

RWANDA ENERGY GROUP

ENERGY DEVELOPMENT CORPORATION LIMITED (EDCL)

ELECTRICITY ACCESS ROLL-OUT PROGRAMME (EARP)

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR ELECTRIFICATION OF MV
AND LV LINES UNDER PRESIDENTIAL PLEDGE IN MUSANZE DISTRICT**

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EXECUTIVE SUMMARY

An African Development Bank (AfDB) team carried out a joint preparation and appraisal mission on the proposed Results-Based Financing (RBF) operation for Scaling up Electricity Access Program II (SEAP II). The objective of the mission was finalize the discussions with GoR on the specific/ details of the energy sector RBF Program. The proposed RBF Program to be supported by the Bank will seek to improve the power supply reliability and increase on-grid access in Kigali city and countrywide. The areas of focus of the RBF program were discussed wit GoR and are in line with the four high-level target set in the ESSP 2018-2024. The RBF program will be implemented in three (3 years, from 2018-2019 to 2020/2021 and is expected to achieve the following:

- Improve reliability of electricity supply;
- Increase on-grid access for household and productive users;
- Increase off-grid access to renewable energy: Low income, isolated rural households will be supported in accessing off-grid solutions such as solar home systems (SHS) in order to increase access
- Institutional strengthening and capacity building.

The RBF will allow the Government of Rwanda to achieve and expand upon result from Electricity Access Rollout Programme EARP which continues to construct the backbone of the power supply system to rural areas and will align generation capacity and demand to achieve an efficient tariff. EARP is being implemented within the framework of a Sector Wide Approach (SWAP) to encompass all donors active in the sector under one common sector investment program.

The aim of RBF is to increase Access to Electricity and to Strengthen Capacity in Electricity Sector with an aim to improve the performance of the electricity sector institution. The project will finance the activities of MV and LV lines distribution electricity network in Northern Province of Rwanda. However, those activities will have adverse impact (both positive and negative) on environment and on connected communities. Before project implementation, it will need an environmental clearance given by RDB. To get this Clearance, each developer must prepare and elaborate the Environmental and Social Impact Assessment (ESIA) report and submit it to this institution.

In Rwanda, legislative and policy framework for environmental assessment are clearly highlighted the most of the laws, policies and guidelines such as: Constitution of the Republic of Rwanda,

Rwanda Vision 2020, and National Environmental Policy. Law on Environment, Environmental Impact Assessment Regulations, Ministerial Order No 001/2019 OF 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment, General guidelines and Procedures for SEA, Energy Policy, Land Policy.

In addition, Rwanda is a signatory country of many international and regional conventions and treaties related to the environmental protection and legislative environmental guidelines and most important the World Bank operation policies as one of the major funding agencies of EARP activities (ESMF-EUCL, 2015).

From the environmental point of view, there is actually growing concern in Rwanda that in the execution phase, many kinds of development projects may cause damage to the environment in general and on human population in particular. Article 46 of LAW N°48/2018 of 13/08/2018 on Environment 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.

Before, starting the project implementation, EDCL/EARP proceed to assess the Impact, and set up proper mitigation measures to ensure that any possible harm to the environment is well managed. The project will be implemented in Northern Province, Musanze District, Busogo Sector in Nyagisozi, Kavumu and Gisesero cells.

The present study will highlight on the potentials environmental and social impacts of the subprojects in the area, and will facilitate to identify corresponding mitigations measures to be put in place for avoiding, reducing, minimizing or compensating potentials adverse impacts likely to arise due to the project.

ACRONYMS

ADB	African Development Bank
BP	Bank Policies
CAS	Country Assistance Strategy
CFL	Compact Fluorescent Lamp
CSP	Country Strategy Paper
DDP	District Development Plan
EA	Environmental Assessment
EAC	East African Community
EARP	Electricity Access Roll out Programme
EDPRS	Economic Development and Poverty Reduction Strategy
EIA	Environmental Impact Assessment
EPC	Engineering Procurement Construction
ESA	Environmental Security Assessment
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
EWSA	Energy Water and Sanitation
FDG	Focus Discussion Group
GEF	Global Environment Facility
GDP	Growth Domestic Product
GoR	Government of Rwanda

HH	Households
IDA	International Development Agency
IMCE	Integrated Management of Critical Ecosystem
IWRM	Integrated Water Resources Management
MDG	Millennium Development Goal
MINAGRI	Ministry of Agriculture
MINALOC	Ministry of Local Government
MINEAC	Ministry for East African Community
MINECOFIN	Ministry of Finance and Economic Planning
MININFRA	Ministry of Infrastructure
MINIRENA	Ministry of Natural Resources
NAFA	National Agro Forestry Authority
NEPAD	New Partnership for Africa's Development
OFID	OPEC Funds for International Development
OP	Operational Facility
PPE	Personal Protective Equipment
PPP	Policy, Plan, or Program
PRSP	Poverty Reduction Strategy Plan
RAP	Resettlement Action Plan
REMA	Rwanda Environment Management Authority
SEAP	Rwanda Electricity Sector Strengthening Project

RPF	Resettlement Plan Framework
SEA	Strategic Environmental Assessment
SWAp	Sector Wide Approach
UNCBD	UN Convention on Biological Diversity
UNCCD	UN Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
WHO	World Health Organization

GLOSSARY OF TERMS

Environment: The physical factors of the surroundings of the human being including land, water, atmosphere, climate, and the biological factors of fauna and flora as well as the cultural, social, and economic aspects of human activity (Adapted from REMA 2006).

Environmental impact: Effects on the environment and natural resources that may be positive and/or negative and produce benefits and/or costs (Adapted from REMA 2006).

Environmental Impact Assessment (EIA): The systematic evaluation of a project to determine its impact on the environment and natural resources (Adapted from REMA 2006).

Environmental security: A condition in which a nation or region, through sound governance, capable management, and sustainable utilization of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the welfare of its population (FESS 2009).

Environmental sustainability: Management of natural resources and the environment that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

Policy: Strategy with defined objectives, set priorities, rules, and mechanisms to implement objectives. (Adapted from Partidário 2009)

Plan: Priority, option, or measure for resource allocation according to resource suitability and availability, following the orientation of and implementing relevant sectorial and global policies (Adapted from Partidário 2009).

Program: Organized agenda with defined objectives to be achieved during program implementation, with specification of activities and program investments, in the framework of relevant policies and plans (Adapted from Partidário 2009).

Project: A detailed proposal, scheme, or design of any development design or development activity, which represents an investment, involves construction works, and implements policy/planning objectives (Adapted from Partidário 2009).

Scoping A process of establishing the principal issues to be addressed in the SEA, the decision criteria, and indicators of desirable outcomes.

Screening: A process of determining whether SEA is required for a specific PPP.

Social sustainability: Social sustainability refers to the continuous betterment of human well-being and welfare through access to health, nutrition, education, shelter, and gainful employment, as well as through maintenance of effective participation in decision-making within and across generations (Adapted from Maler and Munasinghe 1996).

Stakeholders: Individuals, communities, government agencies, private organizations, non-governmental organizations, or others having an interest or stake in the SEA process and outcomes of the policies, plans, and/or program (Adapted from REMA 2006).

Strategic Environmental Assessment (SEA): “A systematic, on-going process for evaluating at the earliest stage, the environmental quality and consequences of alternative visions and development intentions incorporated in Policy, Planning or Programme initiatives to ensure full integration of relevant biophysical, economic, social and political considerations(EAC 2005).

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CHAP I: INTRODUCTION

The Government of Rwanda (GoR) through the Ministry of Infrastructure initiated through Rwanda Energy Group (REG) and its subsidiary the Energy Development Corporation Limited (EDCL), the Scaling Up Energy Access Programme to contribute to Economic Development and Poverty Reduction Strategy (EDPRS) II targets and be supported from different donors include AfDB as one of main donors. Rwanda is strategically positioning for transitioning into a middle Income country by 2035. In line with its National Strategy for transformation (2017), it seeks to build on its strong development achievements of the past two decades by diversifying its sources of economic growth and promoting the creation of quality jobs by the private sector. To catalyze private investments in both economic and social infrastructure including in energy, transport, ICT, water and sanitation, education and training. It is also expediting business environment reforms and sustaining improvements in efficiency, effectiveness and accountability in public service delivery. Cognizant of the catalytic impact of energy infrastructure on driving growth across different sectors, the Government is targeting 100% access to electricity by 2024.

In the energy sector, the GoR has recently developed the Energy Sector Strategic Plan (ESSP 2018-2024) to sustain the momentum derived during the implementation of ESSP 2012-2018, and as a prerequisite to achieve among others its ambitious electricity generation capacity and access targets of National Strategy for Transformation (NST1).

The project objective is to improve reliable on-grid electricity services for households and priority public institutions in Northern Province. The specific objective is the construction of MV and LV distribution lines in this zone of Musanze District, Busogo Sector, Nyagisozi, Kavumu and Gisesere cells.

GoR's interest in piloting RBF stems from the fact that the Government is already implementing performance management approaches aimed at rapid transformation of public service into a vibrant, value-driven, results-oriented institution that is responsive to citizen's needs.

In compliance with LAW N°48/2018 OF 13/08/2018 on environment requires development projects, activities, and programs that may harmful impacts on environment to undergo Environmental Impact Assessment. The implementation of such projects without EIA will cause the punishments which are in this law in its Article 46.

The aim of EIA preparation is to determine and assess future potential environment and social impacts of construction of distribution lines in this zone and thus set out mitigation, monitoring and institutional measures to be taken during implementation and operations of the proposed investments/activities and to eliminate their adverse environmental and social impacts offset them, or reduce them to acceptable levels.

