The population of Nyanza district is predominantly female: 187,073 are female corresponding to 51.2 % of the total population Nyanza district. The results in previous table 1 indicates that, the population share of Nyanza district is 12.2% of the total provincial population. Females are predominant in nine out of 10 sectors of the district (Busasamana with 7.2%, Busoro 5.6%, Cyabakamyi 3.3%, Kibilizi 5.8%, Kigoma 5.8%, and Mukingo 5.6% of the (125,400 population) The next table below indicates the number of the population of Nyanza district by sector, by sex and their shares across sectors to the total population of Nyanza district.

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Table 53: Population of Nyanza District by Sector and sex

Sector	Frequency			Percent			Population Share
	Both sexes	Male	Female	Both sexes	Male	Female	
Rwanda Province	**13,246,394**	**6,429,326**	**6,817,068**	**100**	**49**	**51.5**	
Southern	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48**	**51.8**	
Nyanza District	**365,718**	**178,645**	**187,073**	**100**	**49**	**51.2**	**100**
Busasamana	50,661	24,292	26,369	100	48	52	13.9
Busoro	39,644	19,054	20,590	100	48.1	51.9	10.8
Cyabakamyi	23,199	10,989	12,210	100	47.4	52.6	6.3
Kibilizi	40,939	19,705	21,234	100	48.1	51.9	11.2
Kigoma	41,004	19,736	21,268	100	48.1	51.9	11.2
Mukingo	45,708	25,312	20,396	100	55.4	44.6	12.5
Muyira	42,041	20,085	21,956	100	47.8	52.2	11.5
Ntyazo	33,826	16,202	17,624	100	47.9	52.1	9.2
Nyagisozi	28,092	13,539	14,553	100	48.2	51.8	7.7
Rwabicuma	20,604	9,731	10,873	100	47.2	52.8	5.6

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

The results of Rwanda Population and housing census 2022 revealed that, the total population of Rwanda are spatially distributed in rural area that represent 72.1% and urban area represent 27.9%. The Southern Province is predominantly by the rural area (85.2%) and urban area (14.8%). Nyanza district population is predominantly by rural area 90.8% while urban represents 9.2%. The sectors of Nyanza district which are entirely rural are Busoro, Cyabakamyi, Kibilizi, Kigoma, Mukingo, Muyira, Nyagisozi, Rwabicuma are entirely rural while Busasamana and Ntyazo are semi urban.

b) Household and size

The results of 5th RPHC 2022 indicate the average household size in Nyanza district is 3.9 persons per household. At the Sector level, the highest sizes are found in Kibilizi (4.0 persons/household). The smallest household average sizes are found in Rwabicuma, Busasamana and Cyabakamyi (3.7persons/household each). The results of 5th RPHC 2022 revealed that in Nyanza district, private households headed by females are 34.1%. At sector level, the highest percentages of households headed by women are found in Muyira sector (37.2%) and Rwabicuma sector (36.8%) while the lowest is found in Nyagisozi sector (29.6%).

Table 54: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4.0	71.1	28.9
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Nyanza district	93,007	358,285	3.9	65.9	34.1
Busasamana	13,585	50,483	3.7	66.1	33.9
Busoro	10,088	39,601	3.9	67.5	32.5
Cyabakamyi	6,247	23,187	3.7	65.3	34.7
Kibilizi	10,291	40,933	4.0	66.5	33.5
Kigoma	10,566	40,985	3.9	67.6	32.4
Mukingo	10,131	38,816	3.8	63.7	36.3
Muyira	1,876	41,994	3.9	62.8	37.2
Ntyazo	8,519	33,639	3.9	65.6	34.4
Nyagisozi	7,214	28,071	3.9	70.4	29.6
Rwabicuma	5,490	20,576	3.7	63.2	36.8

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

a) Housing characteristics

The results of 5th Population and Housing Census 2022 revealed that in the Southern province the predominant type of habitat is Modern planned urban housing (72.3%) and Dispersed/ Isolated housing (20.2%). It is in same as in Nyanza district as one of districts of the southern province. The most common type of habitat in Nyanza district is Modern planned urban housing (70.3%) followed by Dispersed/ Isolated housing (23.3%) and Spontaneous/squatter housing (3.5%). The type of habitat varies across sectors. Modern planned urban housing is most prevalent in Busoro

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(79.2%) and Ntyazo (78.7%) and low in Mukingo (50.8%) and Cyabakamyi (66.1%). The sectors with the high percentages of dispersed/isolated housing units are Cyabakamyi (30.1%) and Mukingo (44.3%).

Table 55: Distribution of households in Nyanza 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 urban housing	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**
Southern Province	**760,173**	**100**	**72.3**	**1**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**	**0**
Nyanza district	**93,007**	**100**	**70.3**	**0.5**	**1.1**	**23.3**	**0.6**	**3.5**	**0.7**	**0**
Nyanza Urban	**9,087**	**100**	**63.5**	**0.7**	**1.2**	**12.6**	**5.2**	**15**	**1.8**	**-**
Nyanza Rural	**83,920**	**100**	**71.1**	**0.5**	**1.1**	**24.4**	**0.1**	**2.3**	**0.6**	**-**
Busasamana	13,585	100	60.1	0.4	1	20.9	3.5	12.9	1.2	0
Busoro	10,088	100	79.2	0.8	0.3	14.8	-	4.4	0.6	0
Cyabakamyi	6,247	100	66.1	0.8	0.7	30.1	0.6	0.6	1.1	0
Kibilizi	10,291	100	70.6	0.7	2.2	24.4	0.2	1.6	0.3	0
Kigoma	10,566	100	74.7	0.2	0.5	23.6	0	0.9	0	0
Mukingo	10,131	100	50.8	0.7	2.9	44.3	0	0.6	0.8	0
Muyira	10,876	100	76.6	0.6	1.2	17.8	0	2	1.8	0
Ntyazo	8,519	100	78.7	0.3	0.7	15.7	-	4.2	0.3	0
Nyagisozi	7,214	100	78.4	0.2	0.1	20.8	0	0.2	0.2	0
Rwabicuma	5,490	100	75.4	0.5	0.3	21.8	0.1	1.9	0.1	0

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

The type of habitat in Nyanza district varies according to the area of residence. In urban areas, the predominant types are, modern planned urban housing (63%) followed by spontaneous/squatter housing (46.5%). In rural areas, the predominant type is umudugudu/Planned rural settlement (71%) followed by dispersed/isolated housing (24%).

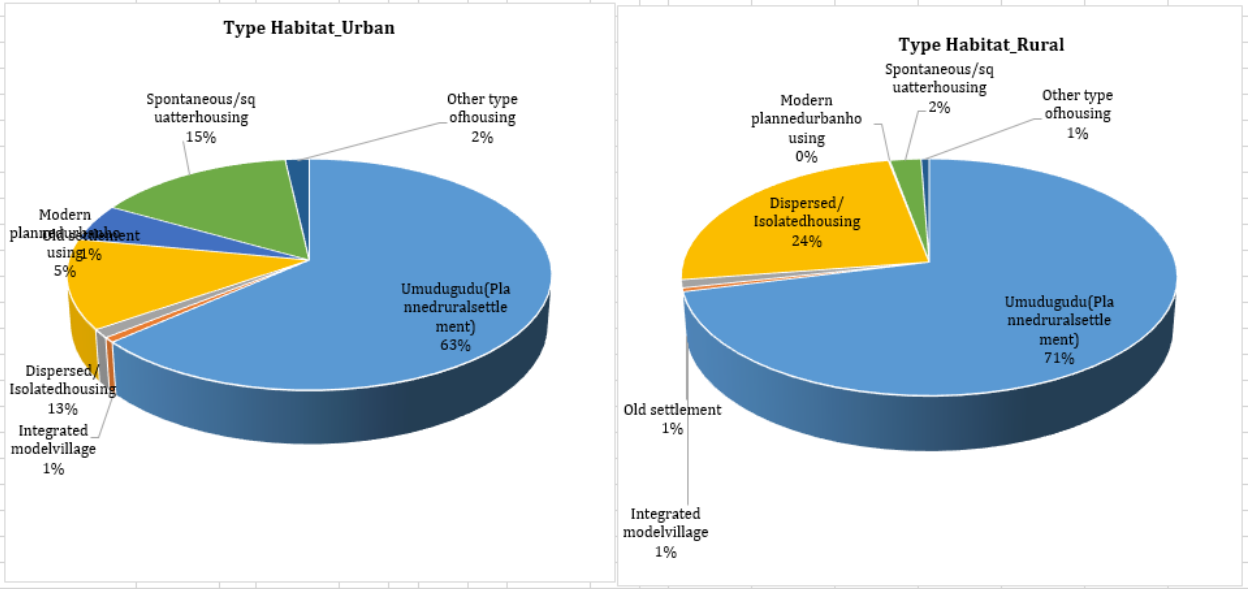

Figure 17: Distribution of households in Nyanza District by type of habitat and by Area of residence.
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

b) Education

The results of 5RPHC-2022 indicate the total population of Rwanda aged 3 and above is 11,999,691. The highest level of education attended is categorized into several levels: Never attended School, Nursery, Primary, and INGOBOKA/Vocational, Lower secondary, Upper secondary, University and not stated. In Rwanda, 16.7% of the population aged 3 years and above has never attended school while 2.7% have attended nursery, and 59.5% have attended primary school. Other education levels include 0.8% for INGOBOKA/Vocational, 9.6% for lower secondary, 7.1% for upper secondary, 3.6% for university, and 0.0% is not stated. The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Nyanza district, 16.7% of them has never attended any formal school, 59.5%

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attained the primary level, 9.6% attained lower secondary level, 7.1% has attained upper secondary and 3.6% attained university level. The level of educational attainment varies across sectors, Nyagasozi is highest percentage of primary school attainment (67.9%), Busasamana is highest in upper secondary school attainment (9.8%), and Busasamana has a high percentage of 6.5% of the population attained University than other sectors.

Table 56: Population of Nyanza District by highest level of school attended by sector (Both sexes)

Sectors	Counts	Percentage								
		Highest level of education attained								
	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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Nyanza District	332,117	100	18.1	2.1	62.4	0.9	9.6	5.1	1.9	0.0
Busasamana	46,720	100	12.7	3.7	54.3	1.3	11.7	9.8	6.5	0.0
Busoro	35,964	100	20.6	1.8	61.8	1.0	9.1	4.5	1.2	0.0
Cyabakamyi	21,017	100	16.8	1.9	65.1	0.9	10.4	3.9	0.9	0.0
Kibilizi	37,000	100	19.8	1.6	63.4	1.0	9.1	4.2	0.8	0.0
Kigoma	37,303	100	18.8	2.0	63.7	0.5	9.4	4.4	1.2	0.0
Mukingo	42,410	100	18.3	2.4	61.5	0.8	10.1	5.2	1.7	0.0
Muyira	37,523	100	19.2	1.4	65.0	0.8	8.8	4.0	0.9	0.0
Ntyazo	30,117	100	23.7	1.2	62.8	0.9	6.8	3.4	1.2	0.0
Nyagisozi	25,327	100	16.2	1.5	67.9	0.6	8.9	4.0	0.8	0.0
Rwabicuma	18,736	100	14.9	3.0	64.5	0.8	10.9	4.8	1.1	0.0

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

c) Means of livelihood and income

The official working age in Rwanda is 16 years and above. Aggregate employment generally increases with growing population. Therefore, the ratio of Employment to the working age population (employment to population ratio) is an important indicator of the capacity of the Economy to provide employment to a growing population. It was observed that in Southern province, the employment to population ratio stood at 43.3 percent, it is higher in urban areas (52.5 percent) than in rural areas of southern province (41.2 percent). It was also revealed that the employment to population ratio is (53.6 percent) among people residing in Nyanza district which is high than in rural with the (42.1 percent). The results of 5th RPHC 2022 revealed that Nyanza district is the one of districts of the Southern province where crop farming and animal husbandly are on small scale. In Nyanza district, Agricultural households occupy (81.0%) with 74.5% of households engaged in crop farming and 60.8% Households engaged in Livestock husbandry. Nyanza district has sectors located in rural areas where the agriculture activities are applied, Nyagisozi sector has a high proportion of Households engaged in crop farming (88.4%) and Households engaged in Livestock husbandry (76.4%). It is the same in Cyabakamyi and Mukingo sectors.

Table 57: Distribution of household engaged in livestock husbandly in Nyanza District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,928	62.6	1,669,273	50.4
Southern Province	760,173	618,452	81.4	574,842	75.6	483,203	63.6
Nyanza district	93,007	75,365	81.0	69,245	74.5	56,587	60.8
Busasamana	13,585	8,347	61.4	7,247	53.3	5,614	41.3
Busoro	10,088	7,964	78.9	7,284	72.2	5,707	56.6
Cyabakamyi	6,247	5,700	91.2	5,392	86.3	4,739	75.9
Kibilizi	10,291	8,560	83.2	8,019	77.9	6,206	60.3
Kigoma	10,566	8,833	83.6	8,088	76.5	6,492	61.4
Mukingo	10,131	8,883	87.7	8,330	82.2	7,157	70.6
Muyira	10,876	8,896	81.8	8,033	73.9	6,547	60.2
Ntyazo	8,519	6,922	81.3	6,168	72.4	5,101	59.9
Nyagisozi	7,214	6,630	91.9	6,376	88.4	5,513	76.4
Rwabicuma	5,490	4,630	84.3	4,308	78.5	3,511	64.0

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

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d) Health, water supply and sanitation facilities

In Nyanza District 95.8% are using Mutuelle as main health insurance, 3.3% using RSSB or RAMA, 0.2% using private insurance, none using school insurance, 0.0% using NGOs insurance and 0.6% using employer insurance.

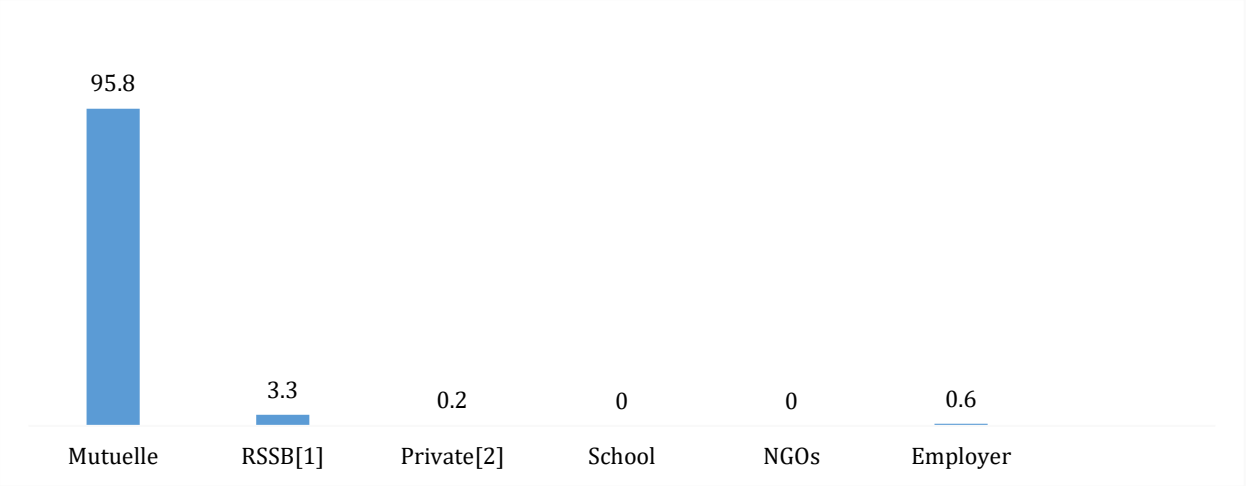

Figure 18: Population who have a medical insurance by main type of insurance in Nyanza District (%)
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of 5RPHC 2022 reveal that improved water sources are the most water sources in Rwanda that represent (82.3%). In Nyanza district, 78.9% 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 Busasamana (87.6%) and Kigoma (87.2%), and the lowest in Nyagisozi (60.8%).

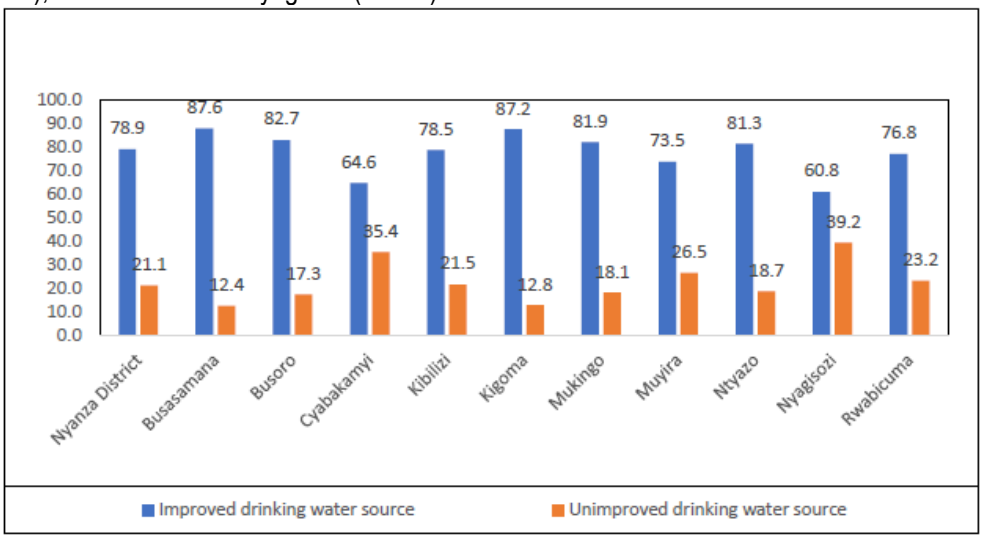

Figure 19: Percentage of households of Nyanza District by main source of drinking water
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

In Nyanza district, both urban and rural areas, private households use mainly improved source of water (94.5% in urban and 77.2% in rural). The percentage of private households using unimproved source of water is higher in rural (22.8%) than in urban (5.5%).

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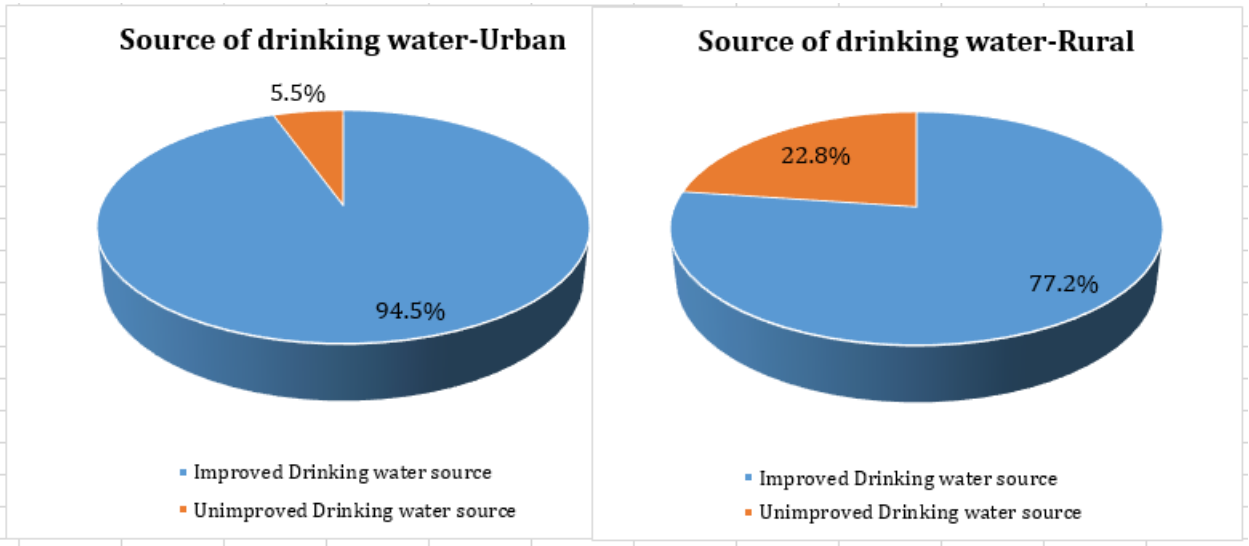

Figure 20: Households of Nyanza District by main source of water and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

i) Appliance ad assets ownership

At the district level, 74.6% of private households possess a radio, 69.3% a mobile phone, 12.2% a smartphone, 6.5% a TV and 1.6% a computer. The percentage of private households possessing a radio is high in Busasamana (84.7%) and Mukingo (80.4%). The percentage of private households possessing a television is high in Busasamana (20.7%) and Mukingo (7.5%) while it is low in Cyabakamyi and Kibilizi (almost 2% each). Mobile phones are mostly possessed by private households of Busasamana (81.6%), Mukingo (75.1%) and Kigoma (71.9%). The sectors with the highest percentage of households with smartphones are Busasamana (32.1%) and Mukingo (12.3%) while the percentage of households possessing this asset is low Nyagisozi (6.2%).

Table 58: Percentage of households of Nyanza 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**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Nyanza District	**93,007**	**74.6**	**6.5**	**69.3**	**12.2**	**1.6**
Busasamana	13,585	84.7	20.7	81.6	32.1	7.2
Busoro	10,088	70.3	4.2	64.8	9.2	0.8
Cyabakamyi	6,247	72.7	1.8	66.3	6.7	0.5
Kibilizi	10,291	70.6	2.5	65.7	8	0.5
Kigoma	10,566	77	6.1	71.9	11	0.8
Mukingo	10,131	80.4	7.5	75.1	12.3	1.1
Muyira	10,876	72.8	4	68.3	8.4	0.6
Ntyazo	8,519	67.7	3.1	61	7.2	0.5
Nyagisozi	7,214	70.3	2.5	62.6	6.2	0.6
Rwabicuma	5,490	71.5	3.4	65.5	8.9	0.6

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

J) Access to energy for lighting and cooking

In Nyanza district, the main source of energy for lighting used by households is electricity (68.0%). At the sector level, the percentage of households using electricity for lighting is high in Cyabakamyi and Nyagisozi (83.5% and 79.3% respectively). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting is Busasamana (2.7%). The sources of energy for lighting in Nyanza district are mainly electricity, candles, 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 (81%), followed by flashlight/phone flashlight (13%). In rural areas, 48% of private households use electricity as main source of energy for lighting while 44% use flashlight and 3% use firewood.

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Table 59: Distribution of households of Nyanza District by main source of energy for lighting

Sectors	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 or lighting	Not stated
Rwanda	**3,312,743**	**100**	**61**	**0.4**	**0**	**3**	**4**	**1.1**	**28.4**	**0.1**	**1**	**0.5**	**0**
Southern Province	**760,173**	**100**	**55**	**0.3**	**0**	**2**	**5**	**1.6**	**34.6**	**0.2**	**1**	**0.6**	**0**
Nyanza District	**93,007**	**100**	**52**	**0.3**	**0**	**1**	**3**	**2**	**40.6**	**0.2**	**1**	**0.6**	**-**
Nyanza Urban	**9,087**	**100**	**81**	**0.8**	**0**	**2**	**1**	**0.1**	**13**	**0.1**	**2**	**0.2**	**-**
Nyanza Rural	**83,920**	**100**	**49**	**0.3**	**0**	**1**	**3**	**2.2**	**43.6**	**0.2**	**1**	**0.7**	**-**
Busasamana	13,585	100	77	0.8	0	3	2	0.5	14.4	0.1	2	0.3	-
Busoro	10,088	100	50	0.2	-	1	3	3.6	41.1	0.2	1	0.5	-
Cyabakamyi	6,247	100	48	0.2	0	1	5	1.2	43.5	0.1	1	1	-
Kibilizi	10,291	100	41	0.1	0	1	2	0.8	54.5	0.1	0	0.8	-
Kigoma	10,566	100	55	0.3	-	1	2	2.9	37.6	0.1	1	0.4	-
Mukingo	10,131	100	55	0.3	-	1	2	1.2	38.5	0.1	2	0.8	-
Muyira	10,876	100	45	0.3	-	1	2	2.1	48.6	0.3	0	0.5	-
Ntyazo	8,519	100	38	0.1	0	1	3	3.9	53.5	0.1	0	0.7	-
Nyagisozi	7,214	100	43	0.3	-	1	5	2	47.8	0.4	1	0.5	-
Rwabicuma	5,490	100	49	0.3	-	2	4	2.2	39.6	0.2	2	1.2	-

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 (92.2%) followed by charcoal (5.3%) and gas (0.9%). At the sector level, firewood is the most used source of cooking energy by private households in Cyabakamyi (97.7). Sectors with the high percentage of private households using charcoal as main source of cooking energy are Busasamana (24.8%). Sectors with the highest percentages of private households using gas as main source of cooking energy is Busasamana (4.7%). The main sources of energy for cooking used by private households in Nyanza district vary by area of residence. In Rural areas, private households use mostly firewood (96.1%) and charcoal (2.2%). In urban areas, private households use most firewood (56.3%) and charcoal (34.0%).

