

THE GOVERNMENT OF RWANDA

**RWANDA Electricity Access Scale-up
Project - Sector wide Approach (EASP).**

Project number (PI11567).

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

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**Prepared by
Tito Kodiaga UERP Safeguards Advisor**

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GLOSSARY OF TERMS

Cumulative impacts/effects: The total effects on the same aspect of the environment resulting from a number of activities or projects.

Developer/Proponent/Sponsor: the entity – person/ company/agency – proposing to develop/implement/install a new project/sub- project or expand an existing project under the EASP.

Direct impacts: An effect on the environment brought about directly by the EASP projects.

Disclosure: Information availability to all stakeholders at all stages of the development of projects.

Environment: physical, biological and social components and processes that define our surroundings.

Environmental impact assessment (EIA): A comprehensive analysis of the project and its effects (positive and negative) on the environment and a description of the mitigative actions that will be carried out in order to avoid or minimize these effects.

Environmental Monitoring: The process of examining a project on a regular basis to ensure that it is in compliance with an Environmental Management Plan (EMP), or the Government of Rwanda (GoR) Environmental Impact Assessment (EIA) certification of approval conditions and / or environmental prescriptions.

Impact: A positive or negative effect that a project has on an aspect of the environment.

Indirect impact: A positive or negative effect that a project indirectly has on an aspect of the environment.

Involuntary resettlement: The forceful loss of land resources that requires individuals, families and / or groups to move and resettle elsewhere.

Lead Agency: The agency with primary responsibility for the protection of the environment. For instance, the lead agency for environment matters in Rwanda is the Rwanda Environment Management Authority (REMA).

Mitigation measures: The actions identified in an EIA to negate or minimize the negative environmental impact that a project may have on the environment.

Project and sub-project: a set of planned activities designed to achieve specific objectives within a given area and time frame.

Project Brief: The initial submitted document to REMA to initiate the process that will lead to the issuance of the EIS certificate of approval.

Scoping: The initial stage in an environmental assessment that determines the likely major environmental parameters that will be affected and the aspects of the project that will bring upon these effects.

Screening: An initial step when a project is being considered for environmental assessment. The screening is the determination of the level of assessment that will be conducted. In the case of GoR, screening will place project into one of three environmental categories (I, II or III).

Significance: Importance.

Significant effect: An important impact on an aspect of the environment.

Stakeholder: Any person or group that has an interest in the project, and the environmental effects that the project may bring about.

ACRONYMS AND ABBREVIATIONS

- CAS: Country Assistance Strategy
- CFL: Compact Fluorescent Lamps
- EA: Environmental Advisor
- EDPRS : Economic Development and Poverty Reduction Strategy
- EIA: Environmental impact assessment
- EMP: Environmental Management Plan
- EPC: Engineer, Procure, Construct
- ESMF: Environment and Social Management Framework
- ESMP: Environmental and social management plan
- ESWG: Energy Sector Working Group
- GDP: Gross Domestic Product
- GEF: Global Environment Facility
- GoR: Government of Rwanda
- GDP: Gross Domestic Product
- HFO: Heavy Fuel Oil
- HIV/AIDS: Human Immuno Deficiency Virus
- IBs: Incandescent Bulbs
- IDP's: Internally Displaced Persons
- ISDS: Safeguards Data Sheet
- LV: Low Voltage
- MINAGRI: The Ministry of Agriculture, Livestock and Forestry
- MININFRA: Ministry of Infrastructure
- MINITERE : The Ministry of Lands, Environment, Forestry, Water, and Natural Resources
- MV: Medium Voltage
- EASP: Electricity Access Scale-up Project
- NEDA: National Energy Development Agency
- NEP: National Policy on Environment
- NGO's: Non-Governmental Organizations
- OP: Operational Procedures
- ORTPN: Office Rwandais de Tourisme et Parc Nationale
- PACD: Plan of Action to Combat Desertification
- PCD: Project Concept Document
- PCU: Project Coordination Unit
- PMU: Project Management Unit
- PRSP: Poverty Reduction Strategy Paper
- PV: Photo Voltaic
- RAPs: Resettlement Action Plans
- REMA: Rwanda Environment Management Authority
- ROW: Right of Way
- RPF: Resettlement Policy Framework
- SED: Sustainable Energy Development
- SIL: Specific Investment Loan

- STDs: Sexually Transmitted Diseases
- SWAp: Sector-wide approach
- T&D: Transmission and Distribution
- TA: Technical Advisor
- UERP: Urgent Electricity Rehabilitation Project
- UN: United Nations
- UNCED: United Nations Conference on Environment and Development
- UNCOD: United Nations Conference on Desertification
- UNEP: United Nations Environment Programme
- UNFCCC: United Nations Framework Convention on Climate Change
- UNICEF: United Nations Children Education Fund
- URC: National Unity and Reconciliation
- WB: World Bank