Rwanda Development Board is responsible for the screening, review and clearance of planned investment subprojects prior to implementation. The use of EIA tool by EDCL would be the instrument, through which the RBF subproject environmental and social impacts are identified, assessed, evaluated and have appropriate mitigation, management and monitoring measures, designed and incorporated within the subproject itself. The AfDB assesses if the latter have been complied with its safeguard requirements.

I.1. OBJECTIVES OF THE ESIA STUDY

The objective of the study is to assist EDCL to develop an Environmental and Impact Assessment (EIA) and Environmental Management Plan (EMP) to ensure that the project is implemented in an environmentally and socially sustainable manner and in full compliance with Rwanda's and World Bank's environmental and social policies and regulations

Specific objectives of the study were as follows:

Analyse the initial state and describe the baseline environmental issues of the areas, which will be covered by the project;

- Identify and characterize the negative and positive potential impacts that could arise as a result of the proposed project's activities implementation;
- Identify appropriate measures to mitigate the identified negative impacts and enhance the positive impacts of the proposed project;
- Compile an Environmental Impact Statement or report, which will assist in decision making about environmental aspects of the proposed development as well as the viability of the proposed project.

I.2.SCOPE OF THE PRESENT STUDY

Scoping was carried out in Musanze District of Northern province of Rwanda in which the project will be implemented. Again, the process was to identify the significant issues which should be addressed by the particular mitigation measures

I.2.1. The Scope and the Baseline Study of the Study broadly include:

- Literature review to collect data relevant to the study area and planned project's activities;
- Environmental and social analysis so as to establish the baseline environmental status of the covered study area;
- Prediction of the potential negative and positive impacts generated by the distribution lines' implementation on the various environmental attributes in the study area;
- Preparation of an Environmental and Social Management Plan (ESMP) outlining the proposed mitigation measures for improving the environmental quality and responsibilities for their application;

I.2.2. Approaches and Methodology

In general, the EIA study team started with the reviewing of all existing baseline information and environment data on the proposed project, including project documents available in REG-EDCL, the review of the relevant Policies, different policies and regulations of the Government of Rwanda, World Bank Policies and guidelines.

I.2.3. Scoping

Upon reviewing the existing information on this project, scoping was done to identify the size and boundaries of the project, key stakeholders, Project Affected People (PAPs), local beneficiaries of the project or have interest in the development of this project. Scoping also directed the study to the area of interest, identifies and predict the likely impact areas and entailed an appropriate assessment of the baseline data obtained on the ground.

The EIA team carried out a detailed analysis of the proposed project through: field visits, interviews with focal groups, local authorities and Project Affected People (PAPs).

I.2.4. Field visits

Visits were made to the project site to assess the socio-physical environment of the proposed project, identify and predict the likely impacts (direct and indirect impacts) and try to propose in advance some appropriate mitigation measures. In addition, the field visits were used to identify the stakeholders especially those who are involved in the project, those who would benefit or be

affected by the project. Meetings with key stakeholders who will be involved in the future subprojects.

I.2.5. Interviews

Interviews were conducted mainly with different stakeholders (EDCL and EUCL staffs, manpower, engineers, Branch managers who are living in the surrounding project sites), residents, PAs, District, Sector and Cell officials among others. Interviews were structures or semi-structures.

I.3. IDENTIFICATION OF SIGNIFICANT IMPACTS

After collecting the baseline data from the site visits and interviews with key stakeholders, Scoping matrices were prepared that assessed impacts of activities under planning, construction, operation, commissioning phases. These impacts were measured on their significance based on whether the impact is expected or not, to some extent or unknown, reversible or irreversible. Those impact activities identified on the groups will serve as samples on proposing mitigation measures and eventually setting out the environmental management plan (EMP).

I.4. PROJECT DESCRIPTION

The project's development objectives are to support *“improvement of access to reliable and cost effective electricity services for households and priority public institutions and sustain the reliability of electricity supply in Rwanda and strengthen the institutional capacity of key sector players in the project.”*

I.4.1. Project Component

The project has two main components: (A) Access scale-up, (B) the Environmental Impact Assessment and Social Management Plan (EIA) and Abbreviated Resettlement Action Plan (ARAP).

This round is going to focus on component B (Environmental Impact Assessment and Social Management Plan (EIA) for the Construction of electrical distribution network in Busogo Sector, MUSANZE District. The focus is to connect households and public institutions (schools and health centers) and productive users (Small Industries).

I.4.2. Project activities

The project is expected to be implemented in Northern Province particularly in Musanze District. During the project implementation, the activities will be divided into 4 phases Design and Planning phase, Construction Phase, Commissioning Phase and Operation Phase.

1.4.2.1. During design phase and planning phase

During Design and Planning Phase, it will be a process of survey and mapping for new transmission and distribution routes, site selection in order 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.

1.4.2.2. ROW Clearance

During Construction phase, it will be a process of clearing of the Right of Way (ROW) as the initial activity that will occur during the construction phase. This is done to create the vertical and the horizontal clearance required when constructing power lines. The clearance will be done on 12 meters large (Right of Way). However, only trees and crops which can grow to more than 3 meters height will be cleared on 12 meters; the short crops will be damaged by the passengers only and it is expected to be minimum like not more than 2 meters large. The asset valuation will be done to 12 meters and will cover all trees and crops on that surface.

1.4.2.3. Construction of access roads

There is also provision of Sites Access on which consisting of the provision and maintenance of all access from the main ways to the line routes. The length of the access road is the distance between the edges of public roads to the lines.

The activity of clearing the right-of-way consist on fell any vegetation and dispose of waste material along the entire length of transmission lines. The transmission line right-of-way is 12 meters wide for the 30kv lines symmetrical about the centerline.

1.4.2.4. Foundation excavation and poles erection

Foundation Excavations and erection of poles consists on 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 already known.

1.4.2.5. Installation of mini substations.

MV/LV mini substations or cabins shall be installed in different sites along the transmission path.

These mini substations will play the role of stepping down the electricity from MV to LV before distributing to consumers. These mini substations are basically small housing units made of concrete and fitted with transformers and electrical gadgets.

During operation phase, it will be operation and maintenance of the transformers, circuit breakers, circuits switches and capacitors that will have been installed during the construction phase. Stations

and mini substations maintenance process will be required. EDCL/EARP will no longer use transformers containing PCBs (as commonly used in old equipment) which are harmful to the environment and humans.

During the Decommissioning phase, it will be a dismantling and removing all the structures from mini substations sites, dismantling the supporting infrastructures and all those structures that were associated with the project implementation. The program also will rehabilitate the site to its former status or near what it was before the project was commissioned.

This electrification project will involve the following technical works:

Construction of aerial MV electrical lines (9.5km of MV Line, 25.6km of LV line, 12 transformers and 1422 Households connections) in:

- Three phase that can be transformable for future industrial zones
- Three phase for remote and inextensible zones
- three-phase for reinforcement of already electrified three-phase zones

I.7. LINE CONFIGURATION

The 30 KV single circuit lines shall be constructed as follows:

Line length : Approximately 9.5km

Types of Poles: Wooden Poles+ Concrete poles and Types of conductors and cable (3 phases ACSR conductor). Switchgear CBS in 3 phases (6mm²)

Insulator Fuse cut-outs and MV surge arrestors

Accessories 88/G/2015-ICB/EARP

Foundations : Compact soil (wooden pole), soil+ cement (steel)

Prepaid meter Single phase

In the project area, EDCL/EARP is planning to connect almost **1,422 households**, which have been identified at the sites (see the table above). Most of households are grouped at the Centers located in rural areas of Northern and Western Province.

CHAP II : POLICY, LEGAL, INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK

I.1 LEGISLATIVE AND POLICY FRAMEWORK FOR ENVIRONMENTAL ASSESSMENT IN RWANDA

II.1.1. Constitution of the Republic of Rwanda

In consideration of the constitution of the republic of Rwanda of 2003 revised in 2015, on its Article 53 on Protection of the environment, which states that everyone has the duty to 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.

II.1.2. Rwanda Vision 2020

The vision 2020 of Rwanda gives strategic actions and inter alia institutes the principle of precaution to mitigate the negative effects caused to the environment by the socio-economic activities, to institute the “polluter pays” principle as well as preventive and penal measures to ensure the safeguard of the environment and to require the environmental impact study of any development project (GoR,2003).

II.1.3. National Environmental Policy (NEP)

The overall objective of the Environmental Policy is the improvement of man’s wellbeing, the judicious utilization of natural resources and the protection and rational management of ecosystems for a sustainable and fair development.

The Policy seeks to achieve this through the following objectives:

- i. To improve the health and the quality of life for every citizen and promote sustainable socio-economic development through a rational management and utilization of resources and environment;
- ii. To integrate environmental aspects into all the development policies, planning and in all activities carried out at the national, provincial and local level, with the full participation of the population;
- iii. To conserve, preserve and restore ecosystems and maintain ecological and systems functioning, which are life supports, particularly the conservation of national biological diversity;
- iv. Optimum utilization of resources and attain a sustainable level of consumption of resources;

- v. To create awareness among the public to understand and appreciate the relationship between environment and development;
- vi. To ensure the participation of individuals and the community in the activities for the improvement of environment with special attention to women and the youth and
- vii. To ensure the meeting of the basic needs of today's population and those of future generations.

II.1.4. Law n°48/2018 of 13/08/2018 on environment

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 authorised in writing to do so by the Authority. If the approval is made by an authorised 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.