Table 60: Distribution of the private households of Nyanza District by main source of energy for cooking

Sectors	Count	Percentage															
	Total number of private	Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafine	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	**3,312,743**	**100**	**76**	**17**	**5**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Southern Province	**760,173**	**100**	**89**	**8.8**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Nyanza	**93007**	**100**	**92**	**5.3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Nyanza -Urban	**9087**	**100**	**56**	**34**	**7**	**0**	**0**	**-**	**0**	**0**	**-**	**-**	**0**	**0**	**0**	**3**	**0**
Nyanza -rural	**83920**	**100**	**96**	**2.2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
Nyanza District	**93,007**	**100**	**92**	**5.3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**1**	**0**
Busasamana	13,585	100	68	25	5	0	0	0	0	0	0	0	-	0	0	2	0
Busoro	10,088	100	96	2.1	0		0		0	0	0	0	-	0	0	2	0
Cyabakamyi	6,247	100	98	1.2	0	0			0	0	0	-	-		0	1	0
Kibilizi	10,291	100	98	1.2	0	-	-	0	0	0	-	-	-		0	1	0
Kigoma	10,566	100	96	2.6	0	-	-	0	0	0	-	-	-	0		1	0
Mukingo	10,131	100	96	2.5	0	0	-	0	0	0	-	-	-	0	0	1	0
Muyira	10,876	100	96	2	0	-	-		0	1	-	0	-	0		1	0
Ntyazo	8,519	100	97	1.7	0	-	-	0		0	-		-	0		1	0
Nyagisozi	7,214	100	96	2.2	0	-	-	0		0	0	0	-	0	0	1	0
Rwabicuma	5,490	100	96	2.6	0	-	-		0	1	0		-		0	1	0

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

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k) Vulnerability

In Nyanza District, the vulnerability prevalence rate is 4%. At sector level, the highest prevalence rates of the resident population with Vulnerability are in Rwabicuma (5.2%), Cyabakamyi and Kigoma (4.7% and 4.6% respectively).

Table 61: People Vulnerability in Nyanza district by Sector of residence and sex

Sectors of residence	Total resident population	People with Vulnerability by Sex			Prevalence of Vulnerability (%)
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Nyanza District	320,741	12,692	5,589	7,103	4
Busasamana	44,572	1,638	700	938	3.7
Busoro	34,503	1,075	506	569	3.1
Cyabakamyi	20,630	972	385	587	4.7
Kibilizi	35,335	1,267	573	694	3.6
Kigoma	35,782	1,633	717	916	4.6
Mukingo	41,478	1,561	792	769	3.8
Muyira	36,367	1,525	623	902	4.2
Ntyazo	29,073	1,191	496	695	4.1
Nyagisozi	24,867	885	414	471	3.6
Rwabicuma	18,134	945	383	562	5.2

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

4.8. Nyaruguru district

The district is the most southerly in Rwanda. It is mountainous, containing part of the montane forest of Nyungwe, one of Rwanda's most popular tourist destinations. In the East, Nyaruguru District borders with the District of Huye and Gisagara District, in the North the District borders with Nyamagabe. In the West, it shares its borders with the Western Province and the Republic of Burundi in the South. The district of Nyaruguru has a surface area of 1,010 km² and it is composed of 14 sectors (Busanze, Cyahinda, Kibeho, Kivu, Mata, Muganza, Munini, Ngera, Ngoma, Nyabimata, Nyagisozi, Ruheru, Ruramba and Rusenge) which are in return made of 72 cells and 332 villages.

4.8.1. Environmental baseline in Nyaruguru district

a) Topography

Nyaruguru District is mountainous region consisting of hills taking the aspects of peaks. It is the home of the chain of high mountains known as “IBISI” located in the Nyagisozi and Rusenge sectors. The altitude of district varies between 1500 and 2300 m.

b) Climate and Rainfall

The land scape of Nyaruguru district influences the climate and rain fall. The rainfall in the district of Nyaruguru varies between 1,000 and 1,250mm and the temperature varies between 12°C and 25°C which is averaged to almost 19°C. In general, the district climate is characterized by four seasons namely the great dry season starting from June to August, the great rain season that commences from March to May, then the small dry season which begins from Mid-January to February and lastly the small rain season which ranges from September to mid-January.

c) Geology and Soils

The district land soils are generally clay and sandy with some aggregate of stones. The soil analysis of the district is generally acidic with pH between 5 and 5.5. Such soil needs amendment with lime. The staple crops that grow in Nyaruguru include Irish potatoes, maize, wheat, suit potatoes, climbing beans and cash crops mainly coffee and tea.

d) Hydrography

Nyaruguru District is composed of a network of internal rivers that would facilitate agriculture and livestock as well as increment of the power plant to increase the electricity access. The following main river network includes: Nshili River, Nshili River, Giswi River, Simbuka River, Akanyaru River, Migendo River, Rwerere River, Kaburantwa river.

e) Fauna and flora

The fauna and flora of the district is very attractive and much diversified. There is a considerable number of black and

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white doves living in groups in branches of trees in Nyungwe National Park. There are also Monkeys and stags living in the same park. The park accommodates different species of birds.

The wildlife in Nyungwe Forest National Park is diverse, with various species adapted to its lush rainforest environment. A primary attraction is its primates, with 13 known species, including chimpanzees, which are highly intelligent and share about 98% of their DNA with humans. Another prominent primate is the Ruwenzori colobus monkey. These monkeys are often observed in large groups of up to 300 individuals, a rare sight anywhere in the world. Other monkeys include the L'Hoest's monkey, blue monkey, grey-cheeked mangabey, and olive baboons.

In addition to primates, the Nyungwe National Park is home to over 75 species of mammals. Some of these are more elusive, like African civets, servals, and side-striped jackals, which often hide in the thick vegetation.

Nyungwe Forest is also famous for its birdlife. Among its 300 bird species, the most notable include the Ruwenzori turaco, the great blue turaco, and the red-collared mountain babbler. People interested in insects will find a range of butterflies and other unique invertebrates.

Reptiles like chameleons, particularly the three-horned chameleon, and amphibians also exist in this biodiversity-rich area. From large primates to hidden small creatures, the forest is a treasure for nature enthusiasts aiming to observe various species in an intact environment.

The forest has 1068 plant species including giant ferns, orchids, and ancient mahogany trees.

4.8.2. Socio-economic Baseline information in Nyaruguru

a) Population

The 5th Rwanda Population and Housing Census (PHC5) indicates that 318,126 residents were enumerated in Nyaruguru district, which represent 10.6% % of the total population of the Southern Province (3,002,699 residents). The population of Nyamagabe district is predominantly female in all 14 sectors of the district (Nyabimata with 53.0%, Ruheru 52.7%, Ngoma 52.7%, Ngera 52.7%, Kibeho 52.4%, Ruramba 52.3%, Muganza 52.3%, Rusenge 52.2%, Cyahinda 52.1%, Kivu 51.9%, Nyagisozi 51.9%, Busanze 51.8%, Mata 51.7% and Munini 51.2%) Busanze (29,795 population), Ruheru (27,712 population), Rusenge (26,911 population) and Kibeho (25,885 population) are the most populated sectors. They represent 9.4%, 8.7%, 8.5 and 8.1% of the total population of Nyaruguru District, respectively.

The three less populated sectors are Mata (16,117 inhabitants), Ruramba (18,705 inhabitants) and Nyabimata (18,843 inhabitants). They represent 5.1%, 5.9% and 5.9% of the total resident population of Nyaruguru District, respectively. The table below indicates the number of the population of Nyaruguru District by sector, by sex and their shares across sectors to the total population of Nyaruguru District.

Table 62: Population of Nyaruguru District by Sector and sex in 2022

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**	**-**
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	**-**
Nyaruguru district	**318,126**	**151,980**	**166,146**	**100**	**47.8**	**52.2**	**100**
Busanze	29,795	14,369	15,426	100	48.2	51.8	9.4
Cyahinda	24,929	11,952	12,977	100	47.9	52.1	7.8
Kibeho	25,885	12,326	13,559	100	47.6	52.4	8.1
Kivu	19,812	9,536	10,276	100	48.1	51.9	6.2
Mata	16,117	7,780	8,337	100	48.3	51.7	5.1
Muganza	21,383	10,201	11,182	100	47.7	52.3	6.7
Munini	19,760	9,642	10,118	100	48.8	51.2	6.2
Ngera	24,242	11,477	12,765	100	47.3	52.7	7.6
Ngoma	24,358	11,514	12,844	100	47.3	52.7	7.7

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District and Sector	Frequency			Percent			Share of the population
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
Nyabimata	18,843	8,850	9,993	100	47	53	5.9
Nyagisozi	19,674	9,470	10,204	100	48.1	51.9	6.2
Ruheru	27,712	13,095	14,617	100	47.3	52.7	8.7
Ruramba	18,705	8,915	9,790	100	47.7	52.3	5.9
Rusenge	26,911	12,853	14,058	100	47.8	52.2	8.5

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

The results of Rwanda Population and housing census 2022 revealed that, Nyaruguru District population is predominantly by rural area 97.6% while urban area represents 2.4%. The sectors of Nyaruguru District which are entirely rural are Busanze, Cyahinda, Kivu, Mata, Muganza, Munini, Ngera, Ngoma, Nyabimata, Nyagisozi, Ruheru, Ruramba, and Rusenge, while Kibeho is the only sector which is entirely urban (29.5%).

b) Household and size

The results of 5th RPHC 2022 indicate the total of 73,805 in Nyaruguru District. The average household size in Nyaruguru District is 4.3 persons per household. At the Sector level, the highest sizes are found in Cyahinda and Ruheru (4.5 persons/household each), Busanze and Muganza (4.4 persons/household respectively). The smallest household sizes are found in Kibeho, Ngera and Ngoma (4.0 persons/household each) respectively. The results of 5th RPHC 2022 revealed that in Nyaruguru District, private households headed by females are 30.7%. At sector level, the highest percentages of households headed by women are found in Ngera Sector (34.8%), Kibeho (33.7%) and Rusenge Sector (33.6%) while the lowest is found in Busanze Sector (26.7%).

Table 63: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	3.9	71.1	28.9
Southern Province	760,173	2,963,528	3.8	68.1	31.9
Nyaruguru District	73,805	317,443	4.3	69.3	30.7
Busanze	6,741	29,774	4.4	73.3	26.7
Cyahinda	5,495	24,899	4.5	72	28
Kibeho	6,329	25,697	4.0	66.3	33.7
Kivu	4,403	19,787	4.4	71.1	28.9
Mata	3,923	16,096	4.1	69.4	30.6
Muganza	4,821	21,328	4.4	69.3	30.7
Munini	4,499	19,580	4.3	70.6	29.4
Ngera	6,003	24,215	4.0	65.2	34.8
Ngoma	5,952	24,337	4.0	68.8	31.3
Nyabimata	4,293	18,825	4.3	67.8	32.2
Nyagisozi	4,640	19,648	4.2	69.7	30.3
Ruheru	6,104	27,680	4.5	70	30
Ruramba	4,325	18,690	4.3	71	29
Rusenge	6,277	26,887	4.2	66.4	33.6

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

c) Housing characteristics

The results of 5th Population and Housing Census 2022 revealed that in the Southern Province the predominant type of habitat is Umudugudu (planned rural settlement) (72.3%) and dispersed/isolated housing (20.2%). It is in the same as in Nyaruguru District as one of districts of the Southern Province. The most common type of habitat in Nyaruguru District is Umudugudu (planned rural settlement) (82.7%) followed by dispersed/isolated housing (13.8%). The type of habitat varies across sectors. Umudugudu (planned rural settlement) is most prevalent in Nyagisozi (96.7%), Nyabimata (95.4%) and Kivu (95.0%) and low in Muganza (44.2%) and Kibeho (67.5%). The sector with the highest percentage of dispersed/isolated housing units is Muganza (54.6%).

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Table 64: Distribution of households in Nyaruguru District by type of habitat and Sector

Sectors	Percentage									
	Total number of households	Total	Umudugudu(Planned rural settlement)	Integrated model village	Old settlement	Dispersed/Isolated housing	Modern planned urban housing	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**
Southern Province	**760,173**	**100**	**72.3**	**1.0**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**	**0.0**
Nyaruguru district	**73,805**	**100**	**82.7**	**1.2**	**0.7**	**13.8**	**0.0**	**1.1**	**0.5**	**0.0**
Nyaruguru _Urban	**1,902**	**100**	**55.7**	**1.1**	**3.8**	**25.8**	**1.4**	**8.4**	**3.8**	
Nyaruguru _Rural	**71,903**	**100**	**83.4**	**1.2**	**0.6**	**13.5**	**0.0**	**0.9**	**0.4**	**0.0**
Busanze	6,741	100	85.3	0.5	0.1	11.5	0.0	1.2	1.4	-
Cyahinda	5,495	100	87.0	0.7	1.2	8.6	0.0	1.6	0.9	-
Kibeho	6,329	100	67.5	1.1	1.7	22.7	0.4	5.2	1.3	-
Kivu	4,403	100	95.0	0.2	-	4.5	-	0.1	0.1	0.0
Mata	3,923	100	77.6	4.1	2.4	13.3	-	2.3	0.3	-
Muganza	4,821	100	44.2	0.1	0.1	54.6	-	0.8	0.1	-
Munini	4,499	100	90.7	4.3	0.1	4.4	0.0	0.4	0.1	-
Ngera	6,003	100	87.2	1.4	0.4	10.5	0.0	0.4	0.1	-
Ngoma	5,952	100	93.3	0.1	0.1	6.3	-	0.1	0.1	-
Nyabimata	4,293	100	95.4	0.2	0.3	2.6	0.0	1.0	0.4	-
Nyagisozi	4,640	100	96.7	0.6	0.8	1.9	0.0	0.0	0.0	0.0
Ruheru	6,104	100	88.2	3.3	0.4	7.2	0.0	0.6	0.4	-
Ruramba	4,325	100	76.1	0.1	1.7	21.9	-	0.0	0.1	-
Rusenge	6,277	100	75.5	1.0	0.5	22.1	-	0.3	0.7	-

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

By area of residence, the predominant types are spontaneous/squatter housing (54.4%) and Umudugudu/planned rural settlement (36.9%) in urban areas. In rural areas, the predominant type is Umudugudu (planned rural settlement) (76.5%) followed by dispersed/isolated housing (17.6%).

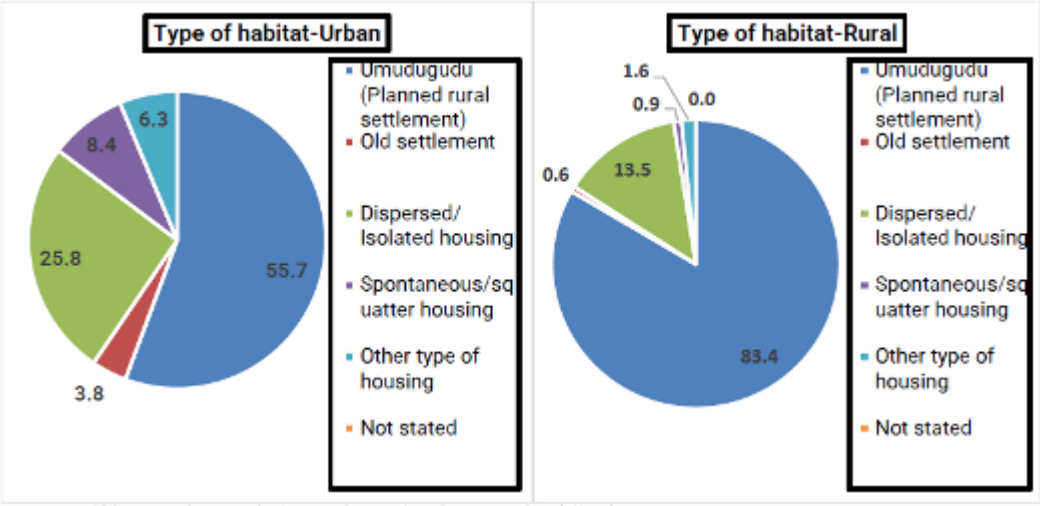

Figure 21:Distribution of households in Nyaruguru District by type of habitat and by Area of residence
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

d) Education

The results of 5RPHC-2022 indicate that, among the population aged 3 years and above in Nyaruguru district is 284,162. In Nyaruguru District, 21.8% of the population has never attended school, while 2.2% have attended nursery, and 60.2% have attended primary school. Other education levels include 0.8% for INGOBOKA/Vocational, 8.6% for lower secondary, and 4.8% for upper secondary, 1.4% 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, Ruheru has a higher percentage (30.0%) of individuals who have never attended school compared to other sectors, while Kibeho has a higher percentage (7.0% and 3.3% respectively) of individuals who attended upper secondary school and University. Each sector has its own unique distribution of education levels attended by the population.

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Table 65: Population of Nyaruguru District by highest level of school attended by sector (Both sexes)[5].

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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Nyaruguru District	284,162	100	21.8	2.2	60.2	0.8	8.6	4.8	1.4	0.0
Busanze	26,256	100	23.6	1.3	62.4	0.6	7.1	4.1	0.9	0.0
Cyahinda	22,005	100	20.3	1.9	61.1	0.6	10.0	4.9	1.2	-
Kibeho	23,187	100	19.0	2.9	55.4	1.6	10.7	7.0	3.3	0.1
Kivu	17,907	100	24.9	2.5	57.5	0.2	8.7	5.0	1.2	0.0
Mata	14,553	100	18.8	3.2	55.8	1.4	11.7	6.6	2.5	0.0
Muganza	19,027	100	24.5	1.8	58.8	0.7	7.9	4.8	1.6	0.0
Munini	17,712	100	18.3	2.8	61.3	0.7	10.3	4.9	1.6	0.0
Ngera	21,954	100	18.4	2.0	64.6	0.9	8.6	4.5	1.0	-
Ngoma	21,321	100	16.3	1.8	68.4	1.1	7.3	3.9	1.2	0.0
Nyabimata	16,883	100	26.7	2.2	59.4	0.3	7.0	3.4	1.0	-
Nyagisozi	17,182	100	18.7	1.6	64.1	1.2	8.9	3.7	1.7	0.0
Ruheru	24,976	100	30.0	2.2	56.7	0.4	5.4	3.9	1.4	0.0
Ruramba	16,996	100	21.2	2.7	56.0	1.1	11.3	6.5	1.2	-
Rusenge	24,203	100	22.9	2.9	60.1	0.8	8.2	4.4	0.8	0.0

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

e) Means of livelihoods

The results of 5th RPHC 2022 revealed that Nyaruguru District is the one of districts of the Southern Province where crop farming and animal husbandry are on large scale. In Nyaruguru District, Agricultural households occupy (88.9%) with 84.5% of households engaged in crop farming and 73.6% Households engaged in Livestock husbandry. Nyaruguru District is almost rural areas where the agriculture activities are mainly applied in all sectors. The high proportion of Households engaged in crop farming is found in Ngoma (91.1%) and the low in Kibeho (70.6%). The proportion of households engaged in Livestock husbandry is high in Muganza (79.2%) and low in Kibeho (59.7%). In Nyaruguru district, most of the youth aged 16-30 currently employed are employees (66.6%) followed by self-employed (25.5%).

The highest percentage of youth employees is found in Mata (82.1%), while the lowest is in Ngoma (43.5%). The biggest share of self-employed youth is found in Ngoma (49.1%) while the lowest is in Mata (8.7%) and Kibeho (10.5%). It was observed that in Southern Province, the employment to population ratio stood at 42,9 percent, it is higher in urban areas (52.5 percent) than in rural areas of south (41.2 percent). The highest employment to population ratio among youth in Nyaruguru District was observed in Nyabimata (36.9%), Mata (35.4%), Ngoma (34.5%) and Kibeho (34.0%), the lowest employment to population ratio among youth was observed in Rusenge (21.8%) and Cyahinda (21.9%).

Table 66: Distribution of household engaged in livestock husbandly in Nyaruguru District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	68.9	2,074,928	62.6	1,669,273	50.4
Southern Province	760,173	618,452	81.4	574,842	75.6	483,203	63.6
Nyaruguru district	73,805	65,613	88.9	62,336	84.5	54,320	73.6
Busanze	6,741	6,195	91.9	5,891	87.4	5,266	78.1
Cyahinda	5,495	4,992	90.8	4,770	86.8	4,158	75.7
Kibeho	6,329	4,850	76.6	4,471	70.6	3,778	59.7
Kivu	4,403	3,965	90.1	3,607	81.9	3,472	78.9
Mata	3,923	3,169	80.8	2,936	74.8	2,569	65.5
Muganza	4,821	4,399	91.2	4,171	86.5	3,819	79.2
Munini	4,499	3,896	86.6	3,679	81.8	3,233	71.9
Ngera	6,003	5,532	92.2	5,395	89.9	4,453	74.2
Ngoma	5,952	5,555	93.3	5,420	91.1	4,325	72.7

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Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Nyabimata	4,293	3,834	89.3	3,588	83.6	3,200	74.5
Nyagisozi	4,640	4,246	91.5	4,093	88.2	3,564	76.8
Ruheru	6,104	5,358	87.8	5,106	83.7	4,553	74.6
Ruramba	4,325	3,938	91.1	3,733	86.3	3,370	77.9
Rusenge	6,277	5,684	90.6	5,476	87.2	4,560	72.6

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

f) Health, water supply and sanitation facilities

In Nyaruguru District 96.2% are using Mutuelle as main health insurance, 3.1% using RSSB or RAMA, 0.1% using private insurance, none using school insurance, 0.0% using NGOs insurance and 0.5% using employer insurance.

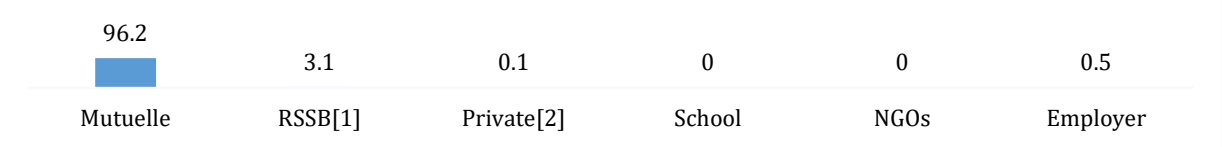

Figure 22: Population who have a medical insurance by main type of insurance in Nyaruguru District (%)
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The results of 5RPHC 2022 reveal that improved water sources are the most water sources in Rwanda that represent (82.3%). In Nyaruguru District, 72.1% 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 Kibeho (89.1%), Ngera (87.4%), Ngoma (85.5%), Mata (80.4%), Ruramba (80.1%), Nyagisozi (80.0%) and the lowest in Ruheru (57.7%).

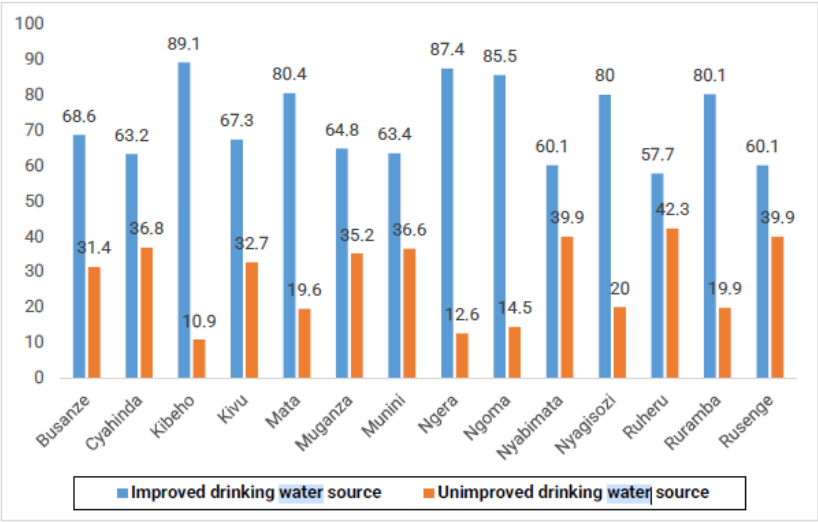

Figure 23:Percentage of households of Nyaruguru District by main source of drinking water
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

In Nyaruguru District, both urban and rural areas of Nyaruguru District, private households use mainly improved drinking water source (91.3% in urban and 71.6% in rural). The percentage of private households using unimproved drinking water source is higher in rural (28.4%) than in urban (8.7%).

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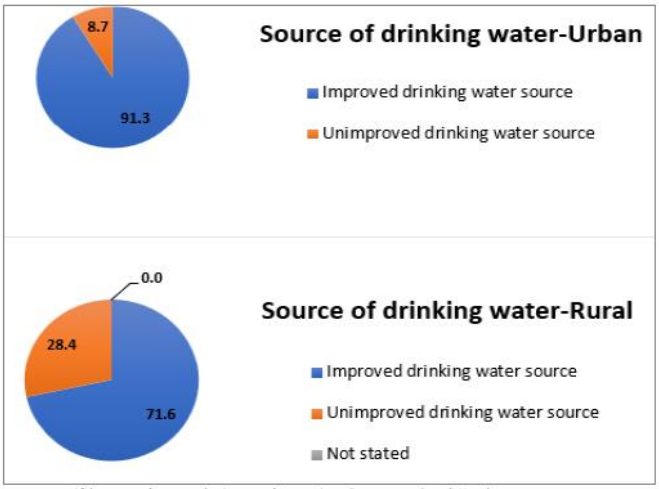

Figure 24: Households of Nyaruguru District by main source of water and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

g) Appliance ad assets ownership

At the district level, 72.6% of private households possess a radio, 48.5% a mobile phone, 5.6% a smartphone, 2.7% a TV and 0.9% a computer. The percentage of private households possessing a radio is high in Kibeho (78.5%), Munini (78.2%), Mata (76.3%) and Nyagisozi (75.7%). It is low in Rusenge (66.9%), Ruheru and Busanze (68.8% each) and Ngera (69.0%). The percentage of private households possessing a television is high in Kibeho (4.6%), Munini (4.0%), Mata (3.6%) and Nyagisozi (3.2%) while it is low in Nyabimata (1.4%), Kivu (1.6%) and Rusenge (1.8%). Mobile phones are mostly possessed by private households of Kibeho (56.1%), Munini (53.6%), Kivu (52.3%), Mata (51.5%), Nyabimata (51.3%) and Nyagisozi (51.1%). The sectors with the highest percentage of households with smartphones are Kibeho (10.5%), Munini (8.2%) and Mata (6.6%) while the percentage of households possessing this asset is low in Ngera (3.7%) and Busanze (3.9%). The computer is mostly possessed in Kibeho (1.9%), Mata and Munini (1.2% each) and Nyagisozi (1.0%).