EXECUTIVE SUMMARY

Limited access and prohibitive costs of supply historically - Despite the high density of population (estimated at about 9 million), only 5 percent of Rwandan households (120,000 customers) have access to electricity from the grid. In recent years (2004-2006), Rwanda has suffered from acute electricity supply shortage and severe load shedding. Its installed generation capacity (mostly hydropower adding up to 55 MW), has been severely constrained by regional drought leading to a rapid draw down of the reservoirs. The Government responded by renting additional diesel generation capacity at high cost, increasing tariffs by over 100 percent to about US\$ 0.21/kWh. By contrast, average retail tariffs in the rest of the region are around US\$ 0.10-0.12/kWh. Looking forward, a number of new generation projects are under various stages of development, many utilizing lower cost indigenous energy sources. With the arrival of the IDA financed Jabana HFO Power Station (20MW, early 2009), the Rukarara Hydro Power station (9.5 MW, early 2010) and the Nyabarongo Hydro Power station (27.5 MW, 2012) national generation capacity will increase more than 50%. In the longer term, the increased integration of the regional power market under the auspices of the East-Africa Power Pool (EAPP) will enable Rwanda to import power from its neighbors to bridge supply

The Government of Rwanda (GoR) through the Ministry for Infrastructure (MinInfra), has proposed the launch of a RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) to realize the primary target of the Economic Development and Poverty Reduction Strategy (EDPRS) for the electricity sector of tripling access to electricity by 2012 to about 16 percent of households and at least 50 percent of identified public institutions in health, education and local administration. This will require about 160,000+ new grid connections, and also include efforts to reach rural consumers and service providers currently off the national grid.

The activities that the EASP will be financing that would give rise for environmental and social concern were not confirmed during the preparation of the project and the exact location of facilities to be constructed was also not finalized during this period.

Environmental and Social Requirements

The GoR by its national laws and the World Banks Operational and Procedural Policies, specifically OP 4.01 requires the government to prepare an Environment and Social Management Framework (ESMF), which establishes a mechanism to determine and assess future potential environmental and social impacts of the Ministry for Infrastructure planned investments/activities under the proposed RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP).

The ESMF then sets out screening, mitigation, monitoring and institutional measures to be taken during design, implementation and operation of these activities to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

An ESMF is required for this project because the precise details of the majority of investments are yet to be defined in terms of their exact location, materials used etc. Therefore it is not possible to ascertain the precise location and nature of impacts at this stage.

OP 4.01 further requires that the ESMF report must be disclosed as a separate and stand alone by the Government of Rwanda and the World Bank as a condition for Bank Appraisal of the EASP. The disclosure of these documents should be both in locations where it can be accessed by the general public and local communities using the media, and at the Infoshop of the World Bank. The date for disclosure must precede the date for appraisal of the project.

In keeping with this requirement and the further detail set out the draft report will firstly be made publicly available to project-affected groups and local NGOs in Rwanda by placing a public notice in a national newspaper and making the report available at the offices of relevant government ministries and REMA. This measure will also satisfy the Organic Law requirement that EIA reports are disclosed and be subjected to review by the public. Following revisions, the ESMF will be officially submitted to the World Bank, and made public before appraisal by the World Bank board

Safeguard Screening Procedures

The proposed project has been rated Category B under the World Bank Policy on Environmental Assessment (OP4.01), requiring a partial Environmental Assessment (EA). The ESMF is expected to cover the unknowns, to help in the screening, and to recommend mitigation measures. The screening and review process will determine whether a particular subproject will trigger a safeguard policy, and what mitigation measures will need to be put in place. The screening and review process will also ensure that subprojects that may have potentially significant impacts will require more detailed study and the need for subproject specific EA and/or EMP.

The EASP objectives are two-fold: (i) increasing electricity access to households and priority institutions at a scale consistent with the targets of the Economic Development and Poverty Reduction Strategy (EDPRS) and; (ii) assisting the GOR mainstream the energy sector-wide approach (SWAp) and process by establishing a functioning donor partnership framework for sustained financing of investment and capacity strengthening, aligned with national priorities and results.

The project has three components (a) Grid Roll-out; (b) "Green connections"; and (c) Technical assistance, capacity strengthening, and implementation support.

(a) Grid rollout - Will finance Medium Voltage (MV) and Low Voltage (LV) grid reticulation, distribution grid strengthening and rehabilitation to reach the required transfer capacity to the targeted areas and customer connections including partial subsidies of connection costs for qualifying households, and priority institutions. This component will involve civil works related to construction of towers and substations, clearing of land and vegetation, use of oil lubricants for the transformers all which will trigger the Environmental Assessment (OP4.01, BP 4.01, GP 4.01) policy.

(b) “Green connections” /Energy Efficiency Component- The project will finance a range of activities to improve affordability for the consumers and reduce the need for additional generation resources. The program would include energy efficient Compact Fluorescent Lamps (CFLs), incentives to promote the use of solar hot water heaters sold through private dealers and specific initiatives to buy down connection costs for the poorest households including mainstreaming of the use of low cost “ready boards” in homes. The disposal of the used CFLs triggers Environmental Assessment (OP4.01, BP 4.01, GP 4.01) policy.

(c) Technical assistance, capacity strengthening, and implementation support – This component will support components (a) and (b) outlined above that are linked to the first project development objective. Additionally, this component will support the second development objective of mainstreaming the SWAp framework and process. This component will not trigger any safeguards requirements.

A unit within the A unit responsible for projects within the Ministry in charge of Energy” will oversee, supervise and monitor coordinated implementation of the off-grid component implementation activities under the sector-wide approach. There are already several multilateral and bilateral donors active in the sub sector including EU, Belgium, Netherlands and Germany.