II.1.5. Ministerial order no 001/2019 of 15/04/2019

This order determines the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment. In its Article 3, Annex 1 it 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 in the list of the projects that must undergo the full EIA. It stipulates that projects of construction of hydro-dams, hydropower plants and electrical lines of high and medium voltage must undergo the full EIA before the commencement of the Works.

II.1.6. 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 pretext of self-centered 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, land owners 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, or 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 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 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 in 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. **Article 38** stipulates that compensation shall be deposited into a bank account with a recognized locally-based bank or financial institution.

II.1.7. Environmental Impact Assessment guidelines 2006

REMA has now developed the EIA regulations which provide a guide and requirements for EIA in Rwanda. According to these new 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 in accordance with 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.

II.2. RELEVANT POLICIES.

II.2.1. National Policy on EIA

The Constitution of the Republic of Rwanda, adopted in June 2003 revised in 2015, ensures the protection and sustainable management of environment in its article 53. LAW N°48/2018 OF 13/08/2018 on environment and various socioeconomic development policies and strategies such as “Rwanda Investment and Exports Strategic Action Plan, 2005-2007” and “Vision 2020” call for a well regulated environment management system that takes into account principles of sustainable development while at the same time contributing to poverty reduction.

The Law N°48/2018 OF 13/08/2018 on environment requires that projects, programmes and policies that may affect the environment shall be subjected to environmental impact assessment before obtaining authorisation for implementation.

EIA is an invaluable tool for environmental management in a trans-boundary context, playing role in information dissemination between Rwanda and neighbouring countries and widening the scope of understanding of impacts beyond its borders. EIA process in Rwanda provides a pretext and basis for future international cooperation and conflict resolution concerning environmental impacts at a regional level (GoR,2006).

II.2.2. Energy Policy

The national policy goal is to meet the energy challenges and needs of the Rwandan population for economic and social development in an environmentally sound and sustainable manner.

Since 1994, the energy sector as well as the overall economy has gone through structural modifications, where the role of the Government has changed, markets have been liberalised and private sector initiatives encouraged. Hence, the energy policy document has to take into account structural changes in the economy and political transformations at national and international levels.

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

The Energy Policy, therefore, focuses on market mechanisms and means to reach the objective, and achieve an efficient energy sector with a balance between national and commercial interests.

An interactive and participatory process between Government, other stakeholders and relevant groups has been necessary as part of the formulation process in order to incorporate views of market actors and energy consumers to address the complex nature of the sector. Specifically, the energy policy takes into consideration the need to:

- i. Have affordable and reliable energy supplies country wide;
- ii. Reform the market for energy services and establishes an adequate institutional framework, which facilitates investment, expansion of services, efficient pricing mechanisms and other financial incentives;
- iii. Enhance the development and utilization of indigenous and renewable energy sources and technologies,
- iv. Adequately take into account environmental considerations for all energy activities,
- v. Increase energy efficiency and conservation in all sectors; and
- vi. Increase energy education and build gender-balanced capacity in energy planning, implementation and monitoring.

Domestic energy demand has grown rapidly due to population growth and the increase in economic activities especially during the last ten years. The vision of the energy sector is to effectively contribute to the growth of the national economy and thereby improve the standard of living for the entire nation in a sustainable and environmentally sound manner. The mission of the energy sector is to create conditions for the provision of safe, reliable, efficient, cost-effective and environmentally appropriate energy services to all sectors on a sustainable basis. By fulfilling its vision and mission, the energy sector will contribute to social economic development, and in the long-term framework, poverty reduction.

The national energy policy objectives are to ensure availability of reliable and affordable energy supplies and their use in a rational and sustainable manner in order to support national development goals. The national energy policy, therefore, aims to establish an efficient energy production, procurement, transportation, distribution and end-use systems in an environmentally sound and sustainable manner (MININFRA,2004).

II.2.3. Land Policy

Apart from a few scattered land regulations, most of which date back to the colonial period, Rwanda has never had a proper land policy nor has it ever had a land law, a situation that enhances the existing duality between the very restrictive written law and the widely practiced customary law, giving rise to insecurity, instability and precariousness of land tenure.

The Rwandan Government, therefore, found it compelling and necessary to establish a national land policy that would guarantee a safe and stable form of land tenure, and bring about a rational and planned use of land while ensuring sound land management and an efficient land administration.

Currently, the land tenure system in Rwanda operates in a dual legal system: On one hand, there is: the customary law, which governs almost all the rural land and promotes the excessive parceling out of plots through the successive father-to-son inheritance system. And 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).

II.2.4. LAW N° 43/2013 OF 16/06/2013 GOVERNING LAND IN RWANDA

Article 34 stipulates that the land owner shall enjoy full rights to exploit his/her land in accordance with the provisions of this Law and other laws. The State recognizes the right to freely own land and shall protect the land owner from being dispossessed of the land whether totally or partially, except in case of expropriation due to public interest. Article 35 determining the developments found on land presumed to be land owner's property stipulates that all buildings, crops and other works found on land that have been performed by the land owner using his/her money or otherwise are presumed to be his / hers. However, this does not prohibit any other person to own buildings, crops and any other works on other person land in accordance with procedures provided for by this Law, other laws or agreement with the land owner. When buildings or crops have been developed by a person on the land that is not his/hers through procedures that are contrary to laws or agreement with land owner, the later has the right to request the person who performed them to remove such development without prejudice to the land owner to claim indemnities for any damages suffered.

II.2.5. Rwanda building control regulations

The Rwanda Building Control Regulations serves as a standard reference for the regulation of planning and design of all buildings in Rwanda. The regulations will facilitate professional practice in the construction sector and reduce the emergence of informal developments to ensure well-planned and safe building and housing facilities, which are environmental friendly in the country.

The document also provides regulations in the different areas including electrical installations; Safety: equipment, escape routes and fire alarm; Site activities: construction and site operations etc. According to the national regulations set by Rwanda Utility Regulations Authorities (RURA) the power lines of 30KV should be centered within the RoW of 12m. According to Guidelines n°01/GL/EL-EWS/RURA/2015 on right-of-way for power lines, Permanent buildings, including foundations and overhangs, pools, septic tanks, dumps, junkyards, wells, fueling or fuel storage facilities, garbage, recycling receptacles and other non-compatible uses shall not be permitted on the Right-of-Way

II.3. INTERNATIONAL LEGISLATIVE FRAMEWORK

II.3.1 Environmental International Conventions

Rwanda has signed and ratified the following environmental international conventions which are to some extent in line with this project and the national policies and laws:

The international Convention on Biological diversity and its habitat signed in Rio de Janeiro in Brazil on 5 June 1992, as approved by Presidential Order No 017/01 of 18 March 1995;

- o 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;
- o 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;
- o 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;
- o 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;
- o 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;
- o 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;

- o The Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their disposal as adopted at Basel on 22 March 1989, and approved by Presidential Order No 29/01 of 24 August 2003 approving the membership of Rwanda;
- o The Montreal International Conventional on Substances that deplete the Ozone layer, signed in London (1990), Copenhagen (1992), Montreal (1997), 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;
- o 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;
- o 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.

II.3.2. International agreements

The following table indicates different agreements, date of signature and date of ratification where Rwanda is a signatory:

Table 1: 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 the 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 Vienna on the protection of the ozone layer		6/12/2002
5	Agreement of Ramsar related to humid	1971	6/6/2003

	zones of international importance particularly the wild housing		
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 the nature conservation and natural resources	15/09/1968	20/05/1975

These treaties and international agreements are relevant for the protection and the conservation of the environment and the biodiversity in Rwanda together with the mobilization of funds as well as at the bilateral and multilateral level (EARP-SEA,2013).

II.4. WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES

World Bank Operational Policies (OP) and Bank Procedures (BP) Environmental Assessment - BP4.01 and OP 4.01 (January 1999 all of which require environmental assessment of projects proposed for World Bank financing to help ensure that they are environmentally sound and sustainable. The World Bank provides guidance on EA requirements through the Environmental Assessment Sourcebook (World Bank 1994) which includes sectoral guidelines. The World Bank EA process is implemented through a set of Operational Policies/Directives whose primary objective is to ensure that Bank operations do not cause adverse impacts and those they “do no harm”. These safeguard policies are grouped into Environment, Rural Development, Social Development and International Law.

The following safeguard policies have been considered in the EARP- SEA.

II.4.1. OP/BP 4.01 Environmental Assessment (January 1999).

Environmental Assessment is one of the 10 safeguard policies of the World Bank. The World Bank Environment and Social Safeguard Policy aims at improving decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01. The World Bank system assigns a project to one of three project categories, as defined below:

Category A: Environmental Assessments are normally required because the project may have diverse significant impacts (projects in this category are forestry, large industrial plants, irrigation and drainage, mineral development (including oil and gas), pipelines (oil, gas, and water), resettlement, rural roads, tourism, urban development, large transmission lines, etc.).

Category B: A limited environmental analysis is appropriate, as the project may have specific environmental impacts. Projects in this category include agro-industries (small scale), aquaculture & marine culture, small industries, mini-hydropower station, public facilities (hospitals, schools, housing complexes, rural electrification, telecommunications, small-scale tourism, rural water supply, etc.

Category C: Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts. Projects in this category include education, family planning, nutrition, institutional development, technical assistance, etc.