Table 67: Households and of Nyaruguru 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**
Southern Province	**760,173**	**76.4**	**7.6**	**71.9**	**14.1**	**2.3**
Nyaruguru District	**73,805**	**72.6**	**2.8**	**67.6**	**9.7**	**0.9**
Busanze	6,741	68.8	2.3	63.2	6.4	0.7
Cyahinda	5,495	74.4	2.6	69.6	10.2	0.8
Kibeho	6,329	78.5	4.6	73.3	15.9	2
Kivu	4,403	73.5	1.7	70.5	8.7	0.7
Mata	3,923	76.4	3.7	72.1	11.5	1.3
Muganza	4,821	73.5	2.6	68.5	9.9	0.9
Munini	4,499	78.2	4	73.6	12.9	1.2
Ngera	6,003	69	2.7	64	8.2	0.5
Ngoma	5,952	70.3	2.8	65	9	1
Nyabimata	4,293	73.8	1.5	69.5	7.8	0.7
Nyagisozi	4,640	75.7	3.2	70	10.6	1.1
Ruheru	6,104	68.8	2.4	63.8	7.7	1
Ruramba	4,325	73.3	2.8	67.8	10.8	0.8
Rusenge	6,277	66.9	1.8	61.1	7.4	0.5

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

h) Access to energy

In Nyaruguru District, the main source of energy for lighting used by households is electricity (65.8%). At the sector level, the percentage of households using electricity for lighting is high in Nyagisozi (81.7%) and Ngoma (80.1%). The sectors with the high percentages of private households using flashlight/phone flashlight for lighting are Mata (32.1%) and Rusenge (31.7%). According to the area of residence, the main source of energy for lighting is electricity (65.8%), followed by flashlight/phone flashlight (19.6%) and firewood (10.5%) in rural areas. In urban areas, 66.0% of private households use electricity as main source of energy for lighting followed flashlight or phone flashlight (19.7%) and

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firewood (9.7%).

Table 68: Distribution of households of Nyaruguru 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	Firewoods	Batteries/Bulb	Flashlight/Phone Flashlight	Rechargeable Batteries	Lantern	Other source of energy for	Not stated
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**	**0.0**
Southern Province	**760,173**	**100**	**55.1**	**0.3**	**0.0**	**2.0**	**4.7**	**1.6**	**34.6**	**0.2**	**0.9**	**0.6**	**0.0**
Nyaruguru District	**73,805**	**100**	**65.8**	**0.2**	**0.0**	**1.8**	**10.4**	**0.5**	**19.6**	**0.2**	**0.7**	**0.8**	**0.0**
Nyaruguru _Urban	**1,902**	**100**	**66.0**	**0.4**	**-**	**1.9**	**9.7**	**0.1**	**19.7**	**0.3**	**1.4**	**0.6**	**-**
Nyaruguru _Rural	**71,903**	**100**	**65.8**	**0.2**	**0.0**	**1.8**	**10.5**	**0.5**	**19.6**	**0.2**	**0.7**	**0.8**	**0.0**
Busanze	6,741	100	60.6	0.2	-	1.9	16.0	0.7	18.9	0.1	0.6	1.1	-
Cyahinda	5,495	100	71.0	0.2	-	0.6	9.2	0.4	17.9	0.1	0.1	0.4	-
Kibeho	6,329	100	62.8	0.3	-	1.8	10.7	0.3	22.0	0.1	1.3	0.7	-
Kivu	4,403	100	71.3	0.0	-	1.1	9.8	0.2	13.7	2.9	0.3	0.6	0.0
Mata	3,923	100	54.1	0.3	0.1	3.1	8.1	0.6	32.1	0.1	0.9	0.6	-
Muganza	4,821	100	77.3	0.1	-	1.8	8.3	0.2	9.7	0.0	0.5	1.9	-
Munini	4,499	100	59.8	0.1	-	1.4	10.3	0.2	25.5	-	0.5	2.1	-
Ngera	6,003	100	58.3	0.3	-	2.1	8.4	1.4	28.5	0.1	0.6	0.2	-
Ngoma	5,952	100	80.1	0.1	-	1.4	6.1	0.2	11.6	0.0	0.3	0.3	-
Nyabimata	4,293	100	75.4	0.2	0.0	1.8	10.5	0.2	10.7	-	0.5	0.6	-
Nyagisozi	4,640	100	81.7	0.0	-	1.3	5.4	0.5	10.1	0.1	0.4	0.6	0.0
Ruheru	6,104	100	74.0	0.2	-	1.8	9.6	0.9	12.8	0.0	0.4	0.3	-
Ruramba	4,325,100		51.0	0.1	-	2.8	16.5	0.6	27.9	0.1	0.6	0.3	-
Rusenge	6,277,100		46.6	0.3	0.0	2.2	15.2	0.7	31.7	0.1	2.0	1.2	-

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 (95.4%) followed by charcoal (3.3%) and gas (0.3%). At the sector level, firewood is the most used source of cooking energy by private households at the percentage more than 90% in 13 Sectors, the lowest percentage is found in Kibeho (88.4%). The high percentage of private households using charcoal as source of cooking energy are Kibeho (9.2%), Munini (6.2%), Mata 4.3%) and Ruheru (4.0%). Sectors with the highest percentages of private households using gas as main source of cooking energy are Munini (1.3%) and Kibeho (1.1%). By area of residence, in rural areas, private households use mostly firewood (96.0%) and charcoal (2.9%). In urban areas, private households use most firewood (73.7%) and charcoal (20.8%).

Table 69: Households of Nyaruguru District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafine	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	**3,312,743**	**100**	**76.1**	**17.3**	**4.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.4**	**0.0**
Southern Province	**760,173**	**100**	**88.5**	**8.8**	**1.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**
Nyaruguru District	**73,805**	**100**	**95.4**	**3.3**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**-**	**-**	**0.1**	**0.0**	**0.8**	**0.0**
Nyaruguru _Urban	**1,902**	**100**	**73.7**	**20.8**	**3.1**	**-**	**-**	**-**	**0.1**	**-**	**-**	**-**	**-**	**2.4**	**-**	**0.0**	**0.0**
Nyaruguru _Rural	**71,903**	**100**	**96.0**	**2.9**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.8**	**0.0**	**96.0**	**2.9**
Busanze	6,741	100	97.3	1.8	0.1	-	-	-	0.0	-	-	-		0.0	-	0.8	-
Cyahinda	5,495	100	95.8	3.3	0.1	-	0.0	0.0	0.0	0.0	0.0	-	-	-	-	0.8	-
Kibeho	6,329	100	88.4	9.2	1.1	-	-	-	0.0	-	-	-	-		-	1.2	-
Kivu	4,403	100	96.6	2.5	0.1	-	-	-	0.1	-	-	-	-	0.1	0.0	0.5	0.0
Mata	3,923	100	94.0	4.3	0.8	0.0	-	-	0.1	-	-	-	-	0.1		0.8	-
Muganza	4,821	100	95.6	3.3	0.1	-	-			-	-	-	-	-	-	1.0	-
Munini	4,499	100	91.4	6.2	1.3	-	-	0.0	0.0	-	-	-	-	-	-	1.0	-
Ngera	6,003	100	98.1	1.1	0.1	-	-	-	0.0	-	-	-	-	0.0	-	0.6	-
Ngoma	5,952	100	97.5	1.7	0.1	-	-	-	0.0	-	0.0	-	-	0.0	-	0.6	-
Nyabimata	4,293	100	96.9	1.7	0.1	0.0	-	-	0.0	-	-	-	-	0.0	-	1.2	
Nyagisozi	4,640	100	96.8	1.9	0.3	0.0	-	-	-	-	-	-	-	0.0	0.0	1.0	0.0
Ruheru	6,104	100	94.6	4.0	0.1	0.1	0.0	-	0.1	0.0	0.0	-	-	0.4	-	0.7	-
Ruramba	4,325	100	95.8	2.9	0.1	-	-	-	0.0	-	-	-	-	0.1	0.0	1.1	-

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Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafine	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rusenge	6,277	100	96.5	2.7	0.1	-	-	-	0.0	0.1	0.0	-	-	-	-	0.6	-

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

i) Vulnerability

In Nyaruguru district the vulnerability prevalence rate is 3.6%. At sector level, the highest prevalence rates of the resident population aged 5 years and above with Vulnerability are in Ngera and Ngoma with the same rate (4.4%) and while the lowest is in Kivu (2.2%), Ruramba (2.7%) and Cyahinda (2.8%) respectively.

Table 70: Persons with vulnerability of Nyaruguru District by Sector of residence and sex

Sectors of residence	Total resident population	Vulnerable people by Sex			Prevalence of Vulnerability
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174,949	216,826	3.4
Southern Province	2,628,449	98,337	43,918	54,419	3.7
Nyaruguru district	275,868	9,914	4,383	5,531	3.6
Busanze	25,835	1,014	424	590	3.9
Cyahinda	21,626	603	264	339	2.8
Kibeho	22,385	923	405	518	4.1
Kivu	17,445	390	198	192	2.2
Mata	13,971	567	253	314	4.1
Muganza	18,525	571	256	315	3.1
Munini	17,295	602	272	330	3.5
Ngera	21,077	924	388	536	4.4
Ngoma	21,128	927	395	532	4.4
Nyabimata	16,452	540	257	283	3.3
Nyagisozi	16,908	709	300	409	4.2
Ruheru	23,851	870	357	513	3.6
Ruramba	16,243	440	192	248	2.7
Rusenge	23,127	834	422	412	3.6

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

4.9. Ruhango district

Ruhango district is one of the districts in the Southern Province bordered by Muhanga district in the North, Kamonyi in the Northern East, Karongi in the North Western, Nyanza District in the South, Nyamagabe district in the South Western and Bugesera in the South Eastern. It is composed of 9 Sectors (Kinazi, Byimana, Bweramana, Mbuye, Ruhango, Mwendo, Kinihira, Ntongwe and Kabagari, 59 Cells and 533 villages (Imidugudu). The district lays due-north of the southern province Headquarter at Busasamana Sector in Nyanza District, straddling the major road from Kigali to Bujumbura on Latitude degrees of 2° 13' 24" S and Longitude degrees of 29° 46' 41" E. The Latitude of -2.223333 and Longitude of 29.778056, Elevation: 1782 m with area equal 621.8 SqKm.

4.9.1. Physical and Biological Environment in Ruhango District

a) Topography

The relief of Ruhango District is inclined from West to East. Its highest point is Mayuzwe hill in Mbuye Sector situated at 2,112 meters of altitude and the lowest point is located at 1,300 metres of altitude in the Akanyaru valley. More precisely, the Sectors of Kinazi, Ntongwe, Ruhango and Mbuye are located in the lowest altitudes whereas those of Bweramana, Kinihira, Byimana, Mwendo and Kabagari, lie on an altitude between 1,400 and 1,800 metres.

b) Climate and Rainfall

Ruhango District is situated within a tropical region and has humid climate. The region experiences alternate season of climate. The rainy season alternates with the dry season. The frequency of its rainfall is adequately compared to the Eastern part with a relief of low altitude and an average annual temperature of about 20°C, different to the Western part which is mountainous with relatively low temperatures.

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c) Geology and Soil

The big part of Ruhango district soil characteristics is composed of sandy soil with less water retention capacity. The Soil structure differ from its relief and is dominated by humidified kaolisol resulted from granite, gneissic and schist rock. These soils generally vary and their principles are grouped into two zones:

(i) Zone A: Western zone (Kinihira, Mwendo, Byimana, Bweramana, and Kabagali). This zone has a slightly deeply over granite, less deeply over granite, soil less deeply over Quartzsite and sand soil slightly deep.
(ii) Zone B: Eastern zone (sectors). This zone has deep soil with dark horizon, deep soil with plinth over schist and low land clay soil and is good for cultivation.

d) Hydrography

The hydrography network comprises the most important running water of the country; Akanyaru, Mwogo-Kiryango and Nyabarongo rivers. Several other streams which are relatively less important form the affluent of the latter. Apart from permanent rivers, Ruhango District has several intermittent running streams especially in the western part.

e) Fauna and Flora

The District natural vegetation has over the years, progressively disappeared due to human activities. There have been efforts to re-afforest the District especially with trees like Eucalyptus, Pinus, Cypress and Grevillea. As regards fauna, there are a number of wild small animals and insect species including toads, frogs, several types of insects and reptiles.

4.9.2. Socio-economic baseline information in Ruhango district

a) Population

The 5th Rwanda Population and Housing Census (PHC5) has enumerated 359,121 residents in Ruhango District, which represent 12% % of the total population of the Ruhango District (3,002,121 residents). The population of Ruhango District is predominantly female: 187,025 are female corresponding to 52.1% of the total population Ruhango District. The results in previous table indicates that, the population share of Ruhango district is 12.0% of the total population. Females are predominant in all sectors of the district of Ruhango with a high percentage in Kinihira (53.0%) and Kinazi (52.6%). The most populated sectors are Ruhango (75.618 residents) and Kinazi (51.016 residents). They represent (21.1%) and (14.2%) of the total population of Ruhango District respectively. The three less populated sectors are Kabagali (25,602 inhabitants) Mwendo (25,908 inhabitants) and Kinihira (25,932 inhabitants). In terms of share, their population represent respectively 7.1% (Kabagali) and 7.2% (Mwendo and Kinihira).

Table 71: Population of Ruhango 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**	**-**
Southern Province	**3,002,699**	**1,448,455**	**1,554,244**	**100**	**48.2**	**51.8**	**-**
Ruhango District	**359,121**	**172,096**	**187,025**	**100**	**47.9**	**52.1**	**100**
Bweramana	31,152	15,026	16,126	100	48.2	51.8	8.7
Byimana	40,046	19,113	20,933	100	47.7	52.3	11.2
Kabagali	25,602	12,022	13,580	100	47	53	7.1
Kinazi	51,016	24,457	26,559	100	47.9	52.1	14.2
Kinihira	25,932	12,281	13,651	100	47.4	52.6	7.2
Mbuye	45,747	22,111	23,636	100	48.3	51.7	12.7
Mwendo	25,908	12,485	13,423	100	48.2	51.8	7.2
Ntongwe	38,100	18,275	19,825	100	48	52	10.6
Ruhango	75,618	36,326	39,292	100	48	52	21.1

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

The results of Rwanda Population and Housing Census 2022 revealed that 72.1% of the total population of Rwanda live in rural area and only 27.9% are in urban area contrary to the Southern Province where 85.2% of the resident population live in rural and 14.8% in urban area. Ruhango District population is predominantly in rural area (89.1%) while resident population in urban represents 10.9%. The sectors of Ruhango District which are entirely rural are Mbuye, Mwendo and Ntongwe.

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b) Household and size

The results of the 5th RPHC 2022 indicate that the average household size in Ruhango District is 3.8persons per household. At the sector level, the highest sizes are found in Ntongwe (4.0 persons/household), Kinazi and Mbuye (3.9 persons/household each). The smallest household sizes are found in Bweramana and Ruhango Sector (3.7 persons/household each).

The results of 5th RPHC 2022 revealed that in Ruhango District, private households headed by female are 32.7%. At sector level, the highest percentages of households headed by women are found in Ntongwe sector (35.8%), Kabagali sector (34.7%) and Kinazi (34.4%) while the lowest is found in Mwendo sector (28.0%).

Table 72: Number of households and their corresponding population, mean size and sex of household head

Sectors	Total number of private households	Corresponding Population8	Household Size	Percentage	
				Male Headed HHs	Female Headed HHs
Rwanda	3,312,743	13,100,600	4.0	71.1	28.9
Southern Province	760,173	2,963,528	3.9	68.1	31.9
Ruhango District	94,508	358,438	3.8	67.3	32.7
Bweramana	8,444	31,132	3.7	67.8	32.2
Byimana	10,607	39,963	3.8	69.5	30.5
Kabagali	6,803	25,545	3.8	65.3	34.7
Kinazi	13,073	50,955	3.9	65.6	34.4
Kinihira	6,994	25,899	3.7	67.1	32.9
Mbuye	11,791	45,705	3.9	69.1	30.9
Mwendo	6,744	25,896	3.8	72	28
Ntongwe	9,588	37,878	4.0	64.2	35.8
Ruhango	20,464	75,465	3.7	66.4	33.6

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

c) Housing characteristics

The results of the 5th Population and Housing Census 2022 revealed that in the Southern Province the predominant type of habitat is "Umudugudu/Planned rural settlement" (72.3%) and "Dispersed/Isolated housing" (20.2%). The type of habitat varies across sectors. "Spontaneous/squatter housing" is most prevalent in Mwendo (7.3%) and Kabagali (5.5%) and low in Kinihira (1.2%) and Ntongwe (0.8%). The sectors with the highest percentages of "Dispersed/isolated housing" units are Kinihira (64.1%) and Mwendo (51.3%).

Table 73: Distribution of households in Ruhango District by type of habitat and Sector

Sectors	Total number of private households	Percentage							
		Total	Umudugudu (Planned rural settlement)	Integrated model village	Old settlement	Dispersed/Isolated housing	Modern planned urban housing	Spontaneous /squatter housing	Other type of housing
Rwanda	**3,312,743**	**100**	**65.4**	**0.8**	**2.3**	**14.9**	**6.9**	**8.9**	**0.8**
Southern Province	**760,173**	**100**	**72.3**	**1**	**1.3**	**20.2**	**0.7**	**3.7**	**0.9**
Ruhango District	**94,508**	**100**	**61.2**	**0.7**	**2.8**	**31.6**	**0.1**	**3.4**	**0.4**
Ruhango Urban	10,576	100	65.4	0.3	10.1	15.7	0.4	7.4	0.7
Ruhango Rural	83,932	100	60.6	0.7	1.8	33.6	0	2.9	0.4
Bweramana	8,444	100	50.9	1.6	2.6	41.7	0	2.8	0.5
Byimana	10,607	100	57.5	0.1	1.3	37.7	0	3.2	0.1
Kabagali	6,803	100	55.1	0.4	1.2	37.4	0	5.5	0.3
Kinazi	13,073	100	77.2	0.4	0.7	19.2	0	1.8	0.7
Kinihira	6,994	100	29.4	0.4	4.9	64.1	0	1.2	0.1
Mbuye	11,791	100	72.3	1.6	1.9	21	0	2.6	0.6
Mwendo	6,744	100	37.8	0.3	2.8	51.3	-	7.3	0.5
Ntongwe	9,588	100	80.4	0.8	1.1	16.3	0.2	0.8	0.4
Ruhango	20,464	100	62.2	0.4	5.9	25.7	0.2	5.3	0.3

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

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By area of residence, the predominant types are "Umudugudu/planned rural settlement" (65.4%) and "Dispersed/Isolated housing" (15.7%) in urban areas as well as in rural areas where the "Umudugudu/planned rural settlement" is predominant (60.6%) followed by "Dispersed/Isolated housing" (33.6%).

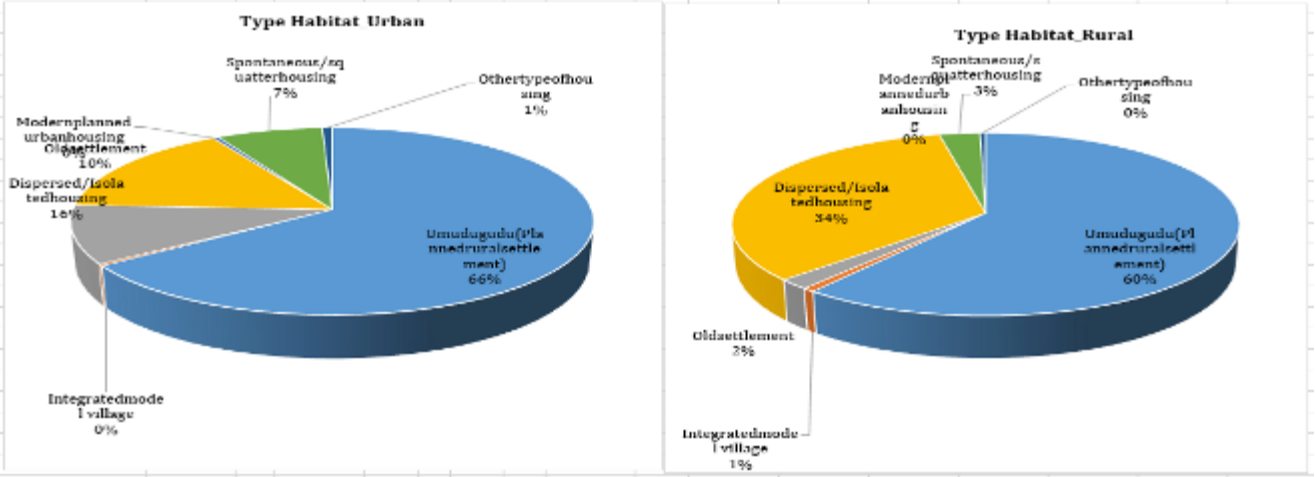

Figure 25: Distribution of households in Ruhango District by type of habitat and by Area of residence.
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

d) Education

The results of 5RPHC-2022 indicate that, the total population of Ruhango District aged 3 and above is 324,946. In Ruhango District, 16.5% of the population have never attended school while 1.8% have attended nursery and 64.5% have attended primary school. Other education levels include 1.4% for INGOBOKA/Vocational, 8.9% for lower secondary, 5.0% for upper secondary and 1.9% 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, Ntongwe has a higher percentage (20.3%) of individuals who have never attended school compared to other sectors while Kabagali has a higher percentage (10.4%) of individuals attended lower secondary school and Ruhango has a higher percentage of individual attended upper secondary school. Each sector has its own unique distribution of education levels attended by the population.

Table 74: Population of Ruhango District by highest level of school attended by sector (Both sexes)[5].

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
Southern Province	2,720,038	100	17.1	2.3	62.6	1.2	9.0	5.5	2.4	0.0
Ruhango district	324,946	100	16.5	1.8	64.5	1.4	8.9	5.0	1.9	0.0
Bweramana	28,564	100	14.2	2.0	64.2	1.9	9.5	5.5	2.8	0.0
Byimana	36,122	100	12.1	2.1	63.4	2.5	10.3	6.3	3.3	0.0
Kabagali	23,260	100	15.6	1.8	64.2	1.6	10.4	5.4	1.1	0.0
Kinazi	45,858	100	18.9	1.5	65.2	1.1	7.6	4.4	1.5	0.0
Kinihira	23,499	100	15.3	1.6	66.9	2.2	8.7	4.3	0.9	0.0
Mbuye	41,654	100	19.8	1.7	65.3	1.1	7.6	3.5	1.0	0.0
Mwendo	23,191	100	15.1	1.7	69.2	1.5	7.8	3.7	1.0	0.0
Ntongwe	34,489	100	20.3	1.6	64.4	0.9	8.2	3.7	1.0	0.0
Ruhango	68,309	100	15.3	2.3	62.0	1.0	9.7	6.5	3.2	0.0

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

e) Means of livelihood and income

Ruhango District is the one of districts of the South Province where crop farming and animal husbandly are on large scale. In Ruhango District, agricultural households occupy 78.9% with 71.0% of households engaged in crop farming and 60.0% households engaged in livestock husbandry. At the sector level, the highest percentages of agricultural

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households are found in Mwendo (92.3%), Kinihira (88.1%), Kabagali (85.8%), Bweramana (81.9%) and Byimana (81.8%). Households engaged in crop farm as well as those engaged in livestock husbandry are more represented in the same sectors: Mwendo (88.3% of households in crop farming and 78.8% in livestock husbandry), Kinihira (81.4% of households in crop farming and 71.8% in livestock husbandry), Kabagali (81.2% of households in crop farming and 71.8% in livestock husbandry), Bweramana (75.2% of households in crop farming and 63.1% in livestock husbandry) and Byimana (75.1% of households in crop farming and 62.8% in livestock husbandry).

The results of 5th census shows that the employment to population ratio stood at 45.9 in Rwanda, it is lower among females (40.2 percent) than males (52.4 percent). On the other side, it was observed that the employment to population ratio is higher in urban areas of Rwanda (53.5 percent) than in rural areas (42.7 percent). It was observed that in Southern Province, the employment to population ratio stood at 42,9 percent, it is higher in urban areas (52.5 percent) than in rural areas of south (41.2 percent). It was also revealed that the employment to population ratio is 40.6 % among people residing in Ruhango District. It is higher in urban areas (48.4%) than in rural areas of Ruhango District (39.6%).