Under a separate stand alone GEF project (Rwanda Sustainable Energy Development Project, P097818), that will complement this project, Bank will support the increasing investments in off-grid renewable energy generation and energy efficiency by financing a program of TA and policy related activities required to make these investments long term sustainable. The original UERP ESMF was updated and approved by the World Bank to include this GEF component in 2007 and therefore, this ESMF does not focus on this separate GEF stand alone project as it has been captured in the UERP ESMF.

This ESMF has also incorporated another on going UERP project that is involved with the exchange of Incandescent Bulbs (IBs) with Compact Fluorescent Lamps (CFLs) similar to the “Green Connections” component but does not include the use of and promotion of solar energy. This ESMF should apply ex-post to this UERP CFL/IB exchange project which has plans to oversee the disposal of the exchanged IBs in an accepted procedure instituted by the World Bank in December 2008.

The Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution Project comprises the distribution of 800,000 CFLs to Electrogaz costumers to be installed in the residential sector instead of incandescent bulbs. To assure this, the project includes the collection of the incandescent bulbs (in exchange of the CLFs) and their destruction. The project started with a pilot (first) phase in August 2007, and the second phase is ongoing. The third phase is planned for April 2009, and the fourth and last phase by the end of 2009.

In 2008 November, World Bank hired a consultant to prepare an incandescent bulb collection and destruction plan which included the procedure for storing, collecting and

destruction of the IBs according to internationally accepted standards. This destruction plan also included the sampling process and reporting to be undertaken by Electrogaz in order to establish an acceptable control of the effective collection of the IBs. This destruction plan is under implementation. So far all the IBs that have been exchanged with the CFLs and which were under the custody of Electrogaz have been disposed using the disposal and monitoring plan developed by the World Bank and implemented by a local consultant. IBs do not contain any mercury or substance that is hazardous to the environment. If Rwanda possessed adequate technology in the glass industry, the IBs can be easily recycled.

Further to this, the CFLs as stated above that are being exchange with the IBs contain some mercury and the World Bank is planning to commission a waste management study in 2009 to provide guidance on the disposal of these CFLs that contain the mercury. So far, no CFLs have been destroyed or disposed mainly because they have just been exchanged. This study is expected to fit within the overall REMA waste management strategy that is also under preparation. **The disposal of the CFLs is a category B project.**

Environmental and Social Impacts

Transmission and distribution network systems extension can be expected to have minor direct and indirect impacts on villages and hamlets where the proposed transmission lines pass, both positive and even negative if mitigation measures and compensation is not undertaken effectively.

The following adverse impacts have been identified as likely to arise from the implementation of the EASP especially when implementing major activities in component (a) Grid Roll Out and (b) Green Connections of the project and for which this ESMF report seeks to address:

Environmental Impacts

- Localised land degradation and soil erosion related to clearing the project areas for construction related works towards installation of towers, cabins, Right of Way (ROW) etc.
- Localised vegetation in the project area due to clearing to create distribution path, construct substations, install towers or create Right of Way.
- Ecological issues should the network cut across sensitive ecosystems
- Impact on fauna, e.g. birds (Bird strikes on T-lines)
- Impacts on soil and water from machinery fuel and lubricants contamination from accidental spills or unsound disposal or handling
- Contamination of soil and water resources from poor disposal of CFLs which contain mercury.
- Borrow pit related impacts including becoming breeding grounds for disease vector, hazards that could drown animals and people, and ecological destruction if borrow pits are located in sensitive environments

Social Impacts

- Loss of land or property/buildings to provide path for Right of Way, distribution line or for construction of LV sub stations. (cabins)
- Localised crop destruction in the project area due to clearing to create distribution path, construct substations, install towers or create Right of Way.
- There may also be minor effects on agriculture, if there would be a restriction on land use in the right of way to the areas where transmission lines pass, and, in any involuntary resettlement requirement.
- Localised dust related impacts during construction
- Aesthetics and visual related impacts
- Workers Health and Safety related impacts due to construction accidents
- Social and cultural interaction impacts between the contractor's workers and local populations.
- Noise impacts during construction from the machinery and from the sub stations during operation phase
- Dust impacts, vegetation destruction, loss of crops in areas where access roads will be built for the project.
- Establishment of construction camps for the workers likely to cause vegetation and crop destruction as well as camp construction relate impacts ...

The impacts are considered to be localised to the specific project areas, minimal and minor in scale and in terms of magnitude and should be easily mitigated through the preparation of adequate EMPs and RAPs whenever required.

Positive Impacts

The positive impacts are numerous and wide-ranging. The benefits of the project for domestic supply and use in small-scale businesses and in access to electric power for schools and public services are evident. In the construction phase there will be temporary employment opportunities for local contractors and those who will be employed or supply services and provisions for workers and to contractors. Within the respective project areas there will be opportunities for petty trading and small business service provision along the power line routes and where there are sub-station rehabilitation components.

Significant social benefit will come through employment generation and safer more efficient operation of key services, through provision of electricity access to the villages along the transmission and distribution lines served by the project. Potential beneficiary enterprises affected by and contributing to regional socio-economic transformation will be small industries like saw mills and joineries, grain mills and other agricultural processing businesses which need electricity.

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.

As a consequence the quality of life and extent of economic opportunity will be changed for the better. Social and environmental costs, not least in noise and air pollution, associated with existing generator usage will be reduced and there may be a more limited requirement for firewood cutting and collection.