II.4.2. OP/BP 4.12 Involuntary Resettlement (December 2001)

Details involuntary resettlement, emphasizing the severe economic, social and environmental risks, if unmitigated. It ensures that the population displaced by a project receives benefits from it and also covers those with usufruct or customary rights to land or other resources taken for the project. The Operational Policy is specifically inclusive, ensuring that all those affected both directly and indirectly by project developments are compensated as part of the project. Affected population, include those with income derived from informal sector and non-farm activities, and from common property resources. The absence of legal title does not limit rights to compensation. The World Bank's Policy objectives urge that involuntary resettlement be avoided whenever possible. If unavoidable, displaced persons need to:

- o Share in project benefits,
- o Participate in planning and implementation of resettlement programs, and
- o Be assisted in their efforts to improve their livelihoods or standard of livings or at least to restore them, in real terms, to pre-displacement levels or levels prevailing prior to the beginning of project implementation, whichever is higher. OP 7.50: International Waterways

Operational Policy (OP)/Bank Procedure (BP) 7.50: Projects on International Waterways may affect the relations between the World Bank and its borrowers, and between riparian states. Therefore, the

Bank attaches great importance to the riparians making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard. In the absence of such agreements or arrangements, the Bank requires, as a general rule, that the prospective borrower notifies the other riparians of the project.

The Policy lays down detailed procedures for the notification requirement, including the role of the Bank in affecting the notification, period of reply and the procedures in case there is an objection by one of the riparian's to the program.

II.5. ENVIRONMENTAL INSTITUTIONS

Institutional framework for environmental management in Rwanda:

The institutional framework for environmental management is currently enshrined in the Organic Law determining the modalities of protection, conservation and promotion of the environment in Rwanda, published in the Official Gazette RWA N° 9 of the 1st May 2005, particularly in its chapter III relating to the establishment of the institutions.

In Rwanda, the implementation of natural resources management and environment policies and sectorial strategies involves several stakeholders, including government state institutions, NGOs, civil society, the private sector, decentralised entities and donors.

Likewise, at regional levels, many actors in the five member countries are involved in carrying out environmental management interventions at different levels, using different modalities and applying different standards. In order to co-ordinate and harmonise different management approaches besides policies, laws, regulations, agreements and standards.

II.5.1. Ministry of Environment (MoE).

Ministry of Environment is responsible for the development of policies, laws and regulations as well as coordination of all activities in the management of land, water resources, forest, mining activities and environment, as well as their follow up and evaluation.

II.5.2. Other Key Ministries and institutions

- o **MINAGRI:** sets national policies on agriculture, livestock and fisheries and provides guidelines and standards for land use management including terracing. MINAGRI is also charged with development of arable land for agricultural production and animal husbandry. The Ministry works closely with RAB, LWH and RSSP which provide technical support and regulatory oversight in the procurement and distribution of agriculture and livestock facilities for beneficiary communities.

- **MINALOC:** Under the framework of decentralization, MINALOC oversees the implementation of the decentralization process as well as relevant community and social protection programmes. This Ministry is also responsible for environment governance and therefore for mobilizing the public to participate in the management and protection of natural resources.
- Districts are responsible for production and protection of water, tourism, and the environment. Similarly, cities, towns, and municipalities are responsible for land and environmental management, urban planning, road maintenance, maintenance of protected and recreational areas, and providing drinking water, sanitation, and waste treatment and disposal. MINALOC is overseeing various community environment management related programmes in the districts. These include: Vision 2020 Umurenge, HIMO, Ubudehe and CDF which involve poor communities to participate in various initiatives aimed at enhancing their income.
- **MINICOM:** sets policy for trade, tourism and cooperatives and industries (including small scale artisans). MINICOM is responsible for the promotion of industries, trade and organization of agro-livestock production cooperatives and management of protected tourism areas. The Ministry promotes export and marketing of handcraft and tourism as well development and regulation cooperatives and rural association. MINCOM is therefore charged with integrating environment in trade and industrial policies and strategies including promotion of friendly environmental export trade of handcraft and tourism; promotion of cooperative and rural associations.
- **MININFRA:** is responsible for setting policies related to energy include electricity; urbanization and settlements; road and communication infrastructure; Meteorology, Urban Water supply. MININFRA oversees the resettlement and housing of people. The Ministry is also charged with constructing infrastructures that protect the environment where different assessments are prioritized. Besides organizing human settlement MININFRA has the mandate for town planning, public infrastructure and transport; the management of water supply as well as actions to encourage water harvesting in the settlement and housing sector.
- **MINECOFIN:** is responsible for Macroeconomic policy instruments, resource mobilization, and coordination of development partners and allocation of budgets to different Ministries and sectors. MINECOFIN is also charged with overseeing and advising on the formation of various Funds (including the Environment and Forestry Funds). It is also concerned with

mainstreaming natural resources and environment concerns in the budgetary, PRSP and DDP processes.

- o **MINIJUST:** is the lead Ministry responsible for development and advising on formulation of laws and regulations in the country. The Ministry oversees the formulation and enactment of various laws and regulations including those that are pertinent and regarding to the ENR sectors. It is charged with advising and following up regional laws including the domestication of EAC treaty as well as providing advisory and legal support pertinent to conflicts resolution.
- o **MIGEPROF:** sets policies and guidelines for mainstreaming gender in formulation and implementation of central and local governments' programmes. The Ministry is mandated to guide MININERA and local governments to mainstream gender related issues in natural resource and environment management and mobilize communities (women, men and youth) in the activities of natural resource and environment protection and management.
- o **MINISANTE:** is responsible for development and overseeing the implementation of Environmental health related programmes that mitigate water borne diseases, malnutrition and HIV/AIDS. The Ministry is also concerned with promoting of hygiene among the population; developing policies, strategies and guidelines for sanitation as well as medical waste disposal and treatment.
- o **MINEDUC:** is responsible for training human resources in the management and protection of natural resources; It oversees the implementation of environmental education programmes in schools (by supporting Environmental Clubs), as well as initiating the process of mainstreaming environmental assessment into schools.
- o **Rwanda Environment Management Authority (REMA):** in 2002, Rwanda Environment Management Authority (REMA) was established to act as the implementation organ of environment-related policies and laws. REMA is also tasked to coordinate different environmental protection activities undertaken by environmental promotion agencies; to promote the integration of environmental issues in development policies, projects, plans and programmes (due the implication of EIA and SEA); to coordinate implementation of Government policies and decisions taken by the Board of Directors and ensure the integration of environmental issues in national planning among concerned departments and institutions within the Government; to advise the Government with regard to the legislation

and other measures relating to environmental management or implementation of conventions, treaties and international agreements relevant to the field of environment as and when necessary; to make proposals to the Government in the field of environmental policies and strategies.

- o **Energy Development Corporation Limited (EDCL):** The Company has as mission to create conditions for the provision of sufficient, safe, reliable, efficient, cost-effective and environmentally appropriate energy, supply energy services to households and to all economic sectors on a sustainable basis. It has a vision of contributing effectively to the growth of the national economy and thereby improve the standard of living for the entire nation in a sustainable and environmentally sound manner.
- o **RDB (Rwanda Development Board):** The Rwanda Development Board is evidence that Rwanda is open for business. It is truly a “one stop shop (Centre) for all investors”. Rwanda Development Board was set up by bringing together all the government agencies responsible for the entire investor experience under one roof.
- o **Rwanda Utilities Regulatory Agency (RURA)**

The RURA energy sector's mission is to control and regulate an efficient, sustainable and reliable energy sector in a transparent and fair manner for the benefit of all stakeholders.

- o **Provincial, District and Lower level Environmental Committees**

The Rwandan National Environment Policy of 2003 also proposed the establishment of provincial, district and lower level environmental committees beside the establishment of REMA responsible for environmental protection (MINITERE,2005).

CHAP III: ENVIRONMENTAL BASELINE DATA

III.1. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

This chapter gives background information of the subproject area as whole specific sites in terms of its location, physical and socio-economic environment, which will play a crucial role in the identification, predict and analysis of environment impacts and proposed the appropriate mitigations of measures and influence the overall direction in the development of the subproject.

III.1.1. Subproject Location

The subproject will be implemented in Northern Province, Musanze District in Busogo Sector.

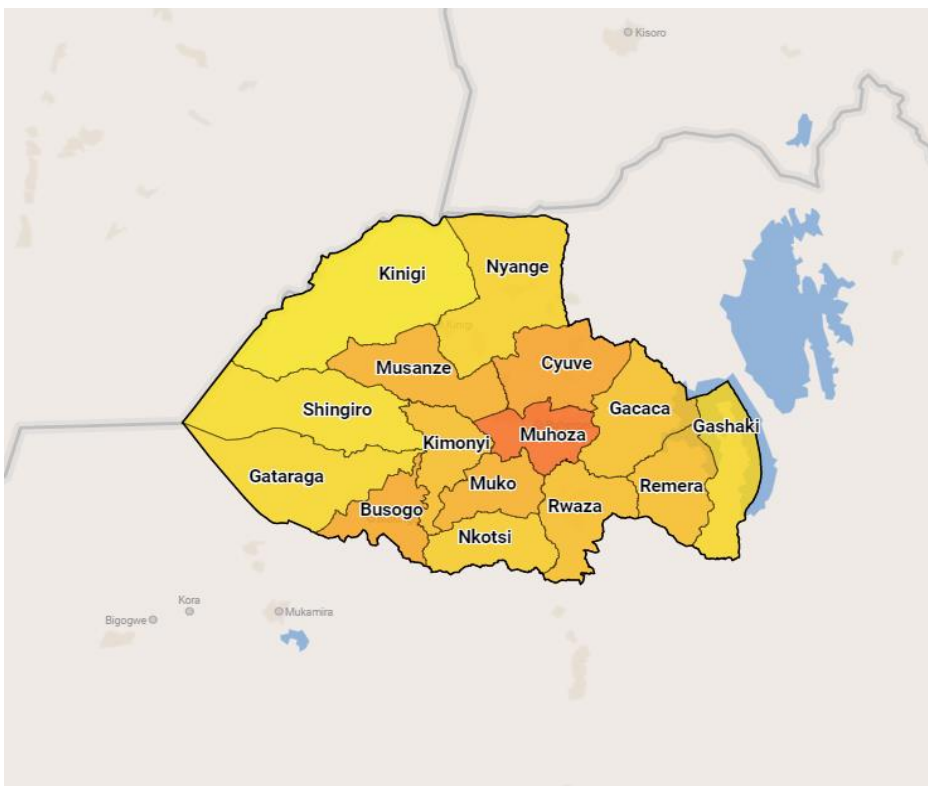


Figure 1: Musanze District map

III.1.2 Relief and Climate

The line route is situated at an average altitude of 2,105 m in Busogo Sector, with one of the coldest climates in Rwanda (an average temperature of 16.2°C). The climatic relief of Musanze as shown by data from meteo Rwanda shows that the District and the region experience heavy rainfall with an average of 1420/year, the months of March, April and May having the highest rainfall. Musanze district especially in Busogo sector, it is characterized by cold and breezy days that are

followed by cooler nights; making it a common feature of the residents to be clad in heavy sweaters. However the rainy season is intense in this sector throughout the year. April and May normally have the heaviest rains, whereas October and November have a much more moderate rainy period.