Table 75: Distribution of household engaged in livestock husbandly in Ruhango District

Sector	Agricultural households			Households engaged in crop farming		Households engaged in Livestock husbandry	
	Total Private Households	Counts	%	Counts	%	Counts	%
Rwanda	3,312,743	2,280,854	69	2,074,928	63	1,669,273	50
Southern Province	760,173	102,733	21	77,039	16	66,749	14
Ruhango District	94,508	74,538	79	67,110	71	56,703	60
Bweramana	8,444	6,919	82	6,349	75	5,325	63
Byimana	10,607	8,674	82	7,966	75	6,657	63
Kabagali	6,803	5,836	86	5,526	81	4,374	64
Kinazi	13,073	9,354	72	7,794	60	6,815	52
Kinihira	6,994	6,164	88	5,693	81	5,022	72
Mbuye	11,791	9,320	79	8,187	69	7,252	62
Mwendo	6,744	6,222	92	5,954	88	5,316	79
Ntongwe	9,588	7,665	80	6,757	71	5,895	62
Ruhango	20,464	14,384	70	12,884	63	10,047	49

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

f) Health, water supply and sanitation facilities

In Ruhango District 95.7% are using Mutuelle as main health insurance, 3.3% using RSSB or RAMA, 0.1% using private insurance, none using school insurance, 0.0% using NGOs insurance and 0.8% using employer insurance.

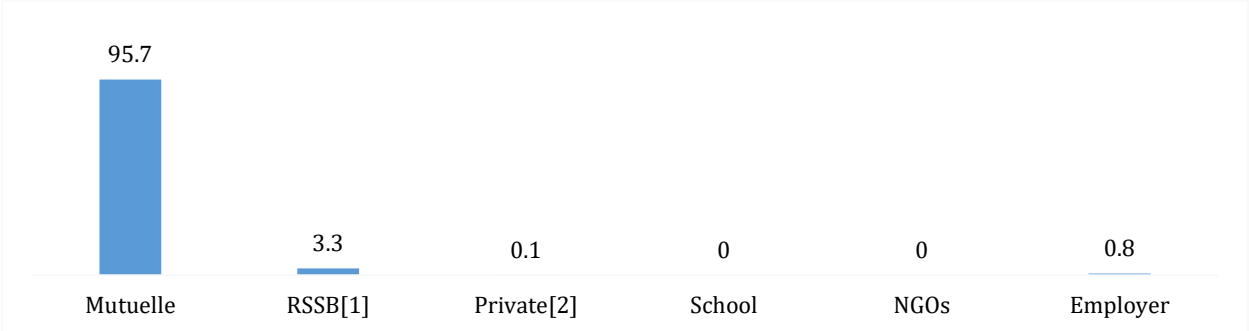

Figure 26: Population who have a medical insurance by main type of insurance in Ruhango District (%)

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

The results of 5RPHC 2022 reveal that in Ruhango District, 76.4% 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 Ruhango (88.2%), Byimana (86.7%), Bweramana (83.0%) and the lowest in Ntongwe (59.7%) and Kinihira (57.9%).

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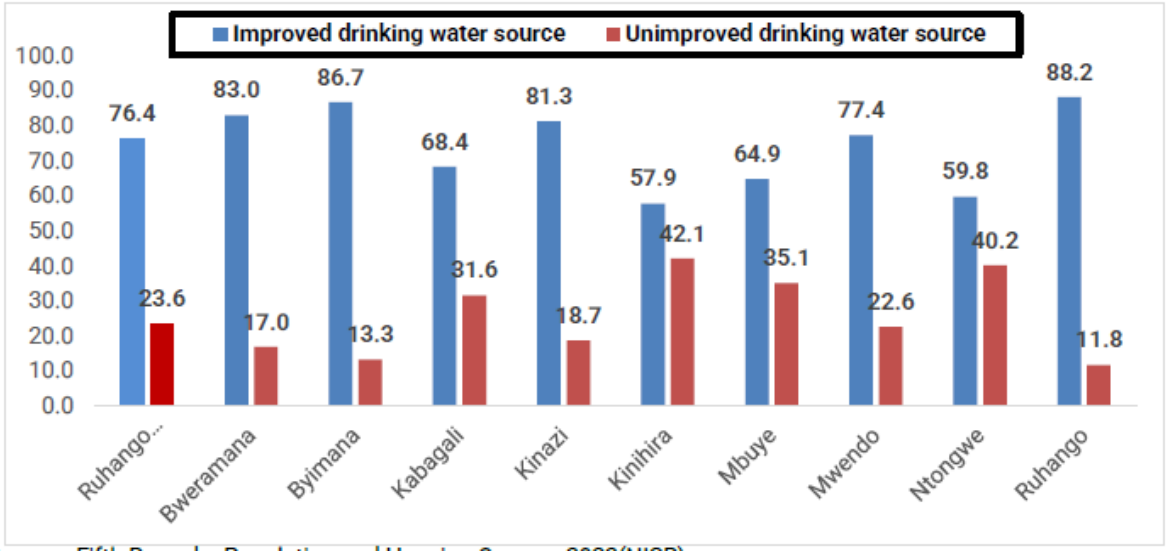

Figure 27: Percentage of households of Ruhango District by main source of drinking water
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

In Ruhango District, both urban and rural areas of Ruhango District (93.1% in urban and 73.4% in rural). The percentage of private households using unimproved drinking water source is higher in rural (25.7%) than in urban (6.9%).

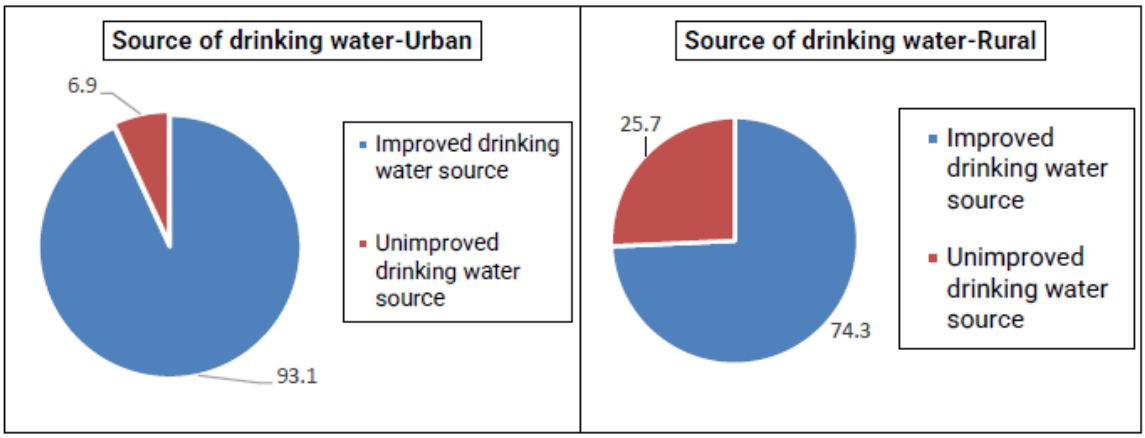

Figure 28: Households (%) of Ruhango District by main source of water and by area of residence
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

g) Appliance ad assets ownership

At the district level, 75.8% of private households possess one radio including one from phone, 55.9% a mobile phone, 7.3% a smartphone, 6.9% a TV and 1.5% a computer. By sectors, the percentage of private households possessing a radio is high in Byimana (81.7%), Ruhango (79.9%), Bweramana (77.4%) and Mwendo (76.3%). It is low in Ntongwe and Kabagali (71.5% each). The percentage of private households possessing a television is high in Ruhango (12.3%), Byimana (10.7%) and Ruhango (7.0%) while it is low in Kabagali (3.3%) and Mwendo (2.4%). Mobile phone is mostly possessed by private households of Ruhango Sector (63.0%) and Byimana while it is low in Kabagali (50.1%), Ntongwe (50.8%) and Mwendo (50.9%). The sectors with high percentage of households with smartphone are Ruhango (12.8%), Byimana (10.8%) and Bweramana (8.4%) while the percentage of households possessing this asset is low in Ntongwe (3.9%) and Mwendo (3.6%). The computer is slightly possessed in Ruhango (2.8%), Byimana (2.5%), Bweramana (1.8%) and Kinazi (1.0%).

Table 76: Percentage of private households and of Ruhango 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[10]	Smart Mobile	Computer
Rwanda	3,312,743	81.5	12.3	78.1	20.8	4.2
Southern Province	760,173	76.4	7.6	56.1	9.3	2.3
Ruhango District	94,508	75.8	6.9	55.9	7.3	1.5

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Sectors and area of residence	Total Number of Private Households	% of HHs owning the specified communication asserts				
		Radio	Television	Mobile phone[10]	Smart Mobile	Computer
Bweramana	8,444	77.4	7	57.4	8.5	1.8
Byimana	10,607	81.7	10.7	60.1	10.8	2.5
Kabagali	6,803	71.5	3.4	50.1	4.1	0.7
Kinazi	13,073	71	5.5	53.2	6	1
Kinihira	6,994	73.2	2.8	51.5	4.1	0.4
Mbuye	11,791	75	4.5	54.5	4	0.6
Mwendo	6,744	76.3	2.4	50.9	3.6	0.6
Ntongwe	9,588	71.5	4.4	50.8	3.9	0.7
Ruhango	20,464	79.9	12.3	63	12.8	2.9

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

h) Access to energy for lighting and cooking

In Ruhango District, the main source of energy for lighting used by households is electricity (58.6%). At the sector level, the higher percentages of households using electricity are found in Ruhango (67.7%), Byimana (65.7%) and Bweramana (61.6%). Sectors with lower percentage of households using electricity for lighting are Kinihira (47.1%) and Kinazi (52.2%). The sectors with the high percentages of private households using flashlight or phone flashlight for lighting are Kinihira (43.4%), Mwendo (39.5%) and Kinazi (39.0%). According to the area of residence, the main source of energy for lighting is electricity (80.3%) followed by flashlight or phone flashlight (14.6%) in urban areas. In rural areas, 55.9% of private households use electricity as main source of energy for lighting while 36.5% use flashlight or phone flashlight.

Table 77: Distribution of households of Ruhango 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
Rwanda	**3,312,743**	**100**	**61**	**0.4**	**0**	**3**	**4**	**1.1**	**28.4**	**0.1**	**1**	**0.5**	**0**
Southern Province	**760,173**	**100**	**55**	**0.3**	**0**	**2**	**5**	**1.6**	**34.6**	**0.2**	**1**	**0.6**	**0**
Ruhango District	**94,508**	**100**	**59**	**0.4**	**0**	**1**	**2**	**1.7**	**34**	**0.1**	**1**	**0.5**	**0**
Ruhango Urban	**10,576**	**100**	**80**	**0.5**	**0**	**2**	**1**	**0.2**	**14.6**	**0**	**1**	**0.3**	**-**
Ruhango Rural	**83,932**	**100**	**56**	**0.4**	**0**	**1**	**3**	**1.9**	**36.5**	**0.1**	**1**	**0.6**	**0**
Bweramana	8,444	100	62	0.5	0	2	2	0.6	31.8	0	1	0.3	-
Byimana	10,607	100	66	0.3	0	2	2	2	27	0.1	1	0.3	-
Kabagali	6,803	100	55	0.2	-	1	5	1.4	36	0	1	0.4	-
Kinazi	13,073	100	52	0.4	0	1	4	1.9	39	0.1	1	1	-
Kinihira	6,994	100	47	0.4	-	1	4	2.5	43.4	0.1	1	0.3	-
Mbuye	11,791	100	54	0.2	-	1	2	3	37.7	0.1	1	0.3	0
Mwendo	6,744	100	57	0.2	0	0	2	0.9	39.5	0.1	0	0.2	-
Ntongwe	9,588	100	55	0.2	-	1	2	2.5	38.8	0.1	1	1	-
Ruhango	20,464	100	68	0.7	0	1	2	0.8	25.3	0.1	2	0.6	-

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 (91.6%) followed by Charcoal (5.7%), No Cooking option (1.2%) and Gaz (0.6%). At the sector level, firewood is the most used source of cooking energy by private households in Ntongwe (96.9%), Mwendo (96.4%), and Mbuye (96.1%) followed by Kabagali (95.7%). The Sectors with the high percentage of private households using charcoal as main source of cooking energy are Ruhango (12.7%), Byimana (8.8%) and Bweramana (7.1%). Sectors with the highest percentages of private households using gas as main source of cooking energy are Ruhango (1.3%), Bweramana (0.9%) and Byimana (0.8%). By area of residence, the private households use mostly firewood (95.1%) and charcoal (2.7%) in rural areas. In urban areas, private households use most firewood (63.8%) and charcoal (29.4%), gas (2.7%). The percentage of private households that not cook is 2.2% in urban area and 1.1% in rural.

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Table 78: Distribution of the private households of Ruhango District by main source of energy for cooking

Sector and area of residence	Total number of private households	Percentage															
		Total	Firewood	Charcoal	Gas	Electricity	Kerosene/Parafin e	Biogas	Solar Power	Crop waste	Animal dung	Briquette	Peat	Sawdust	Other cooking fuel	No cooking option	Not Stated
Rwanda	3,312,743	100	76	17	5	0	0	0	0	1	0	0	0	0	0	1	0
Southern Province	760,173	100	89	8.8	1	0	0	0	0	0	0	0	0	0	0	1	0
Ruhango District	94,508	100	92	5.7	1	0	0	0	0	1	0	0	-	0	0	1	0
Ruhango Urban	10,576	100	64	29	4	0	0	0	0	0	-	-	-	0	0	2	-
Ruhango Rural	83,932	100	95	2.7	0	0	0	0	0	1	0	0	-	0	0	1	0
Bweramana	6,803	100	96	2.7	0	-	0	0	-	1	0	-	-	0		1	-
Byimana	13,073	100	95	2.8	1	0	-	0	0	1	0	0	-	0	0	1	-
Kabagali	6,994	100	96	2.2	0	-	0	0	0	0	-	-	-	0		1	-
Kinazi	11,791	100	96	2.1	0	-	0	0	0	1	0	-	-	0	0	1	0
Kinihira	6,744	100	96	2	0	-	-	-	0	1	-	0	-	0	0	1	-
Mbuye	9,588	100	97	1.4	0	-	0	-	0	1	-	0	-	0	0	1	-
Mwendo	20,464	100	82	13	1	0	0	0	0	2	0	0	-	0	0	2	-
Ntongwe	760,173	100	89	8.8	1	0	0	0	0	0	0	0	0	0	0	1	0
Bweramana	94,508	100	92	5.7	1	0	0	0	0	1	0	0	-	0	0	1	0

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

i) Vulnerability

In Ruhango district is 4.5%. At sector level, the highest prevalence rates of the resident population aged 5 years and above with Vulnerability are in Kinazi (5.8%) and Mwendo (4.9%) while the lowest is in Kinihira (3.5%).

Table 79: Persons with Vulnerability in Ruhango District by Sector of residence and sex

Sectors of residence	Total resident population	People with vulnerability			Prevalence of vulnerability 9%)
	Both sexes	Both sexes	Male	Female	Both sexes
Rwanda	11,537,934	391,775	174949	216826	3.4
Southern Province	2,628,449	98,337	43918	54419	3.7
Ruhango district	315,521	14,355	6040	8315	4.5
Bweramana	27,600	1,132	497	635	4.1
Byimana	35,327	1,296	539	757	3.7
Kabagali	22,699	1,065	454	611	4.7
Kinazi	44,433	2,568	1030	1538	5.8
Kinihira	22,939	812	389	423	3.5
Mbuye	40,168	1,827	734	1093	4.5
Mwendo	22,804	1,110	473	637	4.9
Ntongwe	33,227	1,434	607	827	4.3
Ruhango	66,324	3,111	1317	1794	4.7

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

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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.

5.2. 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. This will help to build and maintain productive working relationships, based on principles of transparency, accountability, accuracy, trust, respect and mutual interests with affected communities and other stakeholders.
- To ensure effective engagement with local communities and other key stakeholders throughout all phases of the project.

5.3. 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:

Table 80: Category of Consulted People

Category	Institution/desired person	Issue to discuss
EDCL	Environmental Specialist, Social safeguards specialist, Project Engineer and project manager	Environmental requirements, framework documents prepared for the project, project design and planned activities, available information's and project specifications,
Regulatory and standards authorities	Rwanda Environment Management Authority (REMA)	Environmental and social requirements, monitoring of environmental and social management plans, environmental and social safeguards reporting etc
	Ministry of infrastructure	Right of way for electrification, compensation process, existing standards and policies for rural electrifications,
	Ministry of Environment	Environment and water quality requirements, land acquisition and land tenure process in Rwanda
	Rwanda Land use and Management	Land ownership and Resettlement process,

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Category	Institution/desired person	Issue to discuss
	Authority	
	Rwanda Development Board	Information on the proposed project including scope, coverage, activities and potential environmental and Social impacts, EIA process including review and approval
Districts	District REG representative	Electricity shortage, electricity absents in their represented area
	District environmental officers and Districts land administration and management officers	Information on the proposed project including scope, coverage, activities and potential environmental and Social impacts; Roles and responsibilities of districts in environmental and social risks assessment and management, land acquisition process, Grievance redress process at community level
Community	Sampled community members People living where the project will be implemented.	Information on the proposed project including scope, coverage, activities and potential environmental and Social impacts; Project appreciation, project proposed mitigation measures, project sustainability, etc.

5.4. Consultations held during ESIA preparation for Southern province

5.4.1. 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[3].

The list of consulted people is presented in annexes.

5.4.2. 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. In the entire province a total number of 288 people were contacted and among them 166 being male (58%) and 122 being female (42%). The list of consulted people is presented in Annexes. 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.

[3] Health and Safety Plan was developed and is provided as annex 14 of this report and can serve as a modal for the contractor.

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Figure 29: Consultations with local community.
Source: Field Consultation

The key findings of the consultations with relevant stakeholders are summarized below:

Table 81: Summary of discussions with stakeholders

discussions/ information	Outcomes
Project line routes and alternative options	The project designs were made to pass all along the buffer zones of existing feeder roads in project areas. Where not possible the MV lines will be passing in agricultural land and the best options to avoid damage and selecting the shortcut will be applied. The implementation of the project has been done in a way that will respect both national and international standards and regulations especially those related to electrical line constructions.
Will be there any land compensation?	The project will pass nearby the existing roads. For the upgrading the existing line routes will be used. Hence no compensation for land is expected. However, affected crops will be compensated. An agreement of overhead land use between EDCL and landowners shall be made before project starts and a fair compensation of crops and other affected assets will be done. However, this a commonly and practical method that is used countrywide whereby MV and LV lines are passing. Land owners continue exploiting their land without compromising the normal operation of the electrical lines.
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.
Job opportunities.	Project developer/ implementer will ensure that local population are prioritized when allocating jobs that don't require specific knowledge minimum wages as per the project implementation areas. Hover this is not guaranteeing that all local population will be employed by the project during construction works.
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.
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.
Project activities and machinery	Considering the nature of the project activities and location, no heavy tracks and machinery are expected. However, trucks will be used for transport of construction materials and personnel. The use of labour-intensive techniques will be prioritized and is recommended as are more environmentally friendly compared to the use of machinery.
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.
Are locals allowed to	People are allowed to continue using their land till they are informed by competent authorities about any

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discussions/ information	Outcomes
continue cultivating their land?	new change.
Will all people be connected to the grid	Anyone wishing to be connected will have opportunity to have electricity.
General 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.
Restriction in the Right of Way and under power lines	Community members will continue to use the Right of way but will be restricted to plant high trees with over 3meters

In general, most of the people in living in the project targeted areas were very happy to hear about the project as this will contribute to the development of their living standards. Most of them were not connected to the national grid and have been living around neighbours who are connected for long. The positive impacts of the project outweigh the negative impacts and wished the project to be implemented as soon as possible.

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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. The proposed line routes and ROWs are selected among the various options, based on the objective 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 passing over houses,
- the minimization of the destruction of property,
- easy accesses to construction and operation sites,
- low pollution level and
- 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 82: Description of identified alternatives.

No	Name of Alternative	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 for the line route, 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 viable alternatives to consider for the project are. The analysis of alternatives is detailed in table below:

Table 83: Analysis of alternatives

No	Name of Alternative	Analysis
1	Preferred Option: Overhead Power Lines	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 environmental impacts, as well as those resulting from maintaining the RoW where necessary.
2	No-Go Option	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	Underground	In some urban areas, distribution and service lines are typically placed underground, for safety and

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No	Name of Alternative	Analysis
	Power Lines	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 costlier 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	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.
5	Construction Methods and Techniques	The construction methods and techniques proposed in Alternative 1 involve hand work and have insignificant environmental and social 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.

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7. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

7.1. Introduction

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 AIIB policies and Standards and policies. The potential significant environmental and social impacts of the electrification project are presented and their level of significance evaluated.

7.2. 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

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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.

7.3. 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 competed. 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

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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 prepared 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 prepared 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

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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

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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 PCRs 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. Maintainace 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 12 of this report to serve as guiing 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 12.
- The Contractor will be required to stop works and contact local Autority 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.

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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

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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 no 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

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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, no 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

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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. NOx, SOx 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

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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 is 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 refiling 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 involvedin 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

7.4. 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

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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.

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✓ **Mitigation measures**

- A robust fire prevention program and fire suppression system should be developed by the contactor 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.

j) 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.

7.5. 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

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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

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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 enhance 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 Southern 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 and wining contractor will be made in a form of contractual framework, this will enable the owner to transfer the complete risk f 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 Next table present an Environmental Management Plan for the entire EPC while Districts Environmental Management and Environmental and Monitoring Plan Plans are presented in Annexes 1-8 of this report.

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Table 84: Environmental and Social Management Plan (ESMP)

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	76,800[4] 38,000[5]
Survey of ROW for medium and law 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	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	320,000[6]
	PAPs complaints about their assets affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	40,000
	Disruption of agricultural activities and land use restriction under RoW	- 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget
Clearing all vegetation, felling	Loss of vegetation cover in in the right of way and poles foundations.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor,	To be included in EPC contract's

[4] One EPC contractor for two district was consider with two staff (800US$ man month for 12 months' implementation period

[5] Four staff by province are proposed for 12months period and 800US$ man Month

[6] estimated based on other projects to be updated and included in RAPs for each district

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
trees in 6m width of Right of Way		- 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 avoided and 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.		Districts	Budget
	Loss of flora and fauna species	- 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. - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	40,000

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	24,000
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	24,000
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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;	Ongoing	EPC contractor, Supervising engineer, REG-EDCL	40,000(five thousands per

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.			district)
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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 - Each site/CESMP will have a traffic management plan that will be displayed across the site and communicated to the local community and local authorities regularly.	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 16,000 (2,000 per district)
	Loss of on Physical and Cultural Resources	- 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;	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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 contractors, following the discovery of possible PCR, the Contractor will be required to follow a "chance finds procedure; - 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 with adequate secondary 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Increased risks of soil erosion	- 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.	Ongoing	EPC contractor, Supervising	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
				engineer	
	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - a waste management plan	Ongoing	EPC contractor, Supervising engineer	Constriction budget 32,000
	Noise and Vibration pollution	- 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. -	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Human waste disposal issues	- 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	Ongoing	EPC contractor, Supervising engineer	16,000
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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 risk of electrocution	- 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. - Apply established precautions to prevent electrocution. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal	Theft of equipment and Vandalism of power distribution	- 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,	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
equipment and Power Distribution through the proposed line	infrastructure	- staging areas, and during materials transportation; - The security firms will be screened and references sought			
	Health and safety issues due to Electric and magnetic field	- 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; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP)	Ongoing	REG-EDCL, District	Operational Budget
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	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 - Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision	Ongoing	REG-EDCL, District	Operational Budget
Decommissioning Phase					
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. - 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).	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. - 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. - 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; - 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	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Total budget				**610,000**

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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 allmitigation measures are implemented. The contractors shall employ an environmental and social risks management officers 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 around project work sites
- Works 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:
- Visual observations;
- Selection of environmental parameters at specific locations;
- Sampling and regular testing of selected parameters.

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 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 it 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:

- ✓ **Soil Erosion Monitoring**

The excavation of earth for the establishment of poles, will be the responsibility of the Contractor to ensure the implementationand 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.

- ✓ **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.

- ✓ **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".

- ✓ **Monitoring of accidents and incidents**

The contractor will make sure that appropriate signs are posted at appropriate locations/positions to

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minimize/eliminate risk of work incident and accident. In addition, the contractor should make sure that:

- Measures to create awareness regarding sexually transmitted diseases, primarily HIV AIDS, and other contaminating diseases are taken;
- Preventive measures to avoid work accidents are in place and followed appropriately
- All site workers are insured with mutuelle de sante as means of health affordability.
- Maintain safety records and report incidents in accordance with ESCP.