Reporting and Performance Review Requirements

Bi-Annual environmental and social progress reports will be prepared by the Electrogaz's Social and Environmental specialists who should be hired immediately or as soon as possible before the commencement of the project with the technical support of the Safeguards Advisor. These reports will be submitted to EASP before the Bank's supervision mission arrives. The annual reports will be shared with EASP PMU, MININFRA, REMA, World Bank and other relevant government agencies.

Capacity Building and Training

Effective implementation of the Environmental and Social Management Framework will require that adequate capacity enhancement within institutions and other stakeholders be undertaken. There will be training for the yet to be recruited RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) Environmental and Social Specialists, Electrogaz Engineering and Survey staff (at least 2) at the national level, and REMA. The training will cover implementation of the ESMF including project screening, impact identification and analysis, Environmental Assessment procedures and requirements (EA and EIA), Design and implementation of mitigation measures at sub project level, monitoring and review of environmental performance and reporting.

Electrogaz design engineers at the national and local level will specifically require some degree of good environmental practice training because they are involved in the survey and design of the transmission lines and substations including project supervision and so this kind of training equips them with the capacity to consider these issues early in their design concepts.

Equally vital is training of the district/local level environmental officers within REMA who also need and should be involved in project implementation including supervision and monitoring of environmental aspects and undertaking review of the screening report.

Finally local contractors will also require training and capacity building in sound environmental practises when implementing all the phases of the project, especially since the project emphasizes use of local contractors and developing their capacity.

The deliverables of the study were this ESMF report, and an accompanying Resettlement Policy Framework.

Report Structure

The key highlights in this ESMF report is presented as follows:

- Introduction about the objectives of the ESMF including description about the EASP.
- The description of the project is found in chapter 2 and further details the EASP project components and anticipated sub project activities within the components.
- Chapter 3 of the ESMF outlines the methodology that was used in undertaking and developing this framework.
- Detailed and comprehensive environmental and social baseline data which provide the environmental and social management process with key baseline information when identifying adverse impacts is found in chapter 4. The information contains data on Rwanda's bio-physical environmental features such as its, climate, hydrology in terms of ground and surface water resources, major and sensitive wetlands, flora and fauna. On social baselines the report discusses the main features of Rwanda in terms of demographics, public health features, education, water and sanitation and poverty.
- Chapter 5 presents a description of the administrative, policy and regulatory framework related to environmental concerns in Rwanda.
- A review of the World Banks Safeguards Policies is made in the same chapter. The triggered policies are:
 - Environmental Assessment (OP4.01, BP 4.01, GP 4.01)
 - Indigenous Peoples (OD 4.20) –may apply
 - Involuntary Resettlement (OP/BP 4.12)

Generic potential adverse environmental and social concerns and impacts from anticipated project activities are presented in detail in chapter 7. This is followed by a monitoring plan in chapter 8.

The last three chapters highlight the project coordination and implementation agreements, approvals and reporting.

- The ESMF report is organized as follows:
- Executive summary
 - Acronyms and abbreviations
 - Chapter 1-Introduction
 - Chapter 2-Description of the proposed project
 - Chapter 3-Study Methodology
 - Chapter 4-Baseline information

- Chapter 5-National and International Regulatory Framework
- Chapter 6-World Bank Environmental and Social Safeguards Policies
- Chapter 7- Determination of Potential Environmental Impacts
- Chapter 8- Project Coordination and Implementation Arrangements
- Chapter 9 - Capacity building and training requirements
- Chapter 10- References
- Technical annexes
- Annex A- Suggested format for EA studies.
- Annex B– Suggested format for a simple EMP.

1.0 INTRODUCTION

The Government of Rwanda (GoR) through the Ministry of Infrastructure intends to initiate through Electrogaz and under the Urgent Electricity Rehabilitation Project the RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) which will be supported from an IDA loan.

The activities that the EASP will be financing that would give rise to environmental and social concerns were not confirmed during the preparation of the project and the exact location of facilities to be constructed was also not finalized during this period.

Program activities will be located throughout Rwanda. However, a spatial coverage of the program may emerge as the program will be informed by the on-going UERP and the location of the existing location of the transmission and distribution network.

Therefore, in compliance with Organic Law on Environmental Protection of Rwanda and the World Bank's Safeguards Policies, the GoR, represented by the Ministry of Infrastructure has prepared this Environmental and Social Management Framework (ESMF).

The aim is to establish a mechanism to determine and assess future potential environmental and social impacts of the EASP, and then set out mitigation, monitoring and institutional measures to be taken during implementation and operations of the proposed investments/activities, to eliminate their adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

The GoR is also further required to disclose this document in-country as a separate and stand alone document so that it is accessible by the general public, local communities, potential project affected people, local NGO's and all other stakeholders. The document must also be available at the Infoshop of the World Bank and the date for disclosure must precede the date for appraisal of the project.

Since the project investments mentioned above have not yet been confirmed in terms of details and location, MinInfra through EASP will be required during implementation of this project to implement the requirements of this ESMF in full.

An environmental and social management process that would then subsequently have to be cleared by the Rwanda Environment Management Authority (REMA) and in some cases, the World Bank, prior to implementation of their planned project investments is also envisaged. World Bank will provide review and no objection to at least the initial 5 EAs/EMP and a similar number of screening forms/decision records or equivalent document that will show who and how the proposed sub project was screened and the project activities for potential environmental and social impacts. The use of this ESMF by RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) would be the instrument through which the projects environmental and social impacts are

identified, assessed, evaluated and have appropriate mitigation, management and monitoring measures, designed and incorporated within the sub project itself.