The climate is of the type wet, characterized by two dry seasons and two rainy seasons which set out again over all the year in the following way: a small dry season extends from mid-December at February a great season of rain extends from March in mid-June a great dry season extends from June until September and a small season of rain extends from mid-September at December. Annual precipitations reach an average of 1420 mm; the temperature varies between 10.4o C and 22.3o C, according to the places and the season.

III.1.3 Hydrography

The hydraulic network of Musanze is formed by temporary torrents and permanent watercourses. Torrents surge during strong storms, and are triggered by water coming downhill from the volcanoes. These torrents cause severe erosion, sedimentation and crop losses. The main torrents identified are Susa, Muhe, Rwebeya, Rungu, Cyuve, Kansoro and Mudakama. The district is drained by two main permanent watercourses, which origin is the water table. There is the Mpenge spring, with a rate of flow of 2.3 m³ per second, and the Kigombe spring, with a rate of flow of 0.7 m³ per second. The district is also crossed by the Mukungwa River, which drains Ruhondo Lake. All these watercourses belong to the Nile basin, and they converge into the river Mukungwa, which, in turn, discharges into the Nyabarongo River, which is an affluent of the Akagera River. The general topography of Musanze city in particular has a series of hills and valleys. It has steep slopes up to 1 in 10. Formation and maintenance of roads and drainages in steep terrain is challenging task.

III.1.4. Geology and soils

Musanze has a landscape divided in two main areas: the volcanic plains and the mountain range. The volcanic plains covers the central and North part of the district, including the Musanze, Muhoza, Muko, Kimonyi, Cyuve and Busogo sectors; its average altitude is 1,860 m where in Busogo the average is 2105m. The mountain range is located in the South-East of the district, covering over a third of the total surface of the district. Its altitude ranges from 1,900 m to 2,300 m, covering the Muhoza, Cyuve, Gacaca, Rwaza, Gashaki, Remera, Nkotsi and Busogo sectors. The highest peaks are Kalisimbi (4,507m), Muhabura (4,127 m), Bisoke (3,711 m), Sabyinyo (3,574 m), and Gahinga (3,474 m). The City of Musanze falls largely in the volcanic plains. The soils of Musanze District can be categorized as being volcanic on moderate to steeply slopes with volcanic

ash soils and volcanic lava predominated with stones and shallow rocks. Musanze City is a gateway to the five of the eight famous volcanoes mountain.

III.1.5. Flora and Fauna

Eucalypts plantation is the dominant woody species of the project area. Other types present in the area are the forest agro species such as Alinus and grevilleas. The principal crop plants are the sorghum, the Corn, the bean, the garden pea, the banana tree, the vegetables and the fruit trees.

Essentially, one can find pets such as cows, pork, goats, poultry whereas wild animals are comprised of reptiles, birds, rodents and wild dogs.



Figure 2: plantation in Musanze District, Busogo Sector

III.1.6 Housing and Settlement

The housing in MUSANZE District is characterized by 4 different types: the well-developed urban area (MUSANZE City), urban areas in settlement (Busogo: Byangabo center), in rural areas and house scattered in rural areas (Busogo Sector: Nyagisozi and Kavumu cells). Most of time, you find many households which are scattered in the landscape which makes it difficult to connect many households at the same time.



Figure 3: Scattered Rural settlement in Musanze district, Busogo Sector)

III.2 DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT

III.2.1.AGRICULTURE

With a population of 398,986, Musanze district is divided into 15 sectors; Busogo, Cyuve, Gacaca, Gashaki, Gataraga, Kimonyi, Kinigi, Muhoza, Muko, Musanze, Nkotsi, Nyange, Remera, Rwaza and Shingiro. Agriculture is the lifeblood of the district. At least 91% of the population is engaged in agriculture as the Northern Province including Musanze District is considered as the country's granary. For many years, the District has focused on increasing productivity of agriculture by engaging in increasing the use of fertilizers, crop intensification programs, land consolidation and other crop prioritization which have all helped reduce extreme poverty and food insecurity among the citizens. Consolidated land for 4 prioritized crops has increased production in the last seven years.

Major economic activities are small scale businesses and agriculture. The Northern Province is leading in the agriculture production in country, the region has been blessed by its fertile soils and its geographical location as it bordered by Uganda in the north, and this also boosts business across the border. It has fertile agricultural land, producing crops like, maize, potatoes, beans and coffee. Cows, as well as sheep and goats mainly produce compost for agriculture. The industrial sector in Musanze District is developed but in Busogo Sector especially in the project area (Gisesero, Nyagisozi and Kavumu cells) the infrastructure is still low. However, the University of Busogo (ISAE Busogo) and Byangabo Market center constitute the main source of development of the whole sector. There has been an increase in the acreage for Irish potatoes grown in the district from 10,696.6 hectares in 2010 to 20,101 in 2016. As for beans, the hectares increased from 14,434 and for wheat the figures grew from 1739 hectares to 2759 hectares on consolidated land.

Livestock is another important source of income and food for Musanze where 62.6% of all households raise some type of livestock. From 2011-2017 the district received and distributed 2,767 cows, 1,045 pigs, 757 sheep, 1,506 goats, 2,164 chicken and 3654 rabbits donated by different stakeholders--Central Government, NGOs, and some other private institutions. From 2011 to 2012, the district distributed 479 cows from the Girinka program and by 2016, the number of citizens who had received cows had increased to 2,767. These livestock constitute the main source of compost for farmers.

III.2.2 Socio economic infrastructure

There is usually insufficient of socio-economic infrastructure like roads, water, electricity in the project area where the access to the electricity is 0% against overall Musanze which is electrified at the rate of 55% (REG, Feb 2019) whereas the people in the project area access water from protected spring from more than 800m. Only one earth Road crosses Nyagisozi and kavumu which shows how inaccessible this project area is. It will require manpower to move materials from one distance to another. Access roads for manpower are not too complicated but it will require the certified valuator to value any damage that will be caused by transportation of materials. There are some other paths but these cannot be used by trucks or cars.

III.2.3 Energy

Homes that have power supply in Musanze District are 55% with 49% (ongrid) and 6% (off grid). This electrification is more than the country average which is now 51% (with 47 on grid connection against 14% of off grid connections). Although this electrification rate is high in Musanze as whole,

it is more concentrated in the town whereas in the Busogo sector especially in Gisesero, Nyagisozi and Kavumu, the access is 0%. The main source of lighting is rechargeable torches and kerosene lamps. The main source of energy for cooking is firewood which increases pressure on forest. The electrification of this area would contribute to the reduction of this pressure and development of local people.

III.2.4 Education

The number of schools in Musanze District are categorized into Kindergartens, Primary schools, Secondary schools, collages (Amasomero), Institutes (INES RUHENGERI...) and university (UR-CAVM located in Busogo Sector). 92.3% of Musanze population have attended at least the primary school with 90.5% of male and 93.6% of female, 31.3% attended the secondary school with 24.2% of male population and 36.9% of female population. Only 3.6% of the total population attended the tertiary education with 5.4% of male population against 2.0% of female population. The literacy for the people aged 15 and above is 74.2% with 81 of male and 68.5 of female population(EICV5).

III.2.5 Industries, trade and tourism

The District is involved in the development of small scale industries, especially agro-related ones. The district is encouraging residents to join cooperatives and work together to produce enough materials necessary to feed the available industries. Some of the industries include SOTIRU, wheat processing plant, and SOPYRWA, pyrethrum processing company, construction companies like Haki Construction and Zamura among others. Members of Reba Kure, a 15-member cooperative in Musanze pooled Rwf35, 000 each and invested in buying and selling of produce. Today, the cooperative is an investment group worth millions of francs – having diversified into fabricating machines for small-scale industries.

Other than being the most mountainous district in Rwanda, the district is also home to Volcanoes National Park, home to the unique and world famous mountain gorillas which attract nearly a 30.000 tourists every year from all over the world. It is also in this district that most of Rwanda's mountain gorillas are found, making it the most popular tourist destination in the country. Gorillas epitomize tourism development in Rwanda and provide potential for further increase in visitor numbers and tourism investments.

CHAP IV: IDENTIFICATION, ANALYSE OF KEY POTENTIAL IMPACT AND PROPOSED OF MITIGATIONS MEASURES.