All districts of the project area of intervention 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 thetransmission and distribution line

✓ **Monitoring of waste management**

The Contractor and supervising engineer 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, as well as construction camps. 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 85: ***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
Soils & stones contaminated With dangerous substances such as fuel, engine oil and lubricants	Yes	Temporarily disposed them to designated area then or evacuated to the identified local disposal site.	Weekly

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Waste	*Hazardous waste*	*Destination*	*Frequency of evacuation*
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 area 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
Campsite (office solid waste)	NO	Temporarily disposed them to designated area then or evacuated to the identified local disposal site.	Weekly
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
Empty drums and containers of bitumen and lubricants	Yes	Temporarily disposed them to designated area then r evacuated to the identified local disposal site.	Weekly
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. 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 summarises other item to be monitored as part of the implementation of the overall Environmental and Social Monitoring

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Table 86: Environmental and Social Monitoring Plan to be applied in each district of the province

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
Securing the RoW	Fair compensation for affected crops, trees and that will be affected by the project.	Reports for competion of affected crops, 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	Regular	Districts local authorities/ PAPs	5,000 (for Estimated 50 complaints in each district)
Accidents and incidents	Number of accidents and incidents	Incidents and accidents regisrer	When deemed necessary	EDCL /Districts local traffic police, Supervising consultant	no cost required for recording
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 and awareness report 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 in each district
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
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

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
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 foe each staff in each district
HIV/ AIDS and other Communicable deases 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	to be covered under project construction budget
Operation and maintenance					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging Damaged poles and cables	Regular	EDCL/ Districts 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
Total Monitoring Budget					**92,000**

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 lines constructions in different districts of the Southern Province. District of the areas of intervention will designate a staff in charge of Environmental and Social risks management officers 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 all monitoring provisions, etc. The project contractor will also have an Environmental Health and Safety officer to oversee the implementation of project during construction.

The main duties of the designated Environmental and social risk management 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 Risks Management Specialists 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. Role 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. Contractor's Role

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. Role 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 Management Specialists shall work closely with EDCL Environmental and Social Risks Management Team in supervising the contractor. In addition, the contractors will conduct scheduled site supervisions to monitor state of environmental compliance as documented or

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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 and to review contractors' plans: CESMP, OHP, Waste Management, Traffic Management, etc.

8.3.6. Role 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 stakeholdersinvolved in electrical energy transmission and distribution and in general develop policies and guidelines and laws related to energy generation and distribution.

8.3.7. Role 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. REMA's Role

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.

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8.3.9. Role 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 assets inventory of affected assets etc.

8.3.10. 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. 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)

8.4.1. Community grievance redress mechanism

The implementation the present project will involve limited land acquisition, recruitment of workers and will affect some assets privately owned by local people such as trees and crops. 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.

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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.

a) Objectives of GRM

The main objectives of establishment of GRM within the project implementation are:

- **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.
- **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.
- **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.
- **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.
- **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.

b) community level grievance redress mechanism structure

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 can not 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)

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- 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 87: Proposed Members of GRC and their roles under project.

No	Member of GRC	Roles and responsibilities
1	PAPs representative	- Chairing meetings; - Give direction on how received grievances will be processed; - Assign organizational responsibility for proposing a response; - Referring cases to next level; - Speaks on behalf of GRC and s/he is the one to report to the cell or the sector administration level; - Represents the interests of aggrieved parties; - Give feedback on the efficiency of GRM.
2	Local administration representative	- Proposes responses to grievances and lead in resolving community grievance - Records and reports all grievances received from village leaders; - Chairs sensitization meeting at the cell level during public consultations meetings; - Assists and guides in identifying vulnerable and disadvantaged groups within the cell; - Signs the valuations sheets for compensation facilitate a proper Resettlement Plan.
3	Women and youth representatives	- Represent the interests of women and youth; - Advocate for equity and equal opportunities; - Help in prevention of sexual harassment and promote wellbeing of the women and youth - Take part in resolution of any grievance related to sexual harassment and any gender domestic violence that may arise; - Mobilize women and youth to be active in income generating activities specifically for opportunities in the project's areas of intervention.
4	Contractor representative	- Receive and log complaints/grievances, note date and time, contact details, nature of complaint and inform complainant of when to expect response; - Handle complaints revolved around nuisance resulted from construction and endeavour to handle them satisfactory; - Inform engineer (supervisor) and GRC of received complaints/grievances and outcomes and forward unresolved complaints/grievance to GRC; - Attend community meetings, respond and react to PAPs complaints raised concerning the contractor.
5	Supervising firm representative	- Represent client (REG-EDCL); - Ensure that all grievances raised have been responded to, and that the contractor responds to the complaints raised concerning them; - Attend community meetings and respond to all concerns related to project from community; - Report on monthly basis the progress of GRM process.

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:

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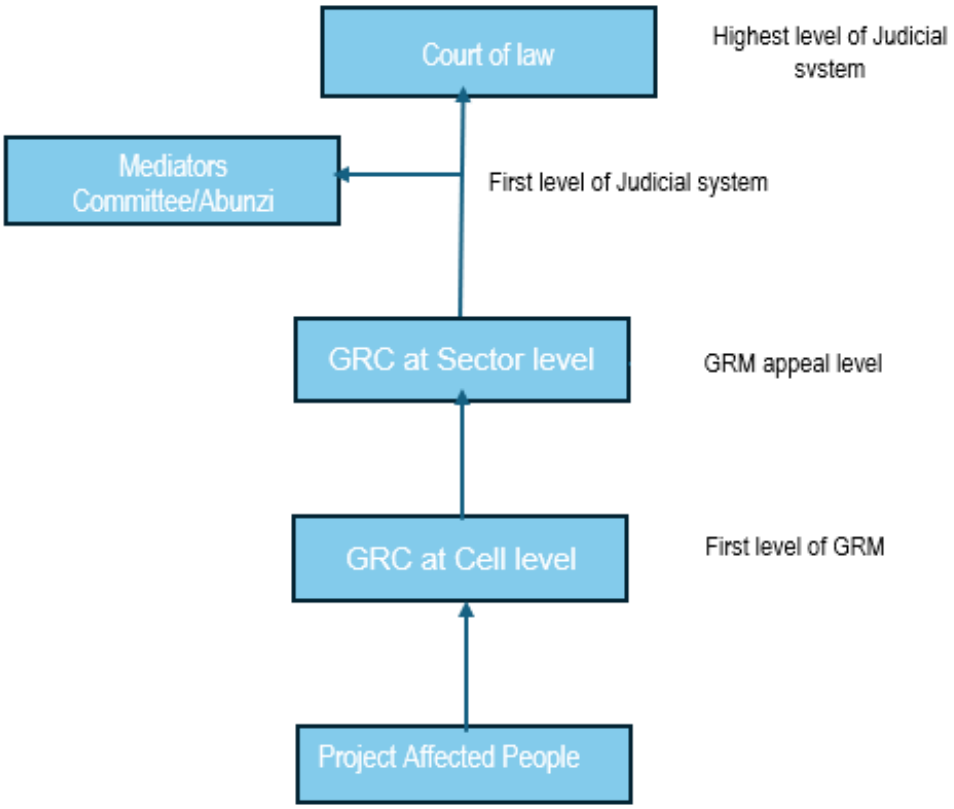

Figure 30: Proposed community GRM flow chart

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. 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 level/cell level

This committee will plan for, coordinate and monitor compensation activities, as well as supervise compensation payments to the recipient PAPs. It is recommended to have site GR committee that would comprise of the following:

- Representative from Sectors
- Representative of the cells that are affected
- Representative from the District Development Committee;
- Representative from any other key sector office involved in the resettlement process;
- Two representatives of PAP by cells (equal gender representation).

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 persons among others (if any)

This committee should meet on a regular basis (as determined by the needs of the project) to ensure the smooth implementation of the project and that project activities are appropriately designed and executed. It is recommended that a representative be elected to act as the District Project Coordination officer who would act as the key contact with

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PAPs and therefore facilitate implementation of consultation, public participation and grievance mechanisms.

c) Sector Grievance redress committee

Each district of the project area of intervention will work closely with REG-EDCL in the establishment of Grievance redress committee in the affected sectors. The grievance redress committee will include

- Sector electrical Engineer,
- Land Bureau officer,
- Social Safeguards specialist;
- Executive secretaries of affected sectors;
- PAPs representatives.

Its initial role will be to undertake screening and assessment of potential subprojects. The committee will be also responsible to address any grievances which is not satisfactorily addressed by site committee. The team will be supported by the project Social Safeguards team based at project headquarters.

At these levels, the overall process of grievance is as follows:

- During the initial stages, the valuation process, the affected persons will be given copies of grievance procedures as a guide on how to handle the grievances.
- The process of grievance redress will start with registration of the grievances to be addressed for reference, and to enable progress updates of the cases.
- The project will use a local mechanism, which includes resettlement committees, peers and local leaders of the affected people. These will ensure equity across cases, eliminate nuisance claims and satisfy legitimate claimants at low cost.
- The response time will depend on the issue to be addressed but it should be addressed with efficiency.
- Compensation will be paid to individual PAPs only after a written consent of the PAPs, including both husband and wife.

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 relates to valuation of assets, a second or even a third valuation will be undertaken, until it is accepted by both parties. These should be undertaken by separate independent valuers than the person who carried out the initial valuation.

a. District and project management

If the aggrieved person does not receive a response or is not satisfied with the outcome within the agreed time, s/he may lodge his/her grievance to the relevant district administration such as the district one stop Center, also mandated to help resolve such matters. If requested, or deemed necessary by the subproject Committee, the District Project Coordination officer will assist the aggrieved person in this matter.

The relevant Local Administration will then attempt to resolve the problem (through dialogue and negotiation) within 30 days of the complaint being lodged. If no agreement is reached at this stage, then the complaint is dealt with through the local courts (Abunzi) where possible.

b. 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 asses 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 88: 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	As soon as possible but not exceeding four days after receiving the complaint

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Stage	Process	Duration
	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	
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

8.4.2. Workers GRM

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

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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 though 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 though the Occupational Health and Safety committee as required by Article 78 of the labour law.

Grievance process for non-labour related issued 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 though 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 though 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 though 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.

8.4.3. 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

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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 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-Cantered 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.

8.4.4. 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.
The overview of grivence management system

Figure 31: The overview of grivence management system

8.5. Environmental and social safeguards training and capacity building

8.5.1. Environmntal 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

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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 89: ESHS 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

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Training course	Unskilled labour	Skilled labour	Supervisors	Drivers	Safety men	Timeframe	Responsible
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 90: Community outreach and training

Training	Targeted group	Estimated budget ($)
Conflict resolution and Grievances management	Grievances redress committees Water users' association	42,000
HIV/AIDS, Sexual Exploitation; Gender Based Violence, water borne diseases	Local community in three projects	40,000
Total		**82,000**

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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 ESIA 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 irrigation 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. Various social issues raised during stakeholder engagement, can be better managed, as detailed in ESMP. The specific negative social impacts related to vulnerable groups, like women and children, requires specific attention and exceptional implementation and management.

It is critical to realize that the project must be implemented within the suggested ESMP guidelines, to avoid negative impacts related to gender inequality, gender-based violence, and the abuse of children as well as planning around old trees and other significant environmental and social sites features. 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 unless worse option. However, land easement will be required at the pole's locations. Furthermore, income loss is expected during project works with loss of fruit 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

In addition to the mitigation measures proposed in the ESMP, in the Occupational health and Safety plan, following recommendations should 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-ESMP, 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.
- ✓ The proposed teams for both contractor and supervising engineer should included 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 and trees 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.

- ✓ Occupational health and safety performance should be evaluated against national and /or international standards.
- ✓ The working environment should be monitored for occupational hazards relevant to this project.
- ✓ 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.
- ✓ EDCL is recommended to take into consideration issues and concerns raised during public consultation especially issues related to compensation and jobs opportunity.
- ✓ All workers shall have valid medical insurance "mutuelle de santé" as means of health affordability
- ✓ Before the implementation of the project starts, EDCL shall secure in full the locations of poles and project facilities such as transformer locations, materials storages sites etc. and this to be accomplished via fair compensation and land easement via negotiations with land owners.
- ✓ 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 ESMMP.

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) 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 reference for ESIA of EPC South

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 WESTERN PROVINCE-EPCS SOUTH

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 southern Province- EPCs South.

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 southern Province- EPCs South, will be implemented across all seven District in Southern Province namely Kamonyi, Muhanga, Ruhango, Nyanza, Huye, Gisagara, Nyamagabe and Nyaruguru. The project objective is to 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.

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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 Western 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.

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

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(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

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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.

4. 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 ESIAs 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.	Environmentalist (Team Leader)	- 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. - To have conducted at least 3 EIAs, proven by service completion certificates and copy of RDB EIA certificates of approval. - Must be registered in RAPEP as Lead Expert or Associate Expert, proven by a valid RAPEP certificate. - 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.
2.	Social Scientist	- 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. - To have participated in preparation of at least 3 ESIAs, proven by service completion certificates. - 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 1completion certificates.
3.	Electrical Engineer	- 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. - 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.
4.	Civil Engineer	- 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.

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		- Must be registered at the national institution of engineers or other recognized foreign institutions (proven by membership certificates)
5.	Health and Safety expert	- 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. - To have worked on at least 2 international donor funded infrastructure projects such as the World Bank, African Development Bank, European Investment Bank
6.	Surveyor	- 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. - Must be a member of national association of surveyors.

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Annex 2:Environmental and Social Management Plan and Monitoring Plan for Kamonyi District

a) Environmental and Social Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	Under the cost of EPC's contract[7]
Survey of ROW for medium and law voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way	Loss of crops and trees and crops along the Right of Way and Poles foundations	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	8,650[8]
	PAPs complaints about their crops and tress affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	8,000
	Disruption of agricultural activities and land use restriction under RoW	- 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; - Notify local community on works schedule for not planting in areas to be affected but also to harvest mature crops,	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget

[7] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[8] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.			
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.	- Ensure the RoW is restricted as much as possible to the road reserve. - Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected. - The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible; - 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 - 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 avoided and 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.	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - Conduct a preclearance survey by qualified environmental specialist to ensure flora and fauna of conservation concern are protected. - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it;	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District	9,000

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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		labour inspector/	
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	6,000
	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; - 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	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; - 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- The entire project should be insured; - The contractor will establish health and safety measures in an OHS Management Plan 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.	Ongoing	EPC contractor, Supervising engineer, REG-EDCL	5,000
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 2,000
	Loss of on Physical and Cultural Resources	- 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.	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - The Contractor will be required to stop works and contact local Autority 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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.	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - Efforts should be made to contain earth movement activities to dry seasons to avoid erosion. - 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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 8,000
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Human waste disposal issues	- 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	Ongoing	EPC contractor, Supervising engineer	7,000
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- Control, before starting work, the efficiency of tools, equipment, lifting slings, equipment, - PPE use and safety equipment; - Apply industry standard precautions to prevent electrocutions - 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and	Theft of equipment and Vandalism of power distribution	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Power Distribution through the proposed line	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			
	Health and safety issues due to Electric and magnetic field	- 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; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP	Ongoing	REG-EDCL, District	Operational Budget
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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 - 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 - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans			
- Decommissioning Phase					
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. - 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).	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal - 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. - Oil spill kits to be provided for during repair and maintenance of transformers	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Ambient air pollution	- 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.	Once	REG-EDCL, EPC contractor	Decommissioning budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Total budget				**61,650**

b) Environmntal and Social Monitoring Plan

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
Securing the RoW	Fair compensation for affected crops, trees	Reports for affected crops, trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	8,190
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	Workerslogbok by sex and by area of orgin	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	Contarctor / supervisor	budgeted for under ESMP
	Number of the traffic accidents	Report on traffic accidents	Monthly	Contarctor / supervisor	No cost required for recpording
	Flagemen at the construction site	Presence of Flagmen and traffic signals at the site	When necessary	Contarctor / supervisor	Under construction budget
Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	Number of compliants 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	Permanenet	Contractor/ supervisor	budgeted for under ESMP
Noise and vibrations	Noise and vibrations	Noise level (in dB) and vibrations levels by WB General EHSG	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

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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 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 foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**14,780**

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Annex 3:Environmental and Social Management Plan and Environmntal and Social Monitoring Plan for Huye District

a) Environmental and Social Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	Under the cost of EPC's contract[9]
Survey of ROW for medium and law voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way	Loss of crops, trees along the Right of Way and Poles foundations	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	12,700[10]
	PAPs complaints about their crops and trees affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	11,700
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget

[9] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[10] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	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.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs 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 avoided and 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.	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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;	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	13,200

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	8,800
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	11,700
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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;	Ongoing	EPC contractor, Supervising engineer,	7,300

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.		REG-EDCL	
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 2,900
	Loss of on Physical and Cultural Resources	- 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;	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - The Contractor will be required to stop works and contact local Autority 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Increased risks of	- During project works, contractor shall only clear areas earmarked for construction;	Ongoing	EPC	Constriction

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	soil erosion	- Efforts should be made to contain earth movement activities to dry seasons to avoid erosion. - The excavated soil shall be re-used in backfilling.		contractor, Supervising engineer	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 11,700
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Human waste disposal issues	- 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	Ongoing	EPC contractor,	10,300

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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		Supervising engineer	
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
	Workers safety	- Provide adequate PPEs to all maintenance technicians and operator - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans	Regulary	REG-EDCL	Operational budget
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution	Theft of equipment and Vandalism of power distribution	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
through the proposed line	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			
	Health and safety issues due to Electric and magnetic field	- 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; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP	Ongoing	REG-EDCL, District	Operational Budget
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables	- Sensitization of local communities on the project ownership and protection;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	and other structures	- 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			
	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 - Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision	Ongoing	REG-EDCL, District	Operational Budget
Decommissioning Phase					
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. - 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).	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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.	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Ambient air pollution	- 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.	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Total budget				**90,300**

b) Environmental and Social Monitoring Plan

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
Securing of the RoW	Fair compensation for affected crops, trees	Reports for affected crops, trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	12,060
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

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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 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/ Districts	40 USD to cater for overall PPE foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**18,650**

Annex 4: Environmental and Social Management Plan and Environmntal and Social Monitoring Plan for Nyamagabe District

a) Environmental and Social Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	Under the cost of EPC's contract[11]
Survey of ROW for medium and law voltage lines routes and Clearing all vegetation, felling trees in 6m width of Right of Way	Loss of crops, asstes and trees along the Right of Way and Poles foundations	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	60,450[12]
	PAPs complaints about their crops and tress affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	55,900
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget
Clearing all vegetation, felling trees in	Loss of vegetation cover in in the right of way and poles	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs and species of conservation concern and commercial value where possible;	During site clearance	REG-EDCL/ /District REG-EDCL/	To be included in EPC

[11] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[12] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
6m width of Right of Way	foundations.	- 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 avoided and 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.		Contractor, Districts	contract's Budget
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - Conduct preclearance survey by a qualified environmentalist - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	62,900

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	41,900
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	55,900
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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;	Ongoing	EPC contractor, Supervising engineer, REG-EDCL	34,900

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.			
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 13,900
	Loss of on Physical and Cultural Resources	- 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;	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - The Contractor will be required to stop works and contact local Autority 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Increased risks of soil erosion	- 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.	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 55,900
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Human waste disposal issues	- 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.	Ongoing	EPC contractor, Supervising engineer	48,900

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Ensure that separate toilets are availed for both men and women and they should be well labelled			
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution through the proposed line	Theft of equipment and Vandalism of power distribution infrastructure	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Health and safety issues due to Electric and magnetic field	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Liaise with local authorities to ensure developments are not approved or occur within the right of way; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP			
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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 disposal - 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. - Oil spill kits to be provided for during repair and maintenance of transformers	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Disruption of electrical supply due to encroachment of the RoW and plantation of high	- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines - Visibility enhancement objects such as marker balls, bird deterrents or diverters shall be installed to avoid avian collision	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	trees under electrical lines				
	Workers safety	- Provide adequate PPEs to all maintenance technicians and operator - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans	Regulary	REG-EDCL	Operational budget
Decommissioning Phase					
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. - 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).	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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. - 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; - 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	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Total budget				**430,650**

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b) **Environmental and Social Monitoring Plan to be applied in Nyamagabe district**

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
Securing of the RoW	Fair compensation for affected crops, trees	Reports for affected crops and trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	7,240
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 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

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	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 foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**13,830**

Annex 5:Environmental and Social Management Plan and Environmental and Social management Plan for Nyaruguru District

a) Environmental Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising	Under the cost of EPC's contract[13]

[13] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
				firm	
Survey of ROW for medium and law 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	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	9,500[14]
	PAPs complaints about their crops and tress affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	8,700
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	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.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs 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;	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget

[14] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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 avoided and 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.			
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	9,800
	Risk of Gender Based Violence (GBV) and	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work;	Ongoing	REG/EDCL, Supervising	6,500

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Sexual Exploitation and Abuse (SEA),	- The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers		Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	8,700
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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.	Ongoing	EPC contractor, Supervising engineer, REG-EDCL	5,400

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 2,100
	Loss of on Physical and Cultural Resources	- 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; - The Contractor will be required to stop works and contact local Autority 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.	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Increased risks of soil erosion	- 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.	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 8,700
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Human waste disposal issues	- 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.	Ongoing	EPC contractor, Supervising engineer	7,600

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution through the proposed line	Theft of equipment and Vandalism of power distribution infrastructure	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Health and safety issues due to Electric and magnetic field	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Liaise with local authorities to ensure developments are not approved or occur within the right of way; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP			
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	-A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget
	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 - 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	Regulary	REG-EDCL	Operational

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans			budget
Decommissioning Phase					
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. - 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).	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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. - 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; - 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	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Total budget				**67,000**

b) Environmental and Social Monitoring Plan to be applied in Nyaruguru district

Environmental	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)

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items					
Planning and construction Phase					
Securing of the RoW	Fair compensation for affected crops, trees	Reports for affected crops and , trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	9,000
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 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

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	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	40 USD to cater for overall PPE foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**15,590**

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Annex 6:Environmental and Social Management Plan and Environmntal and Social Monitoring Plan for Gisagara District

a) **Environmental and Social Management Plan**

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	Under the cost of EPC's contract[15]
Survey of ROW for medium and law 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	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	12,700[16]
	PAPs complaints about their crops and trees affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	11,700
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget

[15] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[16] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	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.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs 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 avoided and 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.	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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;	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	13,200

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	8,800
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	11,700
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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;	Ongoing	EPC contractor, Supervising engineer,	7,300

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.		REG-EDCL	
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 2,900
	Loss of on Physical and Cultural Resources	- 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;	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - The Contractor will be required to stop works and contact local Autority 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Increased risks of soil erosion	- 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.	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 11,700
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Human waste disposal issues	- 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	Ongoing	EPC contractor, Supervising engineer	10,300
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution through the proposed line	Theft of equipment and Vandalism of power distribution infrastructure	- 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	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Health and safety issues due to Electric and magnetic field	- 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; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP	Ongoing	REG-EDCL, District	Operational Budget
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Disruption of electrical supply due to encroachment of the	- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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 - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans	Regulary	REG-EDCL	Operational budget
Decommissioning Phase					
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. - 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).	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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. - 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; - 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	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Total budget				**90,300**

b) **Environmental and Social Monitoring Plan to be applied in Gisagara district**

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
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 A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	12,060
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

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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 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 foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**18,650**

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Annex 7: Environmental and Social Management Plan and Environmental and Social Management Plan for Ruhango District

a) Environmental and Social Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk management	Lack of qualified environmental and social risks experts and E&S instruments for contractor and supervising engineer	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district; - 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.	Ongoing	EPC contractor Supervising engineer Contractor &supervising firm	Under the cost of EPC's contract[17]
Survey of ROW for medium and law 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	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	19,000[18]
	PAPs complaints about their crops and trees affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	17,500
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	RAP budget

[17] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[18] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	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.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs 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 avoided and 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.	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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;	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	19,700

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Risk of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA),	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	13,100
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	17,500
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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;	Ongoing	EPC contractor, Supervising engineer,	10,900

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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.		REG-EDCL	
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 4,300
	Loss of on Physical and Cultural Resources	- 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;	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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; - The Contractor will be required to stop works and contact local Autority 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.			
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Increased risks of soil erosion	- 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.	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 17,500
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Human waste disposal issues	- 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	Ongoing	EPC contractor, Supervising engineer	15,300
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution through the proposed line	Theft of equipment and Vandalism of power distribution infrastructure	- 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	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Health and safety issues due to Electric and magnetic field	- 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; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP	Ongoing	REG-EDCL, District	Operational Budget
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Disruption of electrical supply due to encroachment of the	- Restrict clearance for the trees growing under the transmission line or branches overhanging the lines	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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 - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained - Establish and communicate regular maintenance plans	Regulary	REG-EDCL	Operational budget
Decommissioning Phase					
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. - 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).	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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. - 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; - 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	- Once	- REG-EDCL, EPC contractor	- Decommissioning budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Total budget				**134,800**

b) Environmental and Social Monitoring Plan to be applied in Ruhango district

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					
Securing of the RoW	Fair compensation for affected crops and trees	Reports for affected crops, trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	18,000
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

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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 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	Districts/ 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 foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**24,590**