1.1 Objectives

The objectives of the ESMF are:

- To establish clear procedures and methodologies for environmental and social planning, review, approval and implementation of subprojects to be financed under the project;
- To assess the potential environmental and social impacts of envisaged subprojects;
- To propose mitigation measures which will effectively address identified negative impacts;
- To specify appropriate roles and responsibilities, and outline the necessary reporting procedures for managing and monitoring environmental and social concerns related to subprojects;
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF; and
- To establish the project funding required to implement the ESMF requirements

2.0 PROJECT DESCRIPTION

This chapter describes the proposed RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) including the different components and activities and outcomes expected during the duration of the project.

2.1 RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP)

2.1.1 Objectives of the Project

The project development objectives are two-fold: (i) increasing electricity access to households and priority institutions at a scale consistent with the targets of the EDPRS and; (ii) assisting the GOR mainstream the energy sector-wide approach (SWAp) and process by establishing a functioning donor partnership framework for sustained financing of investment and capacity strengthening, aligned with national priorities and results. *Specifically, the key outcome indicators for the project objectives, and that are aligned with the Africa Action Plan, are proposed as follows:*

Objective 1 – number of new connections at Households level (HH) and, institutions;
Objective 2 - share of sector financing from donors (for investment and capacity strengthening), that is aligned with the Government’s sector investment prospectus

The primary EDPRS target for the electricity sector according to the Country Assistance Strategy (CAS’s) strategic theme of growth and supporting policy and investment interventions for improving economic infrastructure is aimed at tripling access by 2012 to about 16 percent of households and at least 50 percent of identified public institutions in health, education and local administration. This will require about 160,000+ new grid connections, and also include efforts to reach rural consumers and service providers currently off the national grid.

The project will also provide an effective means to advance implementation of the Government-led sector-wide approach and ongoing harmonization process in the electricity sector; a first in the Bank’s energy practice and that is expected to set an example for electricity access scale up programs in other countries in sub-Saharan Africa.

2.2 Project Components

The project has three components (a) Grid Roll-out; (b) “Green connections”; and (c) Technical assistance, capacity strengthening, and implementation support.

(a) Grid rollout - The project will finance Medium Voltage (MV) and Low Voltage (LV) grid reticulation, distribution grid strengthening and rehabilitation to reach the required transfer capacity to the targeted areas and customer connections including partial subsidies of connection costs for qualifying households, and priority institutions. This component will involve civil works related to construction of towers and substations, clearing of land and vegetation, use of oil lubricants for the transformers all which will trigger the Environmental Assessment (OP4.01, BP 4.01, GP 4.01) policy. Modern

manufactured transformers are no longer manufactured using PCBs and therefore there is no need for testing the equipment for PCBs. Specifically though as an emphasis, the tender documents will highlight this requirement.

(b) Energy Efficiency Component “Green connections” - The project will finance a range of activities to improve affordability for the consumers and reduce the need for additional generation resources. The program would include energy efficient Compact Fluorescent Lamps (CFLs), incentives to promote the use of solar hot water heaters sold through private dealers and specific initiatives to buy down connection costs for the poorest households including mainstreaming of the use of low cost “ready boards” in homes. The disposal of the used CFLs triggers Environmental Assessment (OP4.01, BP 4.01, GP 4.01) policy.

(c) Technical assistance, capacity strengthening, and implementation support – This component will support components (a) and (b) outlined above that are linked to the first project development objective. Additionally, this component will support the second development objective of mainstreaming the SWAp framework and process. This component will not trigger any safeguards requirements.

Under a separate stand alone GEF project (Rwanda Sustainable Energy Development Project, P097818), that will complement this project, Bank will support the increasing investments in off-grid renewable energy generation and energy efficiency by financing a program of TA and policy related activities required to make these investments long term sustainable. This GEF stand alone component was incorporated in the ESMF for UERP that was updated by the EA advisor in 2007 and thus is only mentioned here but not reflected in the mitigation measures.

This ESMF has also incorporated another on going UERP project that is involved with the exchange of Incandescent Bulbs (IBs) with Compact Fluorescent Lamps (CFLs) similar to the “Green Connections” component but does not include the use of and promotion of solar energy.

The Rwanda Electrogaz Compact Fluorescent Lamp (CFL) Distribution Project comprises the distribution of 800,000 CFLs to Electrogaz costumers to be installed in the residential sector instead of incandescent bulbs. To assure this, the project includes the collection of the incandescent bulbs (in exchange of the CLFs) and their destruction. The project started with a pilot (first) phase in August 2007, and the second phase is ongoing. The third phase is planned for April 2009, and the fourth and last phase by the end of 2009.

CFLs contain some quantities of mercury and therefore may eventually add to contamination of soils and groundwater resources if they are disposed indiscriminately in a way that encourages leaks.