IV.1. NATURE AND EXTEND OF POTENTIAL ENVIRONMENT IMPACT OF PROPOSED ACTIVITIES.

This subproject and its activities will have potential impacts (both positive and negative) on the surrounding and connected communities, both directly and indirectly as there will be direct and indirect interactions between project activities and the environment. This chapter identifies analyses and proposed mitigations measures of these impacts that could arise from the implanted activities during the construction phase, the operational and maintenance phase.

The impacts also applies on socioeconomic environment (health, security, economic activities, employment, finances, population; present land use; planned development activities; community structure; distribution of income, goods and services; recreation; public health; cultural properties, etc.) and to the biophysical environment (fauna, flora, water, air, soil, landscape).

IV.2. IMPACTS IDENTIFICATION

IV.2.1. Impacts during Construction phase

IV.2.1.1. Positive Impacts

Throughout the construction period, local inhabitants of this area are positioned to benefit in the following aspects:

- i. Employment:** to the locals with the bulk of the staff recruited from within the area. The developer will commit to give priority to the locals in the neighbourhood at the time of employing casual or skilled labour. This positive impact is temporary regarding the time of project in the area because people will get jobs for a short period
- ii. Government revenues:** revenues shall be collected by Government from the procurement of construction materials and finishes, employees' salaries, such as; VAT from sold products among others.

- iii. **Project as an income earner to truck and machine owners:** Truck and machine owners will earn from renting out their vehicles for transportation of construction material and machines that will do various construction activities (excavations, clearing, loading, levelling, using graders, excavators, among others). For prediction and analysis of this impact, some local will benefit temporary for this subprojects.
- iv. **Affordability of medical insurance for workers:** Employees shall from their pay afford medical insurance (Mutuelle de santé) and even pay school fees for their children. This impact will give the opportunity to the local workers to keep the good health even this period is very short.
- v. Increased transmission and distribution of electricity to the project area population will reduce the pressure on the use of fuel wood that is high in the region and in effect would help to conserve the fragile and diminishing forest cover of the country by providing an alternative source of energy.
- vi. The long-term direct positive impact is therefore in access to reliable electricity supplies, which will lead to better provision and easier management of goods and services, and enable new facilities for processing and storage. There will be better availability and supply of safe and clean water (which needs pumping); data management with computers is made possible and communication facilities like Internet can be made available, as also charging for mobile phones; also, electric lighting adds to security at night and enables extended opportunities for work and study. Electricity would support overall investment in education and strengthen the ongoing effort of capacity building to overcome critical constraints in the implementation of development programmes. Essential to this effort would be power supply to health facilities for the installation of cold storage facilities for the safe transportation and storage of vaccinations and other vital medications. As a consequence the quality of life and extent of economic opportunity will be changed for the better.

IV.2.1.2. Negative Impacts

The adverse impact will occur later mainly during and after construction and operation phase. For instance, it will be a number of excavations, soil disturbance and increased traffic around the site because of heavy trucks delivering various construction raw materials and taking away the generated waste including construction debris. All these are likely to pollute and degrade the local environment, through mudslides, noise, and dust and air pollution. Potential adverse impacts emanating from construction activities are described in detail here below:

IV.2.2 Impacts at Pre-construction phase

IV.2.2.1. Line Route Survey and Asset losses.

During line route survey and assets losses, there will be a visual of environmental degradation especially destruction of natural vegetation, food and cash crops. Furthermore, it will include the destruction of sensitive ecosystems such as wetlands or protected areas but survey must avoid the zone in terms of taking environment risk. Concerning, the sensitive ecosystems, the contractor has duty to avoid or minimize the impact. To minimize the impact, stakeholders and beneficiaries must be involved on survey and inventory of Assets and Crops.

IV.2.2.2. Site selection and planning design.

Poor site selection for transmission and distribution can be source of destruction of sensitive ecosystems or reviewing the proposed sites. Planner must be aware of environmental conservation and avoiding negative impact of the future proposed subprojects. However, the size of the impact is very low because the right of way is very small.

IV.2.3. Impacts at Construction phase

IV.2.3.1. Earth excavations

During site earth excavation, foundation excavation and site levelling, large masses of soil are likely to displace. The excavation and earth moving will expose the ground to potential erosion from both storm water run-off and wind. The excavation equipment will be a potential source of noise pollution and gases from exhaust. However, the field is hilly with limited access to roads and most of work will be mainly done by manpower. The field will not be left bare-naked after works, there will be a tree replanting to retain the soil.

IV.2.3.2. Heavy truck and machinery movement

There are bound to be trucks delivering construction materials. The consequence of those trucks movement will create noise and air pollution. However, the impact is supposed to be very low as the sites are far from trucks roads and the transportation mainly will be facilitated by manpower. To keep this to the very low likelihood of occurrence, the strategies proposed will be minimizing the number of deliveries through timely scheduling.

IV.2.3.3. Construction of Access Roads

The construction of access roads can impact the environment through vegetation clearance and compaction of land and a permanent loss of land. Provided temporary access roads are rehabilitated and existing roads/tracks are used for access to minimize the number of new roads required, the impact is not expected to be significant at the workplace

IV.2.3.4. Rehabilitate of existing roads.

The rehabilitation of existing tracks can have impact to the environment through vegetation clearance and compaction of land and a permanent loss of land. This activity will be done to minimize the number of new roads required; the impact is not expected to be highly significant.

IV.2.3.5. Construction of power lines

Clearing of vegetation, site compaction and land acquisition has the potential to change land use patterns. However, the area required for each pole and the power line is not expected to have a major adverse impact on land use patterns as there will be no land acquisition.

IV.2.3.6. Disposal of construction debris

Most activities involved in the construction phase are waste generation, such as: metal and debris, concrete, card board, organic waste on site (from fruits, foods....among others). However, debris from different activities during construction shall definitely affect environment. Poor solid waste management creates an eye sore giving the natural beautiful scenery a less pleasing perspective. Collect and dispose of solid waste correctly and bury off sites with applicable government waste management regulations.

IV.2.3.7. Soil and water pollution

Any spillage of fuel from machinery works during operation and maintenance of the power lines may have impact on soil and water. Store of all liquid material (e.g. fuel, engine oil...) must be avoiding rise out.

IV.2.3.8. Impact on Surface and ground water

No significant impacts on the surface and ground waters of the areas are anticipated during the operational phase of the power line.

IV.2.3.9. Sanitary facilities

Given the big number of workers expected during the construction phase, many impacts can be predicted, which are possible bad odors from the latrines that may be a dangerous and nuisance to

the neighboring residents. During the planning phase of the project, temporary and portable toilets shall be planned for being used during site preparation, construction and operational project phases. It is the duty of EDCL to implement the Health, Sanitation and Environment Plan for this subproject.

IV.2.4. Impacts during operation and maintenance phase.

IV.2.4.1 Negative impact

IV.2.4.1.1. Potential hazards/Accidents and electrocution

There is a possibility on lines or poles falling on the ground, and during the operation phase, contact with the power lines can result in electrocution. Even, some injuries or accidents, which will occur at the work place. EDCL must record every hazards, injuries that occur at the site. The medical Kit for First Aid must be at the site for emergency intervention. PPE must be worn properly, and regular inspection on the implementation of Health and Safety plan should be reinforced.

IV.2.4.1.2. Fire risk

The risk of fire outbreaks during severe weather e.g. storms, winds etc. cannot be overruled especially when the electric poles crash or if electrical faults occur in the “mini” substations. 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. The right of way clearance will be maintained and no tree or crops of more than 3 meters high will be grown under MV electrical lines.

IV.2.4.1.3. Accidents at work place from operating of machineries and equipment by workers.

There are sometime potential adverse impacts for accidents and hazards occurring during the operation of the equipment that could lead to loss of life or injury to the workers. However, there is no significant impact at the site during operation and maintenance phase. EDCL must be ready every time to intervene and be aware of the insurance services for compensation.

IV.2.4.1.4. .Public Safety

Placement of low slung lines or lines near human activity (roads, buildings) increases the risk for electrocutions. Also, poles and power lines injuries from workers. A strong mobilization and sensitization of electromagnetic risk to the beneficiaries should be carried out.

IV.2.4.1.5. Birds Strikes/Collusions

Transmissions and distribution networks are known to be a potential source of bird strikes that get entangled to the lines causing their injury or even instant death. This is especially more significant when large flocks of birds migrates from one points to another and usually get struck by these transmission lines. Public service in charge of biodiversity conservation has duty of joining the synergy of birds protection.

IV.2.4.1.6. Aesthetics and visuals related impacts-visuals intrusion on the landscape

Construction works especially inappropriate installation of poles and wires are likely to cause visual intrusion related impacts mainly by having activities out of touch with the natural environment.

CHAP V. PROJECT ALTERNATIVES

V.1 Analysis of “No Project Option

The purpose of this chapter is to examine the possible alternatives for delivering the goals and objectives of the programme. For this particular programme, some options have been considered. In seeking the best alternative, the “status quo” or “do nothing” option and the actual on grid electrification were considered and the alternatives analysis shows that the EARP implementation emerged as the best alternative.

V.2 Alternative Routes

An analysis of alternative routes is undertaken through mapping and involvement of all the stakeholders in this selection process. Alternative routes were selected among the possible ones, based on the following general siting criteria (which are related to economic and environmental values):

- i. Avoidance of restricted zones (forests, parks);
- ii. Distance from zones of landscape value;
- iii. Distance from mountain edges, preference for valley routings;
- iv. Distance from urban areas;
- v. Route with constant slope;
- vi. Minimization of infrastructure crossing).