Annex 8:Environmental and Social Management Plan and Environmental and Social Monitoring Plan for Muhanga District

a) Environmental and Social Management Plan

Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
Design and Construction Phase					
Environmental and Social risk managemen	Lack of qualified environmental and social risks experts and E&S	- Recruit and maintain a qualified environmental Expert, a social expert at contractor level; - Recruit and maintain a qualified environmental and social Expert for the supervising engineer for each district;	Ongoing	EPC contractor Supervising engineer	Under the cost of EPC's

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
t	instruments for contractor and supervising engineer	- 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.		Contractor &supervising firm	contract[19]
Survey of ROW for medium and law 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	- 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. - 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	Before site works	REG-EDCL/EPC Contractor and District, Districts	36,600[20]
	PAPs complaints about their crops and trees affected by survey team	- Establishment and operationalization of community Grievance Redress Mechanism	Ongoing	REG-EDCL/EPC Contractor and District, Districts	33,900
	Disruption of agricultural activities and land use restriction under RoW	- 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; - 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.	Ongoing	REG-EDCL/EPC Contractor and District, Districts	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.	- Ensure the RoW is restricted as much as possible to the road reserve. - The power line RoW to be routed to avoid CFRs 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;	During site clearance	REG-EDCL/ /District REG-EDCL/ Contractor, Districts	To be included in EPC contract's Budget

[19] One EPC Contractor for two districts was considered. The cost of implementation of environmental and social risk management is to be implemented under EPC nao not by district

[20] Estimates are done based on similar projects in Southern Province and the length of the MV line to be constructed by district and they will be updated and included in RAP after final designs are approved (estimates are made at 950 USD per 1km of MV in Southern Province)

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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 avoided and 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.			
	Loss of flora and fauna species	- The sites clearance should be only done on an area demarcated for project activities; - To minimize the environmental impact, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. - 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 no 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.	During design and Site clearance	EPC contractor	Mobilisation and Operational Budget
Recruitment and employment	Labor influx/ Labour issues and employee conduct	- Establish and operationalise Workers Grievance Redress Mechanism at all construction sites - Development and implementation of a Labor Management Plan - Maximum effort shall be made to recruit locals who return to their home after work; - The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, District labour inspector/	38,100
	Risk of Gender Based Violence (GBV) and Sexual	- Undertake training and awareness sessions for workers on SH, SEA, and GBV - Maximum effort shall be made to recruit locals who return to their home after work;	Ongoing	REG/EDCL, Supervising	25,400

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Exploitation and Abuse (SEA),	- The contractor will be required to prepared and implement a code of conduct and each employee will sign it; - 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 - Code of conduct will be developed, signed and implemented by all project workers		Engineer, EPC Contractor, Health Centers, Districts, Isange One stop center	
	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; - 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	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Health Centers, Districts,	33,900
	Child labor, forced labour and discrimination.	- 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.	Ongoing	REG/EDCL, Supervising Engineer, EPC Contractor, Districts,	Operational Budget
Foundation works, excavation, and trenching	Injuries or fatalities from improper manual handling	- 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.	Ongoing	EPC contractor, Supervising engineer, REG-EDCL	21,200

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Vandalism of construction material	- 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget
	Health and Safety issues	- 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 neighbourhood; - 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 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. - 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; - 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	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget 8,400
	Loss of on Physical and Cultural Resources	- 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; - The Contractor will be required to stop works and contact local Autority 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.	Ongoing	EPC contractor, Supervising engineer /district	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	Increased traffic in the project area	- 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	Ongoing	EPC contractor, Supervising engineer	Operational Budget
	Impacts on Soil, hydrology, water and ground water	- 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 - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Increased risks of soil erosion	- 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.	Ongoing	EPC contractor, Supervising engineer	Constriction budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
	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; - 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, no biodegradable and hazardous streams, and dispose appropriately; - Consider developing a waste management plan for proper solid waste management	Ongoing	EPC contractor, Supervising engineer	Constriction budget 33,900
	Noise and Vibration pollution	- 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	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; - 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	Ongoing	EPC contractor, Supervising engineer	Constriction budget
	Human waste disposal issues	- 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.	Ongoing	EPC contractor, Supervising engineer	29,600

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- 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			
	Oil spillage	- 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 refiling and maintenance should be done with qualified and experienced personnel;	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	- 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. - More details are included in Occupational health and safety	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.	- All vehicles containing heavy lifting equipment will be instructed to follow traffic norms strictly; - Ensure all` safety measures to workers and public including provision of protective safety equipment specific to works; - First aid box and emergency medical coverage will be provided to workers.	Ongoing	REG-EDCL/Contractor and Districts	
Operational & Maintenance Phase					
Maintenance of electrical principal equipment and Power Distribution through the proposed line	Theft of equipment and Vandalism of power distribution infrastructure	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Health and safety issues due to Electric and magnetic field	- 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;	Ongoing	REG-EDCL, District	Operational Budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Liaise with local authorities to ensure developments are not approved or occur within the right of way; - Evaluation of the potential exposure to EMF against the reference levels developed by International Commission on Non-Ionized Radiation Protection (ICNIRP			
	Risk of bird collision	- Conductors along wetlands and in bird's migration areas will run horizontal not vertical. - Installation of visibility enhancement objects such as marker balls, bird deterrents or diverters	Ongoing	REG-EDCL, District	Operational Budget
	Pollution from transformer oil spillages	- 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	Ongoing	REG-EDCL, District	Operational Budget
	Fire accidents due to inappropriate power usage	- A robust fire prevention program and fire suppression system should be developed by the contactor 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. - Technical field personnel should report power outages to the REG-EDCL and repair faults quickly - Public education to raise awareness of electricity danger and how to utilize the system safely; - Improve supervision of field workers and conduct system maintenance regularly and diligently	Ongoing	REG-EDCL, District	Operational Budget
	Vandalism of the electrical cables and other structures	- 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	Ongoing	REG-EDCL, District	Operational Budget
	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 - 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 - Put in pace all precautions to prevent electrocution - Ensure that operators and maintenance workers are adequately trained	Regulary	REG-EDCL	Operational budget

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Activities	Description of Potential Impacts	Mitigations measures	Implementation schedule	Responsible entity	Budget (USD)
		- Establish and communicate regular maintenance plans			
Decommissioning Phase					
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. - 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).	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Water and soil pollution from transformer oil spillages	- 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 disposal. - 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. - 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; - 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	Once	REG-EDCL, EPC contractor	Decommissioning budget
	Total budget				**261,000**

b) Environmental and Social Monitoring Plan to be applied in Muhanga district

Environmental items	Monitoring item	Parameter/Indicator	Frequency	Responsible	Budget (USD)
Planning and construction Phase					

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Securing of the RoW	Fair compensation for affected crops and trees	Reports for affected crops, trees	Once before project activities	District/ local Authorities/ property valuer	To be determined under A-RAP
	Complaints associated to the transmission electrical cables located nearby residential houses	GRM logbook	Regular	District local authorities/ PAPs	14,740
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 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	daily	District/ EDCL	Cost for sign post covered

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		reminding sign posts at the site			under construction budget
	Personal Protective Equipment (PPEs)	Number of workers with PPEs	daily	EDCL/ District	40 USD to cater for overall PPE foe 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	300 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
Operation and maintenance Phase					
Effects from electrocution	Presence of warning signs and anti-climbing barbed wire	Infrastructures damages Proper sagging 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
Total Monitoring Budget					**21,330**

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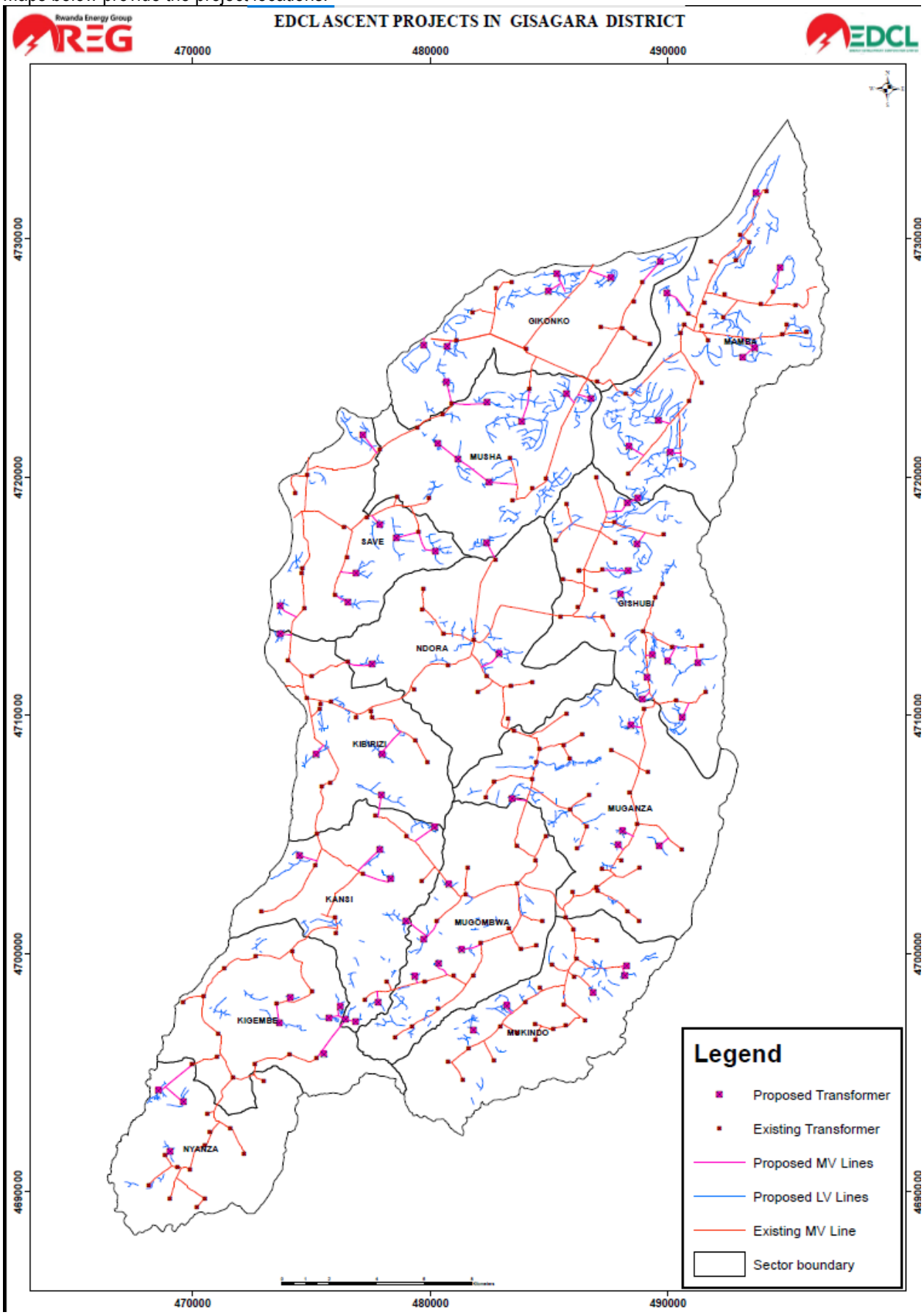
Annex 9: Maps of the project location

Maps below provide the project locations:



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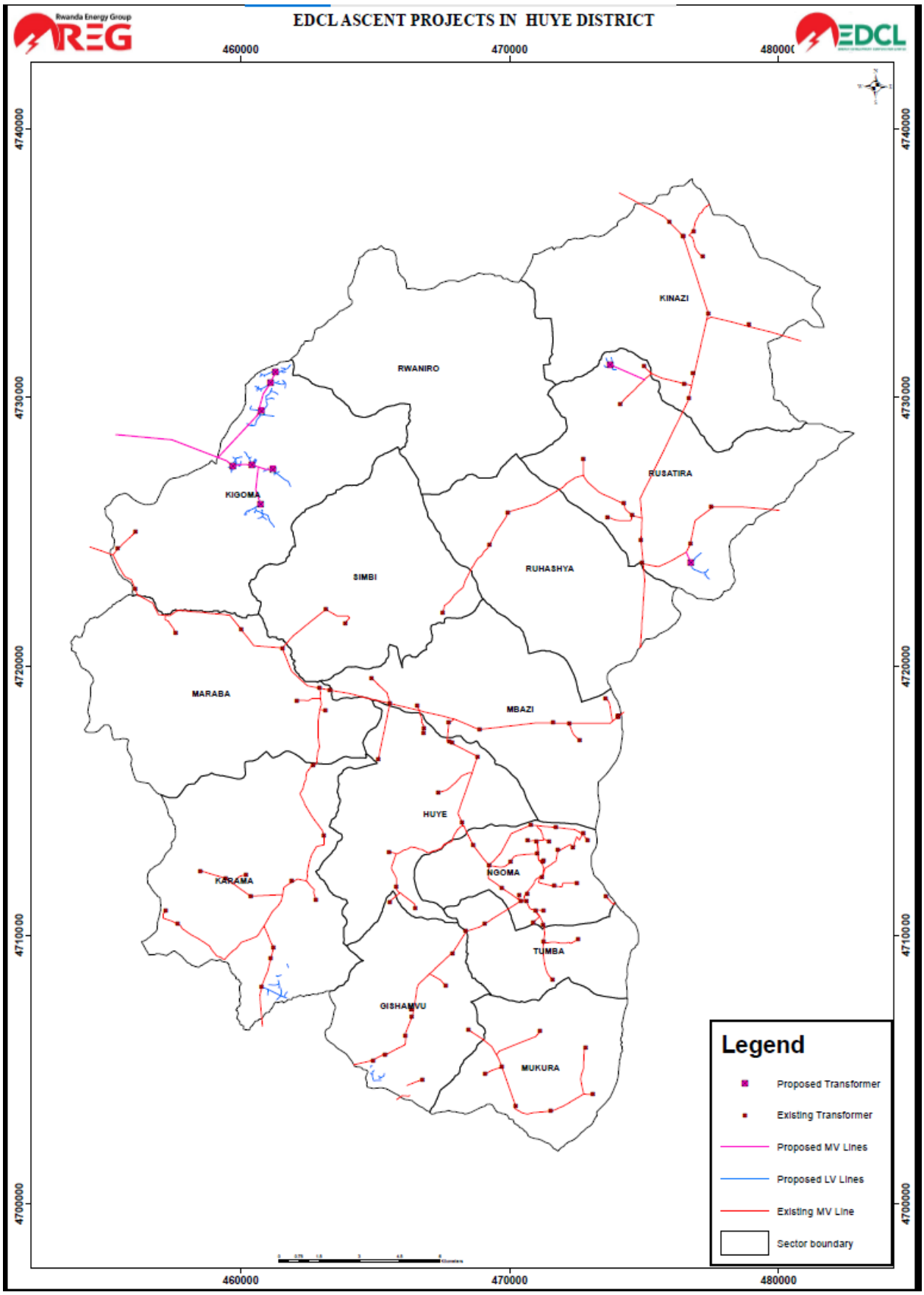

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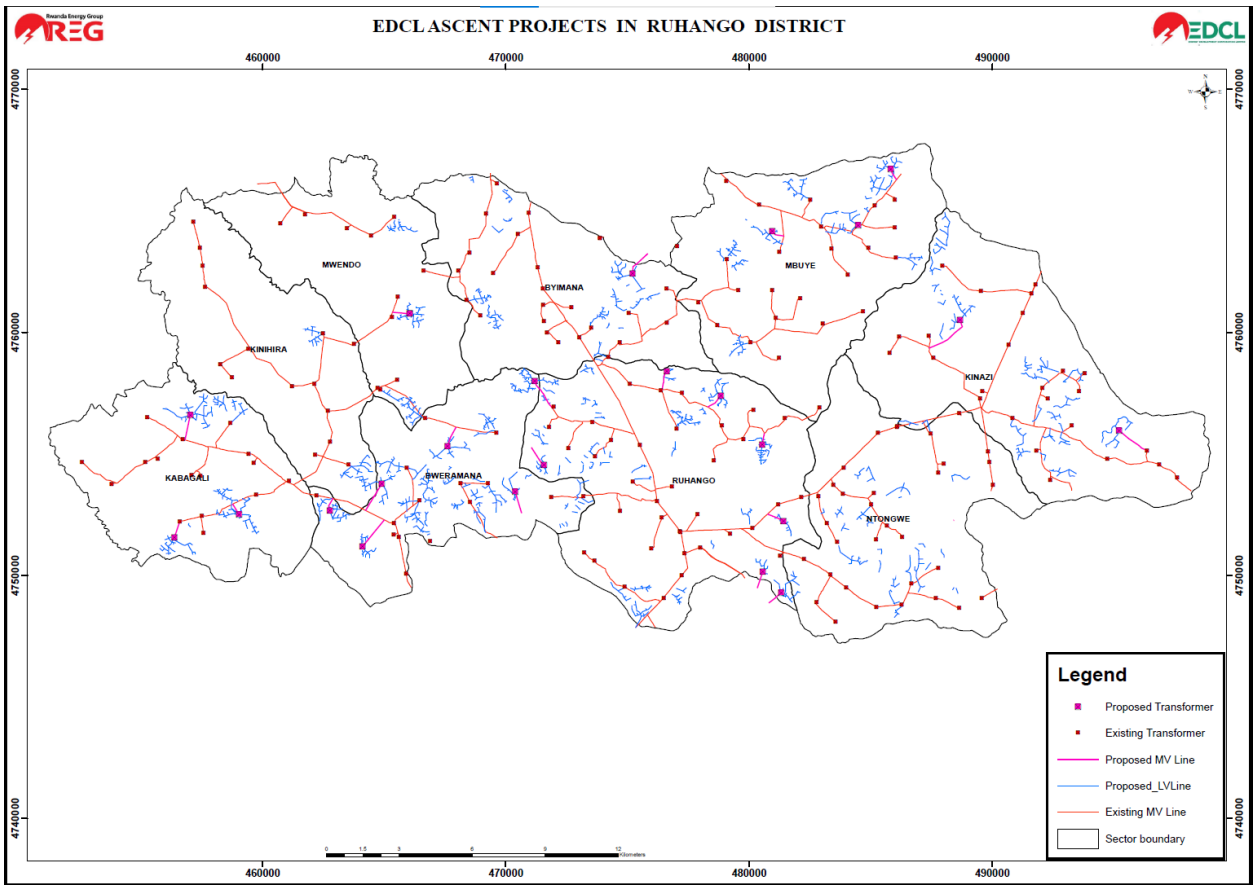

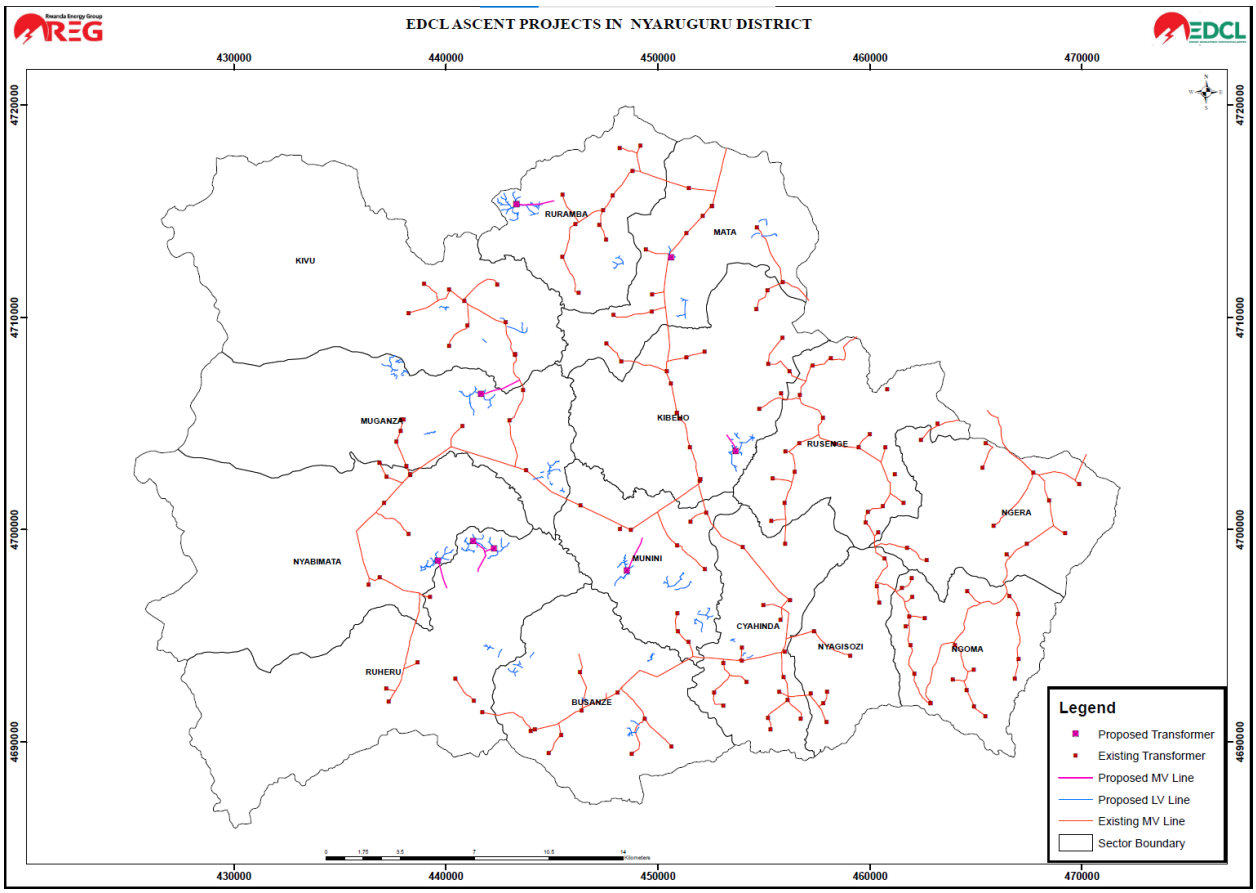

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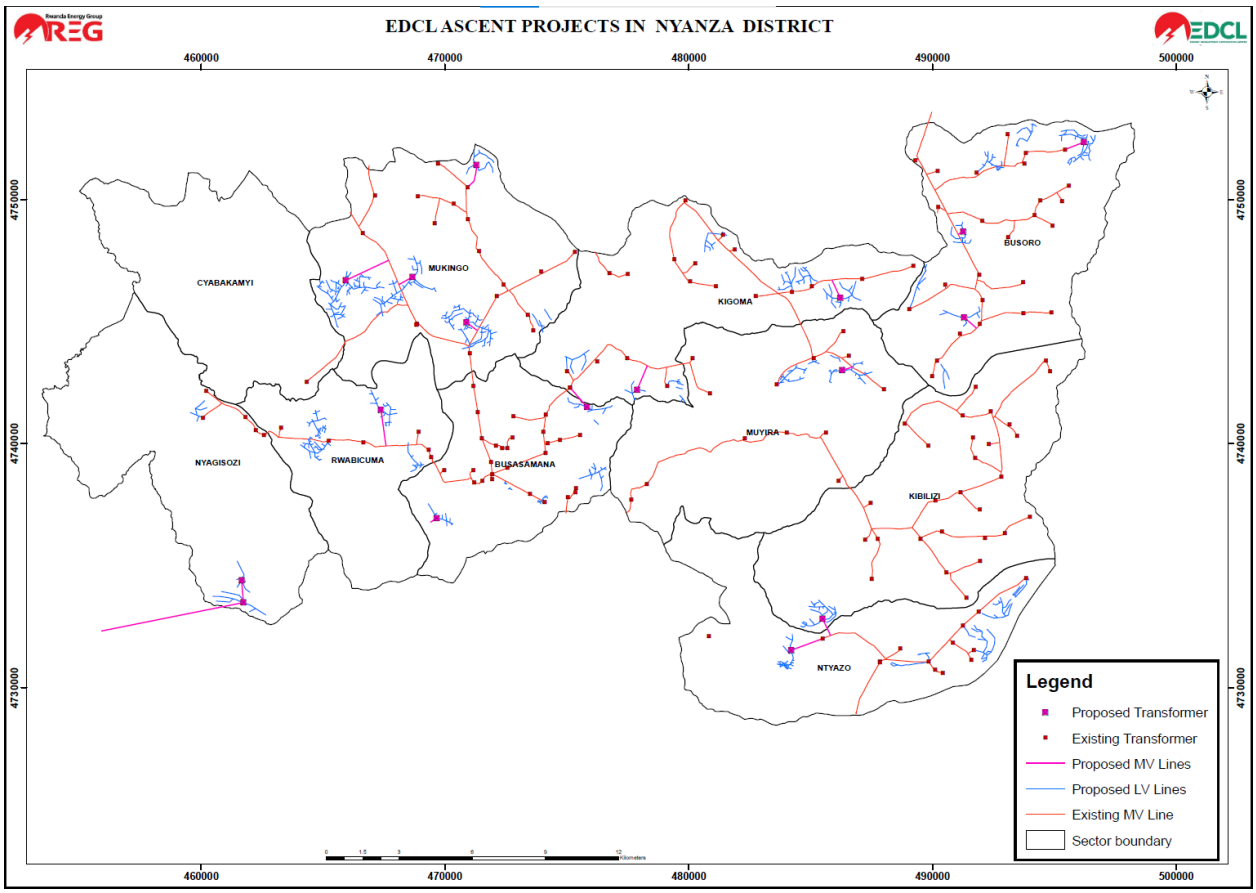