2.3 Outline of Implementation Arrangements

Component (a) Grid rollout – ELGZ will establish a new Projects Department that will consolidate within the company all existing project-specific PMUs and that will also

manage and oversee the national grid rollout and connections program. The strategy for achieving the latter target will be two-fold: (a) expanded outsourcing of household connections and LV network reticulation to local construction capacity mobilized to the maximum, coupled with a program for strengthening and expanding local contractor pool for the mid-to-longer term; (b) utilizing turn-key EPC (Engineer, Procure, Construct) contracts tendered competitively to qualified international firms, especially in the current Economic Development and Poverty Reduction Strategy (EDPRS) period when local capacity is insufficient to meet the connections targets, especially for grid extensification projects that involve MV reticulation as well. As program progresses beyond the current EDPRS time frame, the share of large EPC contracts is expected to decline as local capacity and locally sourced materials and equipment increases. Rwanda is a potential pilot country for the use of country procurement systems. In case the ongoing assessment is successful (to be completed during 2009), it is proposed to pilot the use of country systems for procurement of a portion of the IDA financing for local and international sourced equipment, materials and services. This would further increase the alignment and harmonization of the SWAp framework.

Component (b) “Green Connections” – The *CFL program* for new customers will be managed by the existing energy efficiency unit in ELGZ and paired with the ongoing CFL replacement campaign. It is expected that the component will be able to benefit from Carbon Credits for the realized emission reduction. The *Solar hot water heater program* will be managed by a unit responsible for projects within the ministry in charge of energy”, and delivered by the private sector to qualifying end users. Technical assistance will be provided from the GEF SED project. Following an initial production grade pilot introduction, the program will mainstream a scheme expected to be analogous to but suitably adapted from the highly successful market approach in Tunisia. Basically, the out of pocket investment cost to a household user is bought down by a capital subsidy, and the user has easy access to affordable instalment payments, with ELGZ and a financial institution engaged in managing the payments and collection systems in place. The percentage subsidy has yet to be determined in the pilot phase, but is expected to be around 40%.

Component (c) Technical assistance – ELGZ, a unit responsible for projects within the ministry in charge of energy”, and MinInfra will be responsible for the respective portions of this component.

A unit within the A unit responsible for projects within the Ministry in charge of Energy” will oversee, supervise and monitor coordinated implementation of the off-grid component implementation activities under the sector-wide approach. There are already several multilateral and bilateral donors active in the sub sector including EU, Belgium, Netherlands and Germany.

2.4 SWAp mainstreaming

Prior to appraisal, it is expected that MinInfra together with the sector development partners will reach understanding on the scope and staging each year of the consultative process and arrangements for implementation of the sector-wide approach to joint development efforts in the energy sector. The Energy Sector Working Group (ESWG)

will serve as the decision making body on SWAP-related issues in the sector and supported by specific impermanent thematic teams and sub-sector working groups, such as for electricity, biomass. A coordinated series of linked reports and fora to be staged each year will further formalize the SWAp framework and process of monitoring, consultations and feedback, needed and timely corrective actions, and regular updating of the spatial rollout investment plan and Prospectus for mobilization of financing in future rounds.

2.5 Proposed financing and lending instrument

The overall investment envelope for the first SWAp period September 2009-2012 is being detailed in the ongoing Prospectus preparation work by a Consultant team. In order of magnitude terms it is expected to be about \$200 million for the time slice identified; including grid and off-grid investments, technical assistance, excluding grid generation. Off this total, up to \$150 million is for the grid rollout program of 160,000 – 200,000 new connections through 2012.

The proposed lending instrument is a 4-year Specific Investment Loan (SIL) financed by an IDA grant of USD 50 million.

In addition, the Bank is exploring possibilities for additional grant financing from the Energy for Poor access window donated by OFID/Saudi fund. The balance of financing for the SWAp time slice covered by the first Prospectus will be filled from a number of sources with the details to be worked out by appraisal time.

These sources of funds include: Government, ELGZ, customer connection charges, and major Donors such as AFDB, EU, Belgium, Netherlands, and others. It is not certain if the other listed donors will apply this ESMF in their support to this program. There is need to engage these donors in dialogue at the earliest opportune time preferably before the appraisal by the board in order to determine the willingness to apply this ESMF.

The SIL instrument is appropriate for the proposed project, as the sector institutional framework and SWAp process, including the use of country systems, are not yet sufficiently advanced as to warrant use of a budget support or earmarked budget support for channelling financing for the national access scale up program. While the PRSG Grants program includes energy as a priority sector - along with Health, Education, and Water – it is the Bank’s primary instrument for addressing major policy issues.

Experience with implementation of UERP ESMF

This section summarizes the experience with the implementation of the ESMF for UERP and from which major components of this EASP ESMF is based upon. The experiences included the lessons learned and how these lessons have been reflected in this ESMF.

- **Need for early engagement of REMA;** One of the important lessons from the implementation of the ESMF for UERP is the need to engage REMA in site selection at an early stage preferably during design phase of the project to avoid conflict with this institution. A case example is the location of the 20 MW diesel

power plant. The initial site that was selected and preferred by Electrogaz and MinInfra was rejected by REMA on grounds of close proximity to a wetland. MinInfra and Electrogaz insisted on this site and the EA advisor was compelled to prepare over 3 different EMP/EIA and ARAPs for the same project because the location was changed several times.