V.3 On-Grid Electrification

Provide on-grid electrification. This is the alternative that was proposed by this project. Through this, all targeted cells will be provided with electricity from the existing grid system and the new ones to be constructed. The project is expected to significantly reduce demand for firewood, as this is the primary source of heating and lighting in Rwandan communities.

This alternative will contribute positively to improving the lives of the target communities through reduced exposure to smoke, improvement in living conditions, increased communication via use of mobiles and opportunities for seeking alternative livelihood options. Local government institutions will also benefit through reduced time and money spent on sourcing firewood from local communities, as well as increase in accessibility to information through various media sources, internet and improved communication.

V.4 No Project Alternative

A No Project (Do nothing option) alternative would primarily mean that the status quo will be maintained and in a sense the environmental impacts (adverse) will not occur. However the positive benefits will be forgone in terms of providing more access to electricity to the Rwandan population which would have in turn spurred and contributed to economic growth and sustainable management of forest to reduce the pressure on them.

CHAP VI. PUBLIC CONSULTATION

VI.1 INTRODUCTION

The main objective of the public consultations with stakeholders is gathering information on their concerns, perceptions and uncertainties of the changes to be brought about as a result/consequence of Electrification of Musanze District, Busogo Sector in Nyagisozi and Kavumu Cells under this project.

Public consultations were organized to collect first-hand accounts of benefits and grievances from interested/and affected parties by stated project. The discussions provided multiple views within a group context and were particularly useful in exploring the level of consensus on a given felt impact.

Semi structured interviews were organized to gather information from related parties in public consultation settings, by means of discussions guidance's. The guiding questions were used, and a feedback is composing the present section of this ESIA report. Whenever possible, before and/or after the public consultations, the team made physical visits and observations of the proposed Distribution Line.

The exercise identified all the stakeholders within and in the surrounding area including local community, local authorities, civil society and agencies, government projects among other stakeholders.

The public consultations on behalf of the Environmental and Social Impact Assessment (ESIA) study for stated project, was conducted and involved key various stakeholders that include among others Local authorities as representatives of different levels of stakeholders at sector and district levels. Here we mean the one stop Centre of the District (Infrastructure and electricity officials), Sectors executive Secretaries, Infrastructure Managers, to emphasize their participation and involvement through community mobilization, advocacy and facilitations on the side of contractors to come for this project.

The concerned project scope is located in Musanze District, Busogo Sector in Nyagisozi and Kavumu Cells.

VI.2. CONSULTATION FINDINGS AND CONCERNS

The consultations held at local authorities respective offices and at project sites activity and the main objectives of the project to be implemented and what is going to be done during this study section (public consultations) as well as its importance, where parties participated, are going to raise the flow discussions on the following:

- The need of the project,
- identification of different problems related to the lack of power and services to be affected by the project execution,
- Related socio- economic parameters to be considered in enhancing and mitigating associated positive and negative impacts respectively.
- Suggestions and propositions on what can be done to address raised problems due to the project development.

The meeting highlighted different challenges and benefits associated to the development of this project through the above agenda, especially site-based issues that include the following:

- Perception and awareness on expected project
- Increased income generated from this capacity and employments
- Designed power line approach
- Health, safety, and environmental related risks
- Provision of other related income generated business due to availability of the electricity

VI.3. CONSULTATIONS WITH OTHER STAKEHOLDERS

All public institutions consulted from district to the villages will ensure their support in public/people mobilization and their participation in relocation or displacement and related compensation process. The project has many positive effects on general development through the increasing of power capacity for concerned public, Beautification of the area, Environmental Safeguarding/protection, Job creation and promotes the social being of the public. All negative impacts will be managed through sound designed mitigation measures proposed in this study report. After noting positive and negative effects of the proposed project, consulted public indicated different suggestions to what can be addressed to minimize and avoid those negative impacts on the communities and the general physical environment to ensure sustainable development. Suggested measures include the establishment of a competent and designed structure with appropriate standards for network management trainings for concerned district, sectors staff having electricity in their attributions.

For this, the establishment of a formal participatory system of key stakeholders to enhance the efficiency operation of the project, a full implementation of regular monitoring system and implement measures for enhancing positive impacts, sensitize and build the technical capacity of the project beneficiaries.

Below is the table summarizing discussions held with consulted different stakeholders:

Table 2: Public consultation raised issues and proposed response by stakeholders

ISSUE RAISED	RESPONSE
Perceptions and awareness of stakeholders and the public in general, in relation to the proposed project.	- Consulted authorities in the project area and all stakeholders involved including local authorities are aware of the project, its location, purpose and they agree and acknowledge the excellent/considerable importance of the project.
Expected risks and negative effects of the Project to the beneficiaries/community.	-When there is no people mobilization, sensitization, capacity building, appropriate and professional construction and maintenance of project infrastructures, the project will become harm to different beneficiaries. - Risk of HIV/AIDS pandemic spreading form migration/incursion of people due to employment opportunities and social interactions.
Anticipated benefits likely to be occurred from the project for stakeholders.	-Increased income for different employed personnel that will contribute to the development of the project. -Increased power efficiency and capacity that will grow district development. -Enforced technical capacity in safety measures from different trainings offered. -Improved wellbeing of District inhabitants and surroundings -Increased number of business oriented in the project area.
The willing to accept and participate in resources mobilization for all involved stakeholders.	-Government related Ministries and institutions to advocate and enhance the technical capacity of stakeholders (especially beneficiaries) -District/Sectors to arrange and assist the bush clearing/ROW acquisition where necessary. -Local communities to accept, obey and maintain project activities. -EDCL to collaborate and coordinate different stakeholders' activities relating to the implementation of the project.

Raised concerns/complaints from the proposed connections	- We need to be compensated for our property to be affected according to the national standards fixed by the related law - We need to be considered (as priority) when employing manpowers
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CHAP VII. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

VII.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Impact Assessment has included Environmental Management and Monitoring Plan (EMP) prepared to highlight potential environmental and social impacts, their respective proposed mitigation measures, monitoring indicators and the responsible institutions for coordination and implementation, during the pre-construction, construction and operational phases, in order to eliminate, reduce or offset the adverse environmental and social impacts.

During pre-and construction phases, incorporation and implementation of environmental mitigation measures into electrical transmission lines works will be the responsibility of the (REG-EDCL).

In addition, for some of the proposed mitigation measures, local authorities and government organizations with specific mandates will have to be involved in supervision during and after set up the lines. For example, safety of people, health care with respect to impacts HIV/AIDS prevention and awareness etc....

Environmental monitoring will be required both during the lines construction and operation phases to ensure that recommendations made in the present ESIA report are incorporated and implemented. Monitoring of environmental parameters will identify potential problems from the project's development activities and will allow for prompt implementation of effective corrective measures.

The major issues that need to be monitored during and after electrical transmission lines construction will include impacts on line route survey, public safety risks to workers and farmers, land acquisition and procedures for expropriation and compensation, destruction of natural habitats and loss of biodiversity, prevention of soil erosion, risks of accident, waste management, relocation of public utilities displaced, localization and operation of towers' foundations, construction materials sources and hauling condition, sites restoration after completion of works etc....

Details of the proposed environmental monitoring indicators and responsible parties for the implementation of mitigation measures are presented in the present ESIA report.

Table 3: Environmental and Social Management Plan (ESMP).

Project Components/activity	Potential Environmental issues	Mitigation measures	Responsibility	
			Planning and Implementation	Cost Estimates (USD)
Pre-construction Stage				
Design and location of Distribution Lines and loss of assets	Dispute and conflict arise when the inventory of asset started	Ensure that the identified Assets complies with the requirement of the Government of Rwanda Policies and guidelines regarding their environmental policies. Involve and meaningfully engage PAPs, General Public including administration and local/traditional leaders in the resolution of land conflicts	EDCL EARP-PCU District Authorities and EARP field team leaders	Included in project implementation cost
Site Location and routing	Poor site selection and inadequate planning/designs can cause environmental degradation	Adequate survey and mapping will be carried out for new transmission and distribution lines in order to avoid sensitive ecosystems.	EDCL EARP-PIU District Authorities	Included in project implementation cost
Construction phase				
Clearing of RoW along Distribution lines, construction of access roads or	Clearing of RoW along Distribution lines, construction of access roads or rehabilitating the	Respect the national environmental regulations and policies in terms of soil erosion and biodiversity conservation measures. Additional plantation and embracement using	EDCL EARP-PIU EARP Field team leaders	Included in project implementation cost

rehabilitating the existing ones	existing ones	removed top soil is recommended near sensitive locations. Conservation of access roads to the new routes and roads. Environmental and compliance monitoring by environmental officers, workers in the project site must equipped with the necessary and required personal Protective Equipment (PPE) registered at international level.		
Excavation erection of poles and construction of TLs	Dust may be blown from cleared areas. Effect on local drainage and Soil erosion.	Avoid using big machinery, manual excavated at pole sites and minimize disturbance at excavated sites. Located poles at a minimum distance of 30 m from rivers and 50m from lakes and construct those structures on stable ground.	EDCL EARP-PICU Contractors and EARP Field team leader.	Included in the implementation cost
	Excavation for poles may damage water pipes in village	Consult local authorities, community and beneficiaries to identify and avoid existing infrastructures.		
	Work in villages may create noise, dust and impede access	Before starting the work, try to inform local communities in advance, identify the areas with environmental threats and local significance and consult custodians of facilities (schools, clinics, public buildings)	EDCL EARP-PICU Contractors and EARP Field team leader.	Included in the implementation cost