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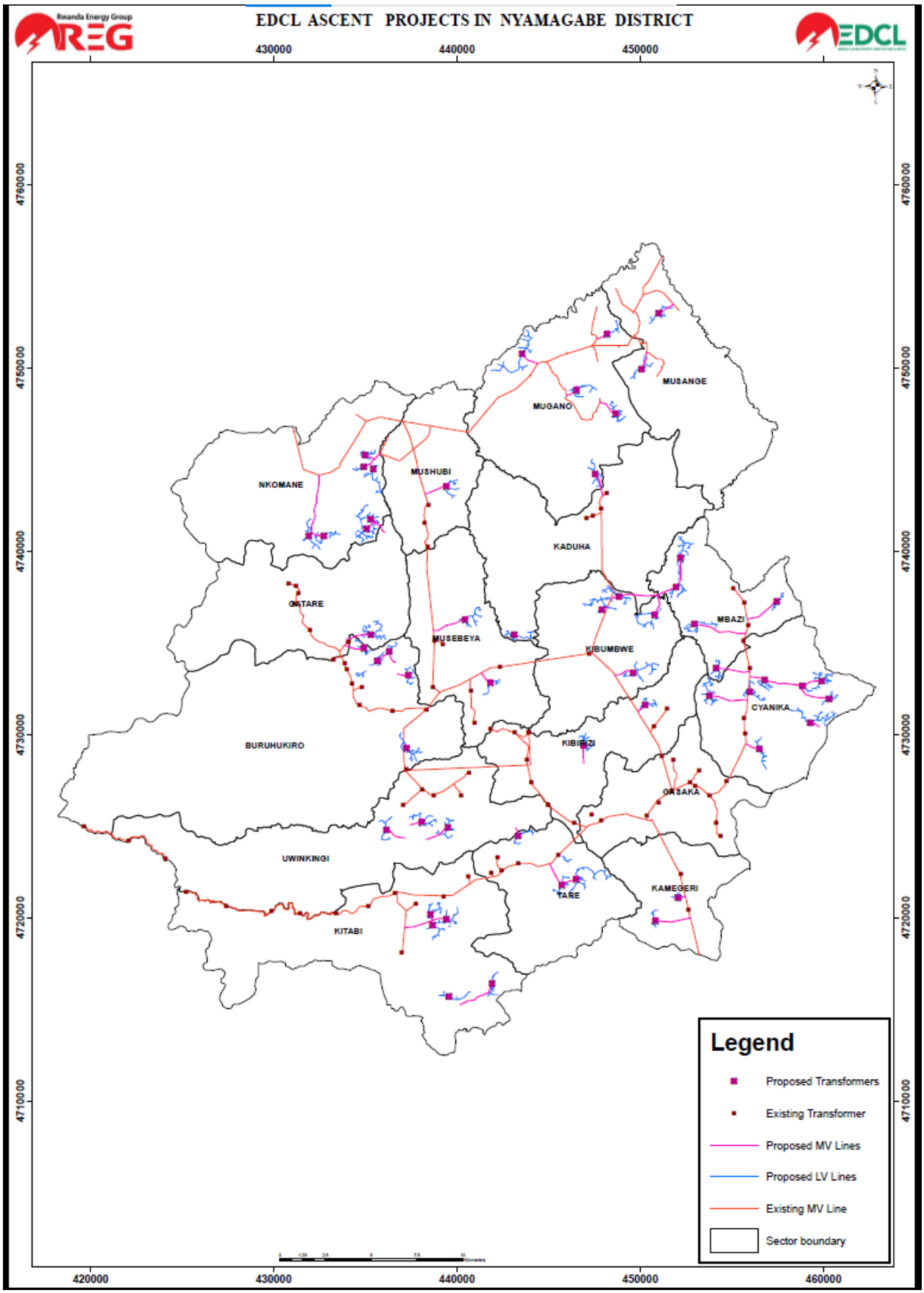

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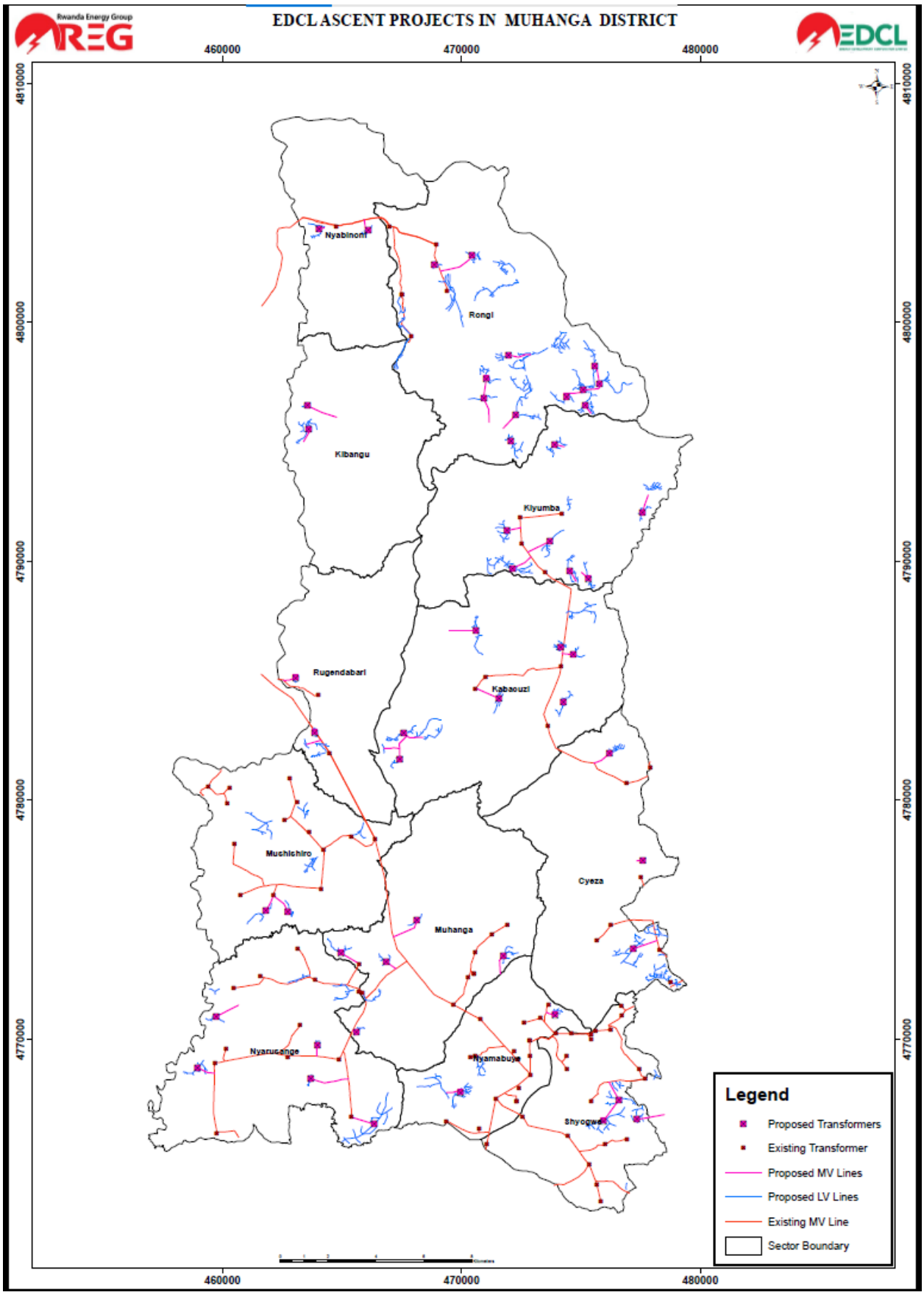

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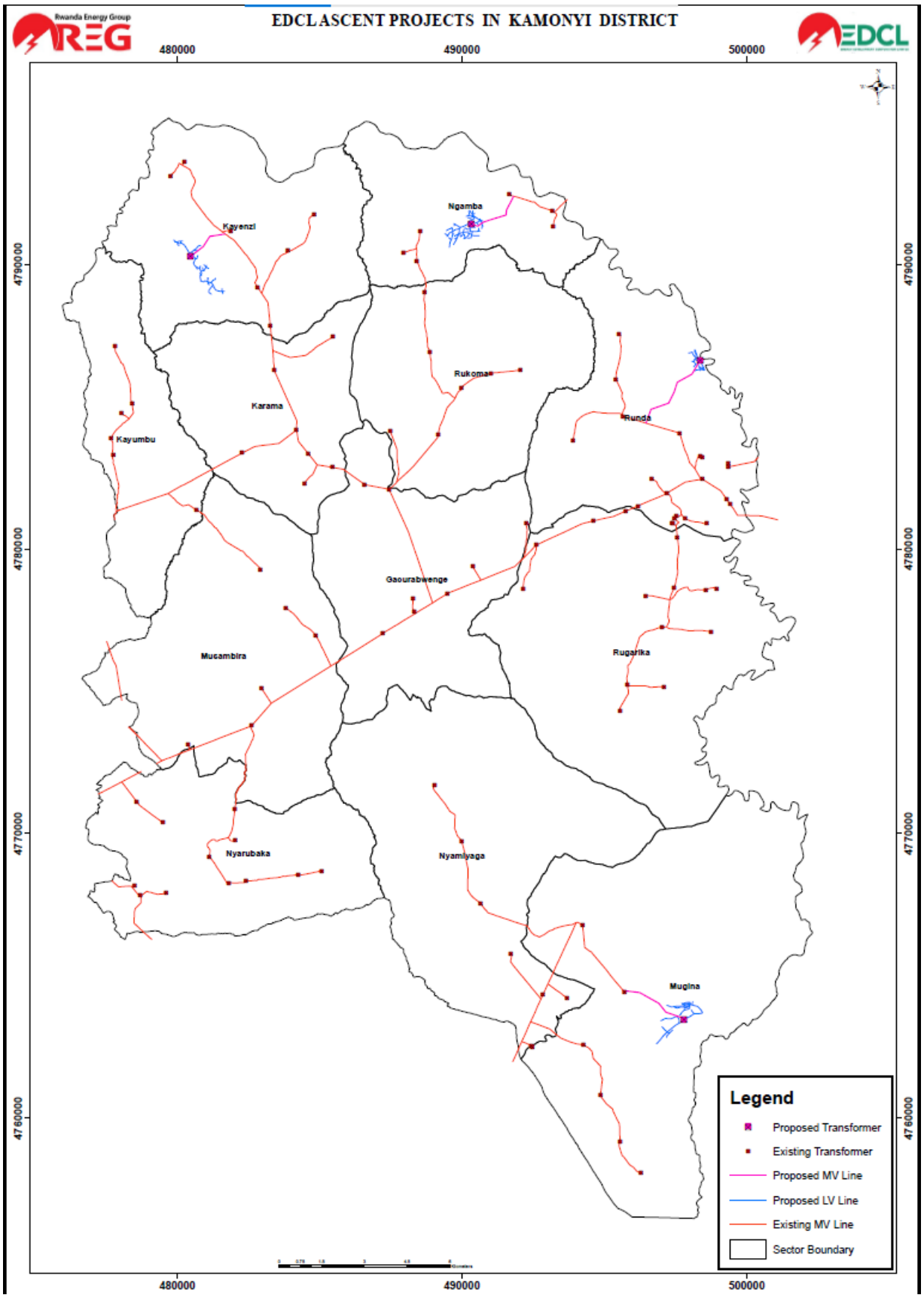

Annex 10: Guidelines of the Right of Way for electrical power lines

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Annex 11: List of contacted consulted persons

List of Technical people who participated in consultation in the Southern Province

NO	NAMES	INSTITUTION	POSITION	EMAIL
1	NDAYISABA Henry Victor	MUHANGA	Environmental Officer	victor.ndayisaba@muhanga.gov.rw
2	KAYANDA Jean Claude	MUHANGA	Director of planning , Monitoring & Evaluation/PME	kayandaclaude@gmail.com
3	NZUNGIZE Gustave	NYANZA	Director of planning , Monitoring & Evaluation/PME	nzungize77@gmail.com
4	UWITONZE Gustave	NYANZA	Ag Director of planning , Monitoring & Evaluation/PME	uwitonzegustave02@gmail.com
5	MUKAMANA Alphonsine	NYAMAGABE	Statistician	statialpha@gmail.com
6	HAVUGIMANA Theophile	NYAMAGABE	District cash crops Officer	theophilehavugimana@gmail.com
7	MUKIZA Justin	KAMONYI	Director of Agriculture &natural resources/ANR	justin.mukiza@gmail.com
8	RUTAYISIRE Gilbert	HUYE District	Dir of ANR	rutatall20@gmail.com
9	UWAMBAJIMANA Philippe	NYARUGURU	Director of Agriculture &natural resources/ANR	uwambajimana@nyaruguru.gov.rw
10	NSANZABERA J.De Dieu	RUHANGO District	Statistician	nsanze6@gmail.com
11	BANGANIRORA Renesse	GISAGARA	Director of Agriculture &natural resources/ANR	brenerse1@gmail.com
12	NSABIMANA Emmanuel	GISAGARA	Statistician	nsabimanaikirezi@gmail.com
13	MUNYAMPIRWA Francois	RUHANGO District	Ag.Director of Agriculture &natural resources/ANR	munyampirwaf@gmail.com
14	UWIZEYIMANA Rosine	HUYE District	Statistician	ruwizeyimana@hy.gov.rw
15	NGARAMBE Jean Paul	KAMONYI	Statistics	najep@gmail.com
16	Eric GASANA	MOE	Data Management Specialist	egasana@environment.gov.rw
17	DUSENGIMANA Theophile	MOE	ECC Policy Specialist	tdusengimana@environment.gov.rw

List of consulted stakeholders at technical level

Names	Institutions	Position	Contact
NTIRUSHWA Jean Pierre	EDCL	Project manager	0788469519
BORAMUNGU Appophia	EDCL	Senior Environmental safeguards specialist	0782537195
NZAYIRAMYA Zacharie	EDCL	Social Safeguards specialist	0785098772
Cedric	EDCL	GIS surveyor	0788919861
MBONERA Michel	EDCL	C.E. Transmission	0788517995
Peace KOBUSINGYE	MINENFRA	Donor coordinator	0788312898
Patrick NZABAMWITA	RSB	Electrical engineer	0788256810
Florien GUMYUSENGE	RURA	GM/EWATSAN	0784463232
BYUMUGABO Morice	EDCL	Senior Engineer substation	0788834953
RIMENYANDE Patrick	EDCL	Design engineer	0788995290
IRUTABYOSE Jean Paul	EDCL	Substation engineer	0788705788
NYIRABUKOBWA Elodie	EDCL	Substation operator	0788235766
NKUNDABAKUZE Fulgence	REG	Ruhango branch manager	0788330062
NIYOTWIZEYE Christophe	REG	Nyamagabe branch manager	0788330059
IGOOMA Stephen	REG	Kayonza branch manager	0788480959
KARINGANIRE Innocent	REG	Jabana branch manager	0788528456

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consulted Stakeholders during Onsite investigation of EPCs (southern province)

No	Names	District	Sector	Position	Telephone	Signature
1.	Habakurira Emmanuel	Muhanga	Shyogwe	Umuturage	0788944142	
2-	Fulgence Mandur	Muhanga	Shyogwe	Umuturage	0790296061	
3	Seraphine Mukandahiro	Muhanga	Shyogwe	Umuturage	0792025853	
4	J. Paul Kubwimana	Muhanga	Nyamabuye	Electrician	0788821918	
5	Hakimu Ntiruriwa	Kamonyi	Runda	Umuturage	0790534666	
6	Emmanuel Niyomugabo	Kamonyi	Runda	Umuturage	0793314881	
7	J. Pierre Munyaneza	Kamonyi	Runda	Umuturage	0788901543	
8-	Niyonsenga Abdoul	Kamonyi	Runda	Technician	0788240279	

consulted Stakeholders during Onsite investigation of EPCs (southern province)

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2	NYIRAKESHYARENYE IMMACULEE	Nyamagabe	Kibirizi	Umuturage	0793834943	
3	Mbuguje Felicien	Nyamagabe	Kibilizi	Umuturage	0782976948	
4	NIYAMUREMYE J BOSCO	NYAMAGABE	GASAKA	Technician	078866861	
5	MANIRIHO Albonheur	GISAGARA	NDORA	ELECTRICIAN/EUCL	0788980172	
6	NSHIMIYIMANA Japhet	GISAGARA	KIBIRIZI	SS Engineer	0782288384	
7	NTAKIRUTIMANA Innocent	Huye	Mbazi	Umuturage	0780750445	
8	MUKAKABAYIZA Illuminée	Huye.	Ruhashya	SEDO of cell.	0784447571	
9	HABYARIMANA Théophile	HUYE	NGOMA	ELECTRICIAN/EUCL	0788557278	
10	HABIMANA Marcel	Nyanza	Busasamana	Branch Manager	0788474593	
11	Munyambonwa Joseph	Nyanza	Busasamana	Electrician EUCL	0784319966	
12	Nsabimana olivier	Nyanza	Busasamana	Electrician EUCL	0786045983	
13	Jules BIGIRIMANA	Ruhango	Ruhango	BM	0788807074	
14	HAGUMIMANA VINCENT	Ruhango	Ruhango	TECHNICIAN	0785266309	
15	UWIZERAMARIYA Monique	RUHANGO		SS operator	0788286765	
16	MUSABYIMANA Jean Pierre	EDCL		ESSS	0788724814	

consulted Stakeholders during Onsite investigation of EPCs (southern province)

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2.	Fulgence Mandusi	Muhanga	Shyogwe	Umuturage	0790296061	
3	Seraphine Mukandahiro	Muhanga	Shyogwe	Umuturage	0782025853	
4	J. Paul Kubwimana	Muhanga	Nyamabuye	Electrician	0788821918	
5.	Hakimu Ntivuguruzwa	Kamonyi	Runda	Umuturage	0780534666	
6.	Emmanuel Niyomugabo	Kamonyi	Runda	Umuturage	0793314881	
7.	J. Pierre Munyaneza	Kamonyi	Runda	Umuturage	0788901543	
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Annex 12: 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

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Annex 13: Typical fauna and flora species in southern province

i. Typical bird species recorded in the project areas of southern province

No.	Order	Family	Scientific name	Common name	Vernacular name	IUCN status
1	Accipitriformes	Accipitridae	*Accipiter melanoleucus*	Great sparrowhawk	Agaca	LC
2	Accipitriformes	Accipitridae	*Buteo augur*	Common buzzard	icyanira	LC
3	Accipitriformes	Accipitridae	*Buteo augur*	Augur buzzard	Icyanira	LC
4	Accipitriformes	Accipitridae	*Milvus migrans*	Black kite	Sakabaka	LC
5	Apodiformes	Apodidae	*Apus caffer*	white-rumped swift	Intashya	LC
6	Caprimulgiformes	Caprimulgidae	*Caprimulgus poliocephalus*	Ruenzori nightjar		LC
7	Charadriiformes	Charadriidae	*Ardea melanocephala*	Black-Headed Heron	Uruyongoyongo	LC
8	Coliiformes	Coliidae	*Colius striatus*	Spickled Mousebird	Umusure	LC
9	Columbiformes	Columbidae	*Columba larvata*	Lemon dove	Inuma	LC
10	Columbiformes	Columbidae	*Streptopelia semitorquata*	Red-eyed dove	Inuma (intungura)	LC
11	Coraciiformes	Alcedinidae	*Halcyon leucocephala*	Malachite kingfisher	Murobyi	LC
12	Coraciiformes	Meropidae	*Merops persicus*	Blue cheeked Bee-eater	Umusure	LC
13	Cuculiformes	Cuculidae	*Centropus superciliosus*	White-browed Coucal	Ikibiribiri	LC
14	Galliformes	Phasianidae	*Pternistis hildebrandti*	Hildebrandt's Francolin	Inkware	LC
15	Gruiformes	Gruidae	*Balearica regulorum*	Grey Crowned Crane	Umusambi	EN
16	Passeriformes	Cettiidae	*Hemitesia neumanni*	Short-tailed warbler		LC
17	Passeriformes	Cisticolidae	*Apalis personata*	Mountain masked apalis		LC
18	Passeriformes	Corvidae	*Corvus albus*	Pied Crow	Icyiyoni	LC
19	Passeriformes	Estrildidae	*Cryptospiza jacksoni*	Dusky crimsonwing		LC
20	Passeriformes	Estrildidae	*Estrilda astrild*	Common waxbill		
21	Passeriformes	Estrildidae	*Lagonosticta rubricata*	African Firefinch	Ifundi	LC
22	Passeriformes	Leiothrichidae	*Turdoides jardineii*	Arrow-Marked Babbler	Ikijwangajwanga	LC
23	Passeriformes	Malaconotidae	*Telophorus dohertyi*	Doherty's bushshrike		LC
24	Passeriformes	Motacillidae	*Motacilla aguimp*	African-Pied Wagtail	Inyamanza	LC
25	Passeriformes	Muscicapidae	*Cossypha heuglini*	White-browed Robin-chat	Inyombya	LC
26	Passeriformes	Nectariinidae	*Hedydipna collaris*	Collared sunbird	Umununi	LC
27	Passeriformes	Nectariniidae	*Cinnyris regius*	Regal sunbird		LC
28	Passeriformes	Passeridae	*Passer griseus*	House sparrow	igishwi	LC
29	Passeriformes	Passeridae	*Passer griseus*	Common Grey-Headed Sparrow	Igishwi	LC
30	Passeriformes	Passeridae	*Passer melanurus*	Cape sparrow	Uruhuri	LC
31	Passeriformes	Passeridae	*Passer melanurus*	Cape sparrow	Uruhuri	LC
32	Passeriformes	Phylloscopidae	*Phylloscopus laetus*	Red-faced woodland warbler		LC
33	Passeriformes	Ploceidae	*Ploceus bicolor*	Forest weaver		LC
34	Passeriformes	Ploceidae	*Ploceus pelzelni*	Slender-Billed weaver	Isandi	LC
35	Passeriformes	Viduidae	*Vidua macroura*	Pin-tailed Whydah	Matene	LC
36	Pelecaniformes	Ardeidae	*Bubulcus ibis*	Cattle Egret	Inyange	LC
37	Pelecaniformes	Scopidae	*Scopus umbretta*	Hamerkop	Sarupfuna/Injongo	NA
38	Pelecaniformes	Threskiornithidae	*Bostrychia Hagedash*	Hadada Ibis	Nyirabarazana y'inkara	LC
39	Pelecaniformes	Threskiornithidae	*Threskiornis aethiopicus*	African sacred ibis	Nyirabarazana	LC
40	Pelecaniformes	Threskiornithidae	*Threskiornis aethiopicus*	Sacred Ibis	Nyirabarazana y'indagi	LC
41	Strigiformes	Strigidae	*Bubo africanus*	Spotted eagle-owl	Igihunyira	LC

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ii. **Typical reptile species recorded in the project areas**

No.	Order	Family	Scientific Name	Common Name	Vernacular name	IUCN Status*	Protected species in Rwanda
1	Squamata	Viperiade	Bitis arietans	Puff Adder	Impiri	LC	Yes
2	Squamata	Lamprophiidae	Boaedon lineatus	Striped house snake	Ikiryambeba	LC	
3	Squamata	Agamidae	Lacerta agama	Agama	Icyugu	LC	
4	Squamata	Elapidae	Naja melanoleuca	Forest cobra	Incira	-	
5	Squamata	Colubridae	Philothamnus heterolepidotus	African Green Snake++	Incarwatsi	NA	
6	Squamata	Lamprophiidae	Psammophis sibilans	Striped sand snake	Imbarabara	LC	
7	Squamata	Chamaeleonidae	Trioceros rudis	Coarse Chameleon	Uruvu	LC	
8	Squamata	Agamidae	*Lacerta agama*	Agama	Icyugu	LC	
9	Squamata	Lacertidae	Zootoca vivipara	Common lizard	Umuserebanya	LC	

iii. **Typical Amphibian species recorded in the project areas**

No	Order	Family	Scientific name	Common name	IUCN status
1	Anura	Bufonidae	*Sclerophrys kisoloensis*	Kisolo toad	LC
2	Anura	Hyperoliidae	*Afrixalus orophilus*	Kivu banana frog	LC
3	Anura	Hyperoliidae	*Hyperolius castaneus*	Montane spiny reed frog	LC
4	Anura	Hyperoliidae	Afrixalus quadrivittatus	Four-lined Spiny Reed Frog	Least Concern
5	Anura	Bufonidae	Amietophrynus kisoloensis	-	Least Concerned
6	Anura	Bufoniadae	Sclerophrys regularis	African common toad	Least Concern
7	Anura	Hyperoliidae	*Hyperolius discodactylus*	Disc-fingered Reed Frog	LC
8	Anura	Bufonidae	*Sclerophrys regularis*	African common toad	LC

iv. Typical mammal species recorded in the project areas

No.	Order	Family	Scientific Name	Common Name	Vernacular Name	IUCN Status	Protected species in Rwanda
1	Carnivora	Viverridae	Civettictis civetta	African Civet	Urutoni	LC	
2	Carnivora	Canidae	Canis adustus	Side Striped Jackal	Imbwebwe	LC	
3	Carnivora	Canidae	Canis familiaris	Feral dog	Imbwa y'agasozi	-	
4	Carnivora	Felidae	Felis lybica	African wildcat	Injangwe y'agasozi	LC	
5	Carnivora	Felidae	Panthera pardus	Leopard*	Ingwe	VU	Yes
6	Canivora	Herpestidae	Galerella sanguinea	Mongoose	Umukara	LC	
7	Lagomorpha	Leporidae	Lepus victoriae	African hare	Urukwavu rw'agasozi	LC	
8	Rodentia	Nesomyidae	Cricetomys gambianus	Gambian rat	Isiha	LC	
9	Rodentia	Spalacidae	Tachyoryctes splendens	Rwanda African mole-rat	Ifuku	LC	
10	Canivora	Viverridae	Genetta servalina	Genete	Urutoni	LC	

v. Typical fish species recorded in the project areas

Order	Family	Scientific Name	Common Name	Vernacular Name	IUCN Conservation status
Siluriformes	Clariidae	Clarias gariepinus	African Catfish	Inkube/Inshonzi	LC
Cichliformes	Cichlidae	Oreochromis niloticus	Nile Tilapia	Ingege	LC
Dipnoi	Lepidosirenidae	Protopterus aethiopicus	Lungfish	Imamba	LC