- **Involving REMA in EMP/EA Review Process;** REMA was provided with EA reports for Birembo sub station, Jabana 20 MW diesel plant at an early stage and this saw there quick approval of the same documents demonstrating the willingness of REMA to be seen as a bottle neck to development by expediting the approval process.
- **By having the EA advisor work with Electrogaz Engineers** in the survey of distribution network routes at an early stage of the distribution component led to minimal land acquisition and property loss, avoiding of ecologically sensitive areas.
- **Inadequate staffing within REMA** caused limited follow up and monitoring of the environmental aspects mentioned in the monitoring indicators. REMA's inclusion in the EASP and success will largely depend on the level to which EASP is able to facilitate REMA's engagement by for instance providing allowance and transportation to REMA staff.
- **Delay in Bank approval of EMP;** The delay by the bank in approving the EMPs and the continuous back and forth comments has to a great extent led to some of the project components to be implemented and almost completed before bank's approval.

3.0 METHODOLOGY AND CONSULTATION

The study was conducted by the consultant using the following approach and methodology;

3.1 Detailed and in-depth literature review

Review on the existing baseline information and literature material was undertaken and helped in gaining a further and deeper understanding of the project. Among the documents that were reviewed in order to familiarise and deeply understand the project included:

- World Bank Project Concept Note and Integrated Data Sheet
- EASP Project preparation brief-Status and Next steps
- EASP Preparation Country document
- PID Electricity Access Scale Up
- UERP ESMF Report
- UERP RPF Report

The consultant also undertook detailed review and analysis of the national relevant legislations, policies and guidelines including the World Bank Safeguards Policies, international conventions related to this project and other relevant documents.

3.2 Field Visits

The consultant made limited visits to the potential project area in order to familiarise with the issues on the ground and appreciate the concerns. The reason being at the time of the visit, the actual areas for the projects were not yet known. There was limited consultation during the study to engage the project affected persons and intended beneficiaries owing to time constraints and the lack of exact location of the sub projects.

3.3 Interactive Discussions

Various discussions were held with the UERP and Electrogaz staff, REMA as well as other relevant staff of key implementing partners of Electrogaz. These discussions were very insightful in understanding the issues and are the basis for most of the measures contained in this ESMF.

3.4 Preparation of ESMF

This involved

- Collation of baseline data on the environmental conditions of the project area;
- Identification of positive and negative environmental and social impacts;
- Identification of environmental and social mitigation measures;
- Preparation of screening procedures to be used while screening subproject proposals; and
- Formulation of environmental and social monitoring plans.

4.0 BASELINE DATA

This section describes the overall baseline condition of Rwanda in terms of bio-physical environment, as well as the socio-economic and cultural attributes.

Location and Size

Rwanda is a small mountainous landlocked country, located in Central Africa, at latitude 2 00 S and longitude 30 00 E, bordered to its south by Burundi for about 290km, Tanzania to its east for 217 km, Uganda to its north for 169km and the Democratic Republic of Congo (DRC, formerly Zaire) to its west for 217 km. Rwanda has a total surface area of 26, 338 sq. km of which the total land area is 24, 948 sq. km and 1, 390 sq. km is water.

Rwanda is often referred to as the country of a “thousand hills” (mille collines) , because of its numerous highly dissected hills, often with flat peaks and convex slopes, separated by relatively narrow valleys, with the lowest altitude of 950m at Rusizi River and the highest altitude at Mount Karisimbi 4,519 m. The average altitude is 1,250 m above sea level.

Rwanda can be divided into six topographical regions which are;

- From west to east are the narrow Great Rift Valley, which slopes sharply to Lake Kivu
- The Volcanic Virunga Mountains, whose highest peak, the snow capped Mount Karisimbi, towers over the high north western lava plains.
- The steep north-south rise of the Congo – Nile Basins divide, whose width averages 25 km.
- The ridge of the Congo – Nile Basins divide, with an average elevation of 2750m above sea level.
- The central plateaus east of the mountains, which are covered by rolling hills.
- The savannas and swamps of the eastern and south eastern border areas which cover one-tenth of the nations land area and include the vast Kagera National Park.
- Most of Rwanda is at least 900m above sea level; the central plains have an average elevation of 1932m, while southeastern Rwanda has a desert like terrain.

4.1 Physical Environment

4.1.1 Climate

Rwanda enjoys a tropical temperate climate due to its high altitude. The average annual temperature ranges between 16°C and 20°C, without significant variations. Rainfall is abundant although it has some irregularities. Winds are generally around 1-3 m/s. In the high regions of the Congo-Nile ridge, average temperatures ranges between 15 and 17°C and the rainfall is abundant. The volcanic region has much lower temperatures that can go below 0°C in some places.

In areas with intermediary altitude, average temperatures vary between 19 and 21°C and the average rainfall is around 1000 mm /year. Rainfall is less irregular, and sometimes causes periods of drought.

In the lowlands (East and Southeast), temperatures are higher and the extreme can go beyond 30°C in February and July-August. The absolute temperature of 32.8°C was recorded in the Southeast by Karama-Plateaustation on the 4th of September 1980.

Thermic constraints are more considerable there than in the remaining part of the country. Rainfall is less abundant in that region (700 to 970 mm/year). Weather in Rwandan is determined by the rainfall patterns. Thus, the climate of the country is characterized by an alternation of four seasons of which two are wet and the other two are dry.

However, one can notice that rainfall is generally well distributed through out the year, despite some irregularities. Eastern and South-Eastern regions (Umutara, Kibungo, Bugesera, Mayaga) are more affected by prolonged droughts while the northern and western regions (Ruhengeri, Gisenyi, Gikongoro and Byumba) experience abundant rainfall that usually causes erosion, flooding, and landslides.

The quantity of total annual rainfall varies between 800mm in the Northeast of Rwanda (Eastern Umutara) and 1600 mm in the natural forest of Nyungwe (Wisumo) and in the high lands of the Northwest (Kinigi). The decrease in rainfall is observed in the region of Bugesera (900 mm) and in the Western part of Gisenyi Province (1200 mm). The increase of rainfall is observed in some regions like Kibungo (Gahororo, 1200 mm); in the Southwest (Mibirizi, 1450 mm) and in the natural forest of Gishwati (1350 mm). The region that is characterized by the highest rainfalls (over the average isohyets of 1200 mm) is located in the western half of the country, from Byumba to Kibeho and from Kinigi to Mibirizi including the region bordering Lake Kivu.

4.1.2 Relief

The Rwandan relief is hilly and mountainous with an altitude varying between 900 m and 4.507 m. The components of that relief are:

Congo-Nil Ridge overlying Lake Kivu with an altitude between 2500 m and 3000 m. It is dominated in the Northwest by the volcanic ranges consisting of five volcanic massifs of which the highest is Karisimbi with 4507 m. *The central plateau* presents a relief of hills with an altitude ranging between 1500 m and 2000 m. *The lowlands of the East* are dominated by a depression characterized by hills with more or less round top and 1000 to 1500 m in altitude. *The lowlands of the South-West in Bugarama plain* with an altitude of 900 m are part of the tectonic depression of the African Rift Valley.

4.1.3 Catchment and Hydrology

Rwanda has a relatively big quantity of water: rivers, lakes and marshes and occupy a surface area of 211000 ha or about 8% of the national territory (lakes: 128000 ha, rivers: 7260 ha and marshes: 77000 ha).

Surface water

Rwanda has a dense hydrographical network of ± 2 km/km² (length of the superficial flow network by km² of surface). The country is divided into two hydrographical basins with a separating line called Congo-Nile Ridge, moving from the North to the South and \pm perpendicular to the volcanic chain, making natural obstacles exchange between the catchments basins of the Northern Kivu and the Southwest of Uganda and those of Rwanda.

In the West of that line there is the Congolese basin (33% of the surface of the national territory) that drains 10% of water resources of the country. It comprises rivers Sebeya, Koko, Rusizi, Rubyiro, as affluents of Lake Kivu (102800 ha on the Rwandan side, 473 m of maximum depth), Ruhwa and many other small rivers.

In the East of the Congo Nile Ridge there is the Nile basin which covers 67% of the National territory and drains 90% of Rwandan waters by two main rivers namely Nyabarongo and Akagera. The latter is the main affluent of Lake Victoria with an average outflow of 256 m³/s at Rusumo station and thus considered as the source of the Nile. The basin of the Nile in Rwanda comprises a lot of small lakes (Bulera, Ruhondo, Cyohoha South, Mugesera, Muhazi, Rwampanga, Mihindi, Mirayi and many others). Those lakes are not very deep (5 to 7 m of depth) except for Lake Bulera and Ruhondo which are 50 to 60 m deep.

Underground water

The outflow of the underground renewable water resource is estimated at 66 m³/s. Out of this, the 22000 known sources contribute an output of 9 m³/s. In general, little information is available on underground resources.

Rwanda's water resources cover a surface area estimated at about 212 000 ha, made of rivers and wetlands; the water of wetlands cover some 77 000 ha, that is 37% of the total surface. Rwanda is divided into two major drainage basins, the Nile to the east and the Congo to the west. The Congo River Basin covers 25 percent of Rwanda and receives 10 percent of the total national rainfall. The rainfall regime has a strong influence on the hydrological regime. The country experiences floods during the long rainy season (March

– May) and floods subside during the long dry season (June – September). Low water levels are very marked.

The catchment/watershed of these marshlands are the many hills that catch rain water and drains slowly to the lower areas where the marshlands modify the movement of water in the channel network by lowering the peak flow and volume of flood discharges. Ground water in most of these marshlands areas is struck at a depth of 8m. The marshlands provide recharge of the ground water through percolation during water retention time in the area.

According to a study by FAO, the total area of marshlands of Rwanda is estimated at about 165 000 ha which are partially exploited depending on their degree of flooding. However, only 4 000 ha of wetland are fully equipped with irrigation and drainage systems and 1 200 ha are partially equipped.

Rwanda has a dense hydrographic network divided in two unequal watersheds which are situated on either side of the Congo-Nile ridge: the Congo basin and the Nile basin. The Congo basin consists only of insignificant and short rivers, which flow into Lake Kivu. River Rusizi in the south is its outflow towards Lake Tanganyika. The Nile basin covers the greatest part of the territory.

Most rivers originate from the slopes of the Congo-Nile ridge. The two main rivers, namely Nyabarongo and Akanyaru, together with their numerous tributaries form, downstream from Lake Rweru, the river Akagera which drains the best part of Rwanda's waters towards the Nile, forming the border with Burundi in the south and Tanzania in the east.

Rivers Nyabarongo and Akagera are closely associated with vast marshes and numerous shallow lakes found along these rivers. The ecology of these ecosystems is very dynamic and complex; the vegetation of marshes and the size of the lakes change continuously with the rainfall and the flow rate of the rivers.

Lakes