Disposal of construction Debris	Dust and air pollution	Reduction of speed and limited movement of vehicles. Use dust-suppressing water on unpaved roads.	EDCL EARP-PICU and EARP Field team leader.	Included in the implementation cost
Delivery of sanitary facilities	Hygiene and sanitation issues and air pollution. Dissemination of communicable diseases.	Use of mobile toilets in the work place. Delivery of clean drinking water. Delivery of soaps, toilets papers, dustbins... Hiring a permanent site keeper for cleaning and bringing every day clean water	EDCL/EARP	Included in the implementation cost
Operation and maintenance phase				
Potential Hazard/Accidents	Electromagnetic fields, Deaths and Injuries.	Follow EARP-EDCL Occupational, Health and Safety Procedures, especially the use of PPE, Safety meetings to keep workers updaters and aware of dangers. Repair faults quickly and effectively. Conduct system maintenance regularly and diligently. Improved supervision of field workers Required expropriation has to be done to create required setback distance from the lines. Awareness and clear inspection and collaboration with local authorities to cater for line setback encroachers	EDCL EARP- PICU	Included in the implementation cost

Health and Safety	Occupational hazards and accidents from different operations of materials and machinery by workers	<p>Develop Health, Safety and Environmental plan (EHSP).</p> <p>Implement the EHSP, Monitor on the regular Implementation and compliance on EHSP.</p> <p>Waste management should be an integral part of this EHSP and should be given a clear consideration in order to keep out the occupational hazards among others.</p> <p>Regular Health and safety meetings and awareness on good conduct of workers toward the local population.</p> <p>Raise awareness among the population and local authorities about the safety of infrastructure (power lines), but also the dangers that threaten them if they do not meet the safety requirements for power lines.</p>	EDCL EARP- PICU	Included in the implementation cost
Solid waste	Waste will be generated especially that from conductor and tree cuttings	<p>All leftover conductors and debris to be disposed appropriately. Proper budgeting and use of materials to reduce wastage.</p> <p>Waste management hierarchy should be taken into consideration for proper and better waste ,management (Reduce, Reuse, Recovery)</p> <p>Dispose of transformer oil according to industry standards.</p>	EDCL EARP- PICU	Included in the implementation cost

VII.2. ENVIRONMENTAL AND SOCIAL MONITORING PLAN OF THE PROJECT.

VII.2.1. Monitoring plan

A detailed environmental monitoring plan will be developed later to verify that predictions of environmental impacts are accurate and that unforeseen impacts are detected at an early stage and allow corrective measures to be implemented, if needed. During the construction phase the plan will provide for dust, noise, visual impacts, service disruption and safety monitoring.

During the operation period, monitoring will be planned in terms of routine inspection of the health and safety of the workers, disruption impacts during maintenance of ROW and probably fire hazards. The Monitoring Plan will be developed by EARP-PICU at the end during environmental monitoring process.

Environmental monitoring is an essential component of project implementation. It facilitates and ensures the follow-up of the implementation of the proposed mitigation measure, as they are required. It helps to anticipate possible environmental hazards and/or detect unpredicted impacts over time. Monitoring includes:

- Visual observations;
- Selection of environmental parameters at specific locations;
- Sampling and regular testing of these parameters. Monitoring should be undertaken at a

number of levels.

Firstly, it should be undertaken by the Field team at work sites during construction, under the direction and guidance of the Supervision Consultant who will be responsible for reporting process. Actually, the Contractor's responsibility to monitoring inventory Assets and crops and compensation issues.

REG-EDCL will undertake independent monitoring of selected parameters to verify the results of the field team and to audit direct implementation of environmental mitigation measures contained in the EMP. REG-EDCL also will have the direct responsibility to supervise inventory Assets and Crops and compensation issues as outlined in the on-going preparation RAP.

RDB has the overall responsibility for issuing approval for the Project and ensuring that their environmental guidelines are followed during Project implementation. Their role therefore is to review environmental monitoring and environmental compliance documentation submitted by the

implementing authorities and they would not normally be directly involved in monitoring of the Project unless some specific major environmental issue arise.

Environmental monitoring of the following parameters is recommended as a minimum for EARP - EDCL subprojects:

IV.4.1.1 Noise Levels Monitoring

Although noise during construction is not expected to be a problem with the Project, periodic sampling of EARP equipment and at work sites should be undertaken to confirm that it is not an issue. Noise level monitoring could be supplemented by consulting with Project Affected People (PAPs) in the first instance to identify the level of monitoring required.

IV.4.1.2 Soil Erosion Monitoring

The excavation of earth for erection of poles, temporary and permanent access roads, and storage facilities will exacerbate soil erosion. It will, therefore, be the responsibility of the EARP field team leaders to ensure the implementation and effectiveness of erosion control measures. Focus should be given to work sites where soil is disturbed and its immediate environ as well as along the ROW during and after vegetation clearing.

IV.4.1.3 Monitoring of Vegetation Clearing

Unique stands of indigenous trees should not be removed for the establishment of poles. The team leaders should make sure that the unique tree stands identified during the present study should not be removed.

IV.4.1.4 Monitoring Rehabilitation of Work Sites

The EARP field team leaders should ensure that areas used as temporary campsites for workers are progressively rehabilitated as they are no longer required. Once a site is rehabilitated it should be “signed off” by either REG-EDCL environmental staff. He has the duty of implement the EHS plan and proposed EMP.

IV.4.1.5 Monitoring of Accidents/Health

The EARP field team leaders must make sure that appropriate signs are posted at appropriate locations/positions to minimise/eliminate risk of electrocutions’

IV.5 Environmental and Social Monitoring Plan

Table 4: Environmental and Social Monitoring Plan

Project components/ Activities	Negative Impacts	Mitigation measures	Benchmark Period	Cost	
Pre-construction stage					
Land/Property acquisition impacts, loss of assets, loss of land (access roads) and other economic resources	Disputes, complaints and conflict arise when the inventory of Asset started.	Respect the national environment regulation and World Bank Policies and guidelines in terms of soil erosion, biodiversity conservation measures. Additional plantation and embracement using removed top soil is recommended near sensitive locations.	Annually	MININFRA MINECOFIN REG-EDCL EARP-PCU	N/A
Site selection and routing	Poor selection and routing can cause environmental degradation	Adequate survey and mapping will be carried out for new transmission and distribution route in order to avoid sensitive ecosystems. Ensure that during this process, each action taken must respect national environment regulation. Nsure that all employees have and use properly their PPE	Weekly	REG-EDCL EARP-PCU EARP Linesmen Team leader	N/A
Construction Stage					
Excavation erection poles and construction of transmission line	Dust may blow from cleared areas.	Avoid using big machinery, manual excavated at pole sites and minimize disturbance at excavated sites.	Monthly	REG-EDCL EARP-PCU EARP Linesmen Team leader	

Solid waste and waste water management	Air and water pollution, problem of health and sanitations (communicable diseases).	Delivery of mobile toilets at the work place. Delivery of clean and drinking water at the site.	Monthly	EARP Linesmen Team leader	
Social Impact	Poor management of the workplace. Social conflicts and disputes.	Ensure that workers have health insurance (Mutuelle de Santé). Mobilization and training on best practices talking about health and safety.	Monthly	REG-EDCL EARP-PCU EARP Linesmen Team leader	
Operation and maintenance phase					
Potential hazards/ Accidents	Electromagnetic fields, Death and injuries	Regular training of EARP Linesmen to increase their awareness to avoid dangers and hazards. Improved supervision of field workers.	Occasional	EARP-PCU EARP Linesmen Team leader	
Health and Safety	Problems of Hygiene and Sanitation. Development of communicable diseases at the workplace.	Develop Health and Safety Policy and Health, Safety and environment plan of EDCL-EARP. Record regularly all hazards and injuries at the workplace.	Monthly	REG-EDCL EARP-PCU EARP Linesmen Team leader	

CHAP VIII. CONCLUSION AND RECOMMENDATIONS

The proposed construction of a power transmission lines project in Northern Province is largely link with Government policies and World Bank Policies and guidelines for energy sector development. The project will benefits to the local people of this area and will strongly support initiatives towards poverty reduction and environment conservation based on the recommendations of NST1.

According to the field visit done in Musanze District, Busogo Sector, the mission found that there is no significant impact on project implementation.

In other word, adverse impact of construction and distribution of Electrical lines on environment in this area are not expected to be severe. The intervention will not pose major or important risks to biodiversity, natural habitats and wetlands as in protected areas like National Park of Virunga.

The present ESIA study recommends that the project development should precede, but factor in the implementation of mitigation measures are proposed herein. The key mitigations measures will depend on the choice of the construction material, disposal of waste water and solid waste, access of drinking water, the private protection equipment and the best management storage

Implementation of those recommendations and others proposed in the present document will a high contribution to minimize negative impact which will occur very late when the project will be started. REG-EDCL, EARP-PICU concerned District and local beneficiaries shall take their responsibilities to closely environmental monitoring activities especially at construction and operational stages as well and at the same time environment funds will be agreed by all stakeholders for all planned activities.

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APPENDIX

Table 5: PEOPLE CONSULTED

#	NAMES	PHONES	ADRESS	POSITION
1	HATEGEKIMANA Jean Claude	0788440231	Busogo Sector	LAND Officer
2	TWAGIRIMANA Edouard	0782307336	Busogo Sector	ES Sector
3	MUTUYIMANA Emile	0788287131	EDCL	EARP Linesmen Team Leader
4	NIZEYIMANA Yves	0784153853	MUSANZE District	Infrastructure
5	Joel Elvis NSABIMANA	0788600505	MUSANZE District	BRANCH MANAGER
6	NYINAWAMWIZA MUGANGA Petronille	0788640856	EDCL	Social Safeguards Specialist