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vi. typical plant species recorded in the project areas

No.	Order	Family	Scientific Name	Vernacular Name	IUCN Status	Protected species in Rwanda
1	Lamiales	Acanthaceae	Acanthus pubescens	Igitovu		
2	Lamiales	Acanthaceae	Brillantaisia patula	Ikirogora	-	
3	Lamiales	Acanthaceae	Thunbergia alata	Urusayura	-	
4	Sapindales	Anacardiacea	Mangifera indica	Umwembe	-	
5	Sapindales	Anacardiaceae	Lannea schimperi	Umumuna		
6	Gentianales	Apocynaceae	Carissa edulis	Umushubi	-	
7	Alismatales	Araceae	Colocasia esculenta	Amateke	LC	
8	Arecales	Arecaeae	Phoenix reclinata	Umukindo	-	
9	Asparagales	Asparagaceae	Agave sisalana	Umugwegwe	LC	
10	Asparagales	Asparagaceae	Dracaena afromontana	Umuhati	LC	
11	Asterales	Asteraceae	Aspilia pluriseta	Icyumya	-	
12	Asterales	Asteraceae	Bidens pilosa	Inyabarasanya	-	
13	Asterales	Asteraceae	Blumea brevipes	Igitabitabi	-	
14	Asterales	Asteraceae	Coryza sumatrensis	Bambuwa	-	
15	Asterales	Asteraceae	Crassocephalum vitellinum	Isununu	-	
16	Asterales	Asteraceae	Guizotia scabra	Igishikashike		
17	Asterales	Asteraceae	Helianthus annuus	Igihwagari	LC	
18	Asterales	Asteraceae	Lactuca inermis	Ikinyamata	-	
19	Asterales	Asteraceae	Melanthera scandens	Kimari		
20	Asterales	Asteraceae	Sonchus luxurians	Rurira	-	
21	Asterales	Asteraceae	Tagetes minuta	Nyiramunukanabi		
22	Asterales	Asteraceae	Vernonia amygdalina	Umubilizi	-	
23	Asterales	Asteraceae	Vernonia lasiopus	Igiheriheri	-	
24	Lamiales	Bignoniaceae	Markhamia lutea	Umusave	LC	
25	Brassicales	Brassicaceae	Brassica oleracea	Ishu	-	
26	Brassicales	Caricaceae	Carica papaya	Ipapayi	-	
27	Brassicales	Cleomaceae	Cleome gynandra	Isogi	-	
28	Myritales	Combretaceae	Combretum collinum	Umukoyoyo	-	
29	Solanales	Convolvulaceae	Ipomoea batatas	Ikijumba	-	
30	Cucurbitales	Cucurbitaceae	Cucurbita pepo	Igihaza	LC	
31	Cucurbitales	Cucurbitaceae	Zehneria scabra	Umushishiro	-	
32	Pinales	Cupressaceae	Cupressus spp.	Sipure	-	
33	Poales	Cyperaceae	Rhynchospora corymbosa	Urukangaga	LC	
34	Malpighiales	Euphorbiaceae	Euphorbia tirucalli	Umuyenzi	LC	
35	Malpighiales	Euphorbiaceae	Manihot esculenta	Umwumbati	-	
36	Malpighiales	Euphorbiaceae	Ricinus communis	Ikibonobono	-	
37	Malpighiales	Euphorbiaceae	Tragia brevipes	Isusa	-	
38	Fabales	Fabaceae	Acacia sieberana	Umunyinya	-	
39	Fabales	Fabaceae	Caesalpinia decapetala	Umufatangwe	-	
40	Fabales	Fabaceae	Calliandra calothyrsus	Kariyandra		
41	Fabales	Fabaceae	Cassia floribunda	Umwicanzoka	-	
42	Fabales	Fabaceae	Erythrina abyssinica	Umuko	LC	Yes
43	Fabales	Fabaceae	Indigofera arrecta	Umusororo	-	
44	Fabales	Fabaceae	Mimosa pigra	Umuguha		
45	Fabales	Fabaceae	Senna spectabilis	Kasiya	-	
46	Fabales	Fabaceae	Sesbania sesban	Umunyegenyege	LC	
47	Fabales	Fabaceae	Vigna unguiculata	Rurandaranda	LC	
48	Lamiales	Lamiaceae	Clerondendrum rotundifolium	Ikiziranyenzi	-	
49	Lamiales	Lamiaceae	Leonotis nepetifolia	Igicumucumu	-	
50	Lamiales	Lamiaceae	Ocimum suave	Umwenya	-	
51	Lamiales	Lamiaceae	Salvia nilotica	Urukembagufa	-	
52	Laurales	Lauraceae	Persea gratissima	Avoca	LC	
53	Malvales	Malvaceae	Triumfetta sp.	Umucundura	-	
54	Ranunculales	Menispermaceae	Stephania abyssinica	Umurandagashi	-	
55	Rosales	Moraceae	Ficus thonningii	Umuvumu	LC	Yes
56	Rosales	Mosaceae	Artocarpus heterophyllus	Igifenesi	LC	

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No.	Order	Family	Scientific Name	Vernacular Name	IUCN Status	Protected species in Rwanda
57	Asterales	Musaceae	Ageratum conyzoides	Inkuruba	-	
58	Zingibenales	Musaceae	Musa spp.	Insina	-	
59	Myritales	Myritaceae	Eucalyptus sp.	Intusi	-	
60	Myritales	Myritaceae	Psidium guajava	Ipera	-	
61	Malpighiales	Passifloraceae	Passiflora edulis	Itunda	-	
62	Caryophyllales	Phytolaccaceae	Phytolacca dodecandra	Umuhoko	-	
63	Pinales	Pinaceae	Pinus patula	Pinusi	LC	
64	Poales	Poaceae	Arundinaria alpina	Umugano	-	
65	Poales	Poaceae	Pennisetum clandestinum	Umucaca	LC	
66	Poales	Poaceae	Pennisetum purpureum	Urubingo	-	
67	Poales	Poaceae	Phragmites mauritianus	Uruseke	LC	
68	Poales	Poaceae	Saccharum officinarum	Igisheke	-	
69	Poales	Poaceae	Setaria barbata	Urukoko		
70	Poales	Poaceae	Sorghum vulgare	Amasaka	-	
71	Poales	Poaceae	Zea mays	Ikigori	LC	
72	Caryophyllales	Polygonaceae	Polygonum sp.	Igorogonzo	LC	
73	Ericales	Primulaceae	Maesa lanceolata	Umuhanga		
74	Proteales	Proteaceae	Grevillea robusta	Gereveriya	LC	
75	Gentianales	Rubiaceae	Coffea robusta	Ikawa	LC	
76	Gentianales	Rubiaceae	Pavetta ternifolia	Umumenamabuye		
77	Sapindales	Rutaceae	Citrus sinensis	Icunga	-	
78	Sapindales	Ruteaceae	Citrus limon	Indimu	-	
79	Solanales	Solanaceae	Capsicum spp.)	Urusenda	-	
80	Solanales	Solanaceae	Cyphomandra betacea	Ikinyomoro	-	
81	Solanales	Solanaceae	Solanum aculeastrum	Umutobotobo	-	
82	Solanales	Solanaceae	Solanum lycopersicum	Inyanya	-	
83	Solanales	Solanaceae	Solanum melongena	Intoryi	-	
84	Lamiales	Verbenaceae	Lantana camara	Umuhengeri	-	
85	Rosaceae	Rosales	Rubus rigidus	Umukeri	-	
86	Asterales	Asteraceae	Bothriocline ugandensis	Igitamatama	-	
87	Fabales	Fabaceae	Tephrosia vogelii	Umuruku	-	
88	Asterales	Asteraceae	Tithonia diversifolia	Amaroro	-	
89	Lamiales	Acanthaceae	Hypoestes triflora	Magaru	-	
90	Poales	Poaceae	Eragrostis sp.	Inshinge	-	
91	Poales	Poaceae	Panicum maximum	Igikaranka	-	
92	Lamiales	Lamiaceae	Coleus barbatus	Igicunshu	-	
93	Caryophyllales	Amaranthaceae	Dysphania ambrosioides	Umwisheke	-	
94	Asterales	Asteraceae	Senecio mannii	Umutagara	-	
95	Malpighiales	Euphorbiaceae	Alchornia hirtella	Ikinetenete	-	
96	Apiales	Apiaceae	Daucus carota	Karoti	-	
97	Poales	Poaceae	Melinis minutiflora	Ikinyamavuta	-	
98	Poales	Poaceae	Digitaria abyssinica	Urwiri	-	
99	Malpighiales	Euphorbiaceae	Euphorbia grantii	Umukoni	-	
100	Poales	Poaceae	Hyparrhenia filipendula	Umukenke	-	
101	Lamiales	Pedaliaceae	Sesamum angolense	Igonde	-	
102	Cucurbitales	Cucurbitaceae	Lagenaria sphaerica	Umutanga	-	
103	Rosales	Moraceae	Ficus ingens	Umurehe	-	
104	Caryophyllales	Amaranthaceae	Cyathula uncinulata	Igifashi	-	
105	Fegales	Myricaceae	Myrica kandtiana	Isubyo	-	
106	Lamiales	Orobanhaceae	Striga hermontheca	Kurisuka	-	
107	Celastrales	Celastraceae	Mystroxylon aethiopicum	Umwiha	-	
108	Fabales	Polygalaceae	Securidaca longipedunculata	Umunyagasozi	-	
109	Solanales	Solanaceae	Solanum terminale	Umuhanurankuba	-	
110	Caryophyllales	Amaranthaceae	Achyranthes aspera	Umuhurura	-	
111	Gentianales	Rubiaceae	Mitragyna rubrostipulata	Umuzibaziba	-	
112	Fabales	Fabaceae	Cassia floribunda	Umukubayoka	-	
113	Ericales	Primulaceae	Lysimachia ruhmeriana	Umuyobora	-	

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No.	Order	Family	Scientific Name	Vernacular Name	IUCN Status	Protected species in Rwanda
114	Fabales	Fabaceae	Acacia mearnsii	Barakatsi	-	
115	Asparagales	Asphodelaceae	Aloe vera	Igikakarubamba	-	
116	Lamiales	Lamiaceae	Tetradenia riparia	Umuravumba	-	
117	Asterales	Asteraceae	Tithonia diversifolia	Kimbazi/Icyicamahirwe	-	
118	Myritales	Melastomataceae	Dissotis senegambiensis	Icyoganyanja	-	
119	Polypodiale	Pteridaceae	Pteris pterdioides	Igishihe	-	
120	Lamiales	Lamiaceae	Ocimum basilicum	Umusurasura	-	

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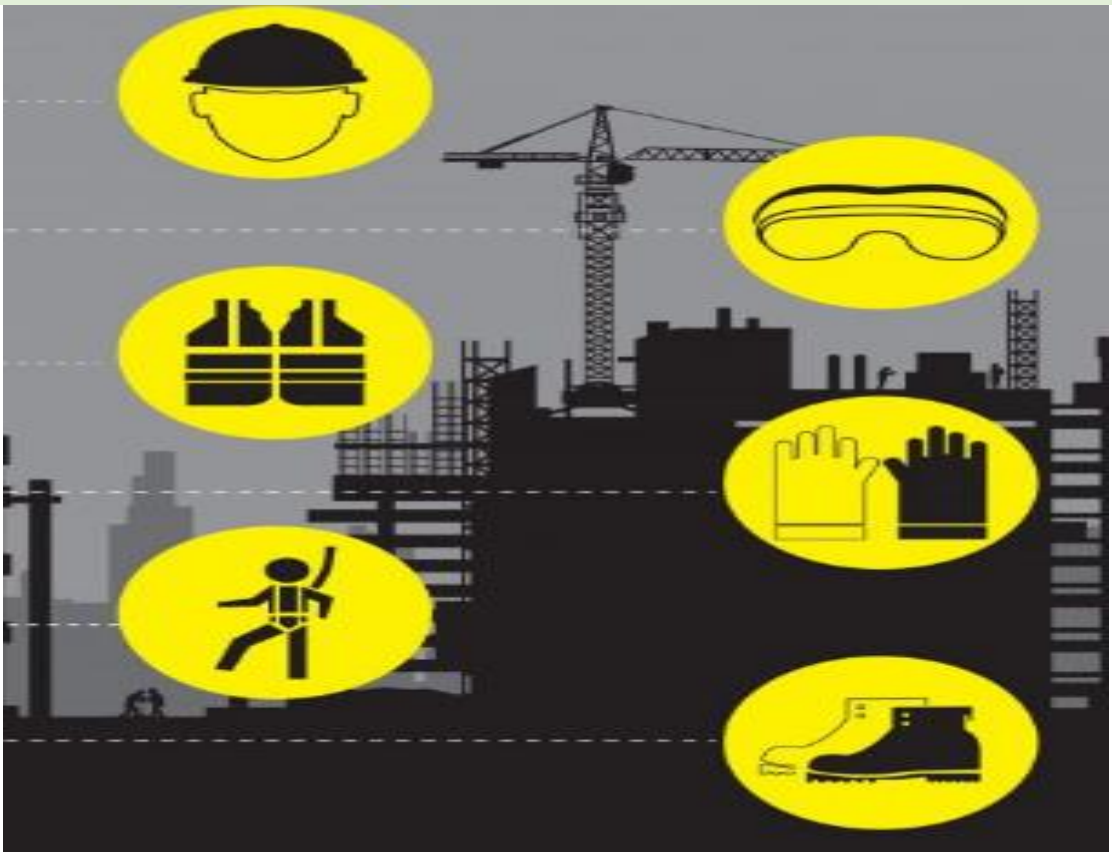
OCCUPATIONAL HEALTH, AND SAFETY PLAN FOR THE DESIGN, SUPPLY, AND INSTALLATION OF MEDIUM AND LOW VOLTAGE LINES, SERVICE CONNECTIONS, AND UPGRADING THE SINGLE-PHASE LINES TO THREE PHASES IN THE SOUTHERN PROVINCE OF RWANDA



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ACRONYMS AND ABBREVIATIONS

ASCENT	: Accelerating Sustainable and Clean Energy Access Transformation
BESST	: Bureau for Engineering and Environmental Studies
EA	: Environmental Assessment
EDCL	: Energy Development Corporation Limited
EPC	: Engineering Design, Procurement and Construction
ESF	: Environmental and Social Framework
ESHS	: Environmental, Social Health and Safety Plan
ESIA	: Environmental and Social Impact Assessment
ESS	: Environment and Social Standards
ESS	: Environmental and Social Standard
GoR	: Government of Rwanda
HSP	: Health and Safety Plan
IFC	: International Finance Corporation
MININFRA	: Ministry of Infrastructure
MoE	: Ministry of Environment
OHS	: Occupational Health and Safety
OS	: Operational Standards
PPE	: Personal Protective Equipment
PS	: Performance Standard
RDB	: Rwanda Development Board
REG	: Rwanda Energy Group
REMA	: Rwanda Environment Management Authority
WBG	: World Bank Group
WMP	: Waste Management Plan

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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 Southern 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 Southern 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 Southern province namely Kamonyi, Muhanga, Ruhango, Nyanza, Huye, Gisagara, Nyaruguru and Nyamagabe 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.

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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 assets valuation will be done to 12 meters and will cover all trees and crops on that surface and other structures located within th RoW. 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 and hight crops 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:

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- Each employee has a right to work in an environment that will not adversely affect his or herhealth 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 achievethis, all employees must work together to identify and control situations that could causeharm. 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 andacceptance 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 notendanger 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.

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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 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 theOHSP 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 theproject 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 ofresponsibility;
- 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-siteOHSP 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;

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- ✓ 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 EDCLProject Manager;
- ✓ Participate actively in OHSP promotional activities;
- ✓ Conduct daily Pre-Job Briefings on-site (Toolbox meetings) to ensureall 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 thesafety 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/OHSPManager 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

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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;

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- **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 hazardousconditions, 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 beperformed 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 allimportant 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 conditionsfor 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.

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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 ensurethat all personnel at the site always comply with the safe operation resulting in zero accidents. At the projectsite, 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;
- A**ppropriate 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 shallinclude 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;

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The minimum required PPE includes a hard hat with a chin strap, a high visibility safety vest, and safety bootswith 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 projectwill 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 conductingany 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 withoutcracking, 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 oneworker.
- **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 restrictthe overall fall to 1.8 m or less. The lifeline size must be stamped on the rope grab, andonly that size and type of line used.
- **Anchorage:** The strength of any fall protection system is dependent on a secureattachment 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 nolower 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 isregularly 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.

Danger Noise **Electrical** **Suspended** **Forklift** **Flammable** **Loads**

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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

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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/sheholds adequate training.

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It may be that additional qualified first aiders are required to achieve the response timesdetailed 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

WORK-RELATED INCIDENT	**The incident happens at EDCL-controlled worksites or at time**	**EXAMPLES:** All work-related travel and transportation by EDCL rented vehicle / All activities at company worksite and office.
NOT WORK-RELATED INCIDENT	**Incident which does not happen at EDCL controlled situation**	**EXAMPLES:** 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).
	Actions	**Notes**
FATAL or LIFE-THREATENING ACCIDENT	**Immediately 24/7** by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager The Project Manager informs the Project Director, who in return informs the Managing Director.	**Ensure that the message goes through.** You must send additional detailed information by email within 12 hours of the accident.
ENVIRONMENT, MAJOR ROAD or OTHER ACCIDENT	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager 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.
LOST TIME INCIDENT(WITH BODILY INJURIES)	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager The Project Manager informs the Project Director, who in return informs the Managing Director.	**The incident resulted in more than one day's absence from work.** For example, when a person is taken to hospital and is not able to work the next day. E.g. a tool fell from a pole and hit a ground man's head that requires stitches.
RESTRICTED WORK	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager 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 E.g. a person injures his arm and can't do site work, the person is sent to do office work
MINOR INCIDENT(WITH BODILY INJURIES)	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager 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. NOTE: When only a third party is injured, this is treated as a Near Miss. 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
NEAR MISS (NO BODILY INJURIES)	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager The Project Manager informs the Project Director, who in return informs the Managing Director.	**An incident that occurred already but it did not cause any personnel injury.** E.g. a tool fell from a pole but did not hit anybody or hit the helmet without injury.
POTENTIAL INCIDENT (NO BODILY INJURIES)	Daytime within 24 hours by phone, SMS, or email. Site Manager/Local Project Manager informs Project Manager The Project Manager informs the Project Director, who in return informs the Managing Director.	**An event that could happen in the future if it is not prevented by preventing action.** E.g. a tool could fall because it is not put properly into the tool pocket. E.g. car tires are slippery and may not be safe if rains.

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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 inmind, 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.

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3.5.2. Load handling.

Load handling implies potential hazards, with high−risk levels for both operators and labor 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.

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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 suchas caution tape, flagging, or local material such as thornbushes. This fulfills the goal ofstopping 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 equipment 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;

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- 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 present 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 carriedout from the ladder;
- ✓ To use short ladders spliced together;
- ✓ To place ladders on insecure supports (loose bricks or other loose packing) to obtain extraheight;
- ✓ When using extension ladders an overlap of two rungs is recommended for a length of 5 mand 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 conductingany 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 withoutcracking, breaking, or taking a permanent deformation
- **Lanyard**: The lanyard must be a rope or shock-absorbing web lanyard. The lanyard and allof 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 oneworker.
- **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, andonly that size and type of line used.
- **Anchorage:** The strength of any fall protection system is dependent on a secureattachment 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 contractorwill 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 fallprotection systems before assigning the work to employees;
- Adopt a 100% fall protection policy that makes provision for secondary fall protection forall 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 recognizedinternational standard;
- Review work to identify the methods to achieve 100% fall protection beforethecommencement 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 willonly be used for fall protection;

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- 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 fromheight.

3.7. Fire prevention and protection.

Fire protection and prevention shall be followed throughout all phases of the construction anddismantling. 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 firefightingequipment 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 anysources 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 tooxidation;
- 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 firewhen 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 ne 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 potentialbodily 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;

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- ✓ 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 choked, 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 anytripping, 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 clearof debris, waste, and other rubbish. To minimize any incidents to bystanders, site personnel shall identify work areas through cleardemarcation signs to avoid access to restricted zones:

3.9.3. Tools and equipment

To ensure a safe operation, the following guidelines are described:

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- 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, usingan approved checklist, when the equipment is first placed at the job site and whenever the equipment is demobilized and successively placed back on t h e 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, immediatelyafter 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 ofworkers (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 andcontrolling 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 drugsIt 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

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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 OHSPactivities 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 OHSPfunctions 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 regularlyimplemented for each daily work assignment.

4.2.3. Toolbox talks

Toolbox talks communicate the risks identified for project activities and daily work including potentialhazards 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 tocarry 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

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- Competency is achieved.

Contractors will be required to report on their training activities, and the Project will maintain records of all training delivered.

Table 91: 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 flan has been developed to protect employees from safety hazards that may beencountered 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 trainingin 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 toperform 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.

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Employees are responsible for reporting hazardous practices or situations to the Supervisor/Foreman, as well as reportingincidents 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 ifsuch 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 loadedor 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 mightimpair their proper function.

Manufactured materials and equipment used for protective systems will be used and maintained in amanner 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 isotherwise suitable for safe use, then the material or equipment will be removed from service and willbe 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 unlessprecautions 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 maybe encountered during erection works and the use of heavy machinery like cranes. All employers involvedin pole erection works have complete knowledge of pole election. 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;

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- 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 contractorwill 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 fallprotection systems before assigning the work to employees;
- Adopt a 100% fall protection policy that makes provision for secondary fall protection forall 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 willonly 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 fromheight.

5.4. Stringing works

Employees shall not be permitted under overhead operations or on cross-arms while aconductor 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 beprovided, 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 protectemployees 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 theyreceive continuously. This plan is intended to ensure that:

- Control before the work of grounding and safety of power lines interfering with line of work andequipment;
- 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 thestringing of conductors;
- Use of one radiotelephone for operators at the puller, and at any locationdeemed 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 theircapacities;
- 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.

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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 andadequate 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 andcaution 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 pullingsetup.

5.7. Barricades and traffic control plans

The contractor will properly erect and maintain barricades and barriers in such a manner that they provideadequate 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 thata 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, untilthe arrival of paramedic assistance via the Emergency Services;
- Treatment of minor injuries that would otherwise receive no treatment or are not sufficientlyserious 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 includegiving medication.

6.2. Emergency procedures

The general procedures applicable in emergencies must be followed to implement theappropriate 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
Report to supervisor; **Restore** all working and safety conditions.	**Report** to supervisor; **Provide** first aid and sendthe injured to the Hospital; **Restore** all working and safety conditions.	**Report t** o supervisor; **Provide** first aid; In case of emergency communicate with external means of relief for intervention; Indicate the correct location andnumber of victims

The contractor will implement procedures and will provide all emergency equipment and supplies neededto support the work and each work location. The enclosure above illustrates the procedures and guidelines in case of an accident.

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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 andthe 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, orother 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 logdocumenting 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 flammableliquids shall be stored in approved Flammable Liquid Storage Cans. Only the quantity necessary for thejob 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 firstaid. If no life threat is present, do not move the victim until the condition is known to be safe to moveor 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, whohas 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 followingpersonnel:

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1) Paramedic;
2) Ambulance driver.

The Paramedic/ Site Manager will advise personnel at the emergency scene about what actionis 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 isrequired, 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 theinjured 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. Thedegree, 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 severedanger. 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 involvingexpenditures 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 waitingfor the patient's arrival.
- Field first aiders will proceed on foot if necessary to the accident site with all necessaryequipment for patient stabilization.
- Other work groups near the site of the incident are to stop work if necessary and assist medicalpersonnel in case stretcher carriers etc are required.
- If the patient can walk or be moved safely by his companions, they are to make their waytowards 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 roughterrain.
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 andunder 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.

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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 disposalwill 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 exposureduring 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 anyhazard All employees involved in the collection, transport, and disposal of Hazardous substances are to be providedwith 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

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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

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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

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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 southern 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.

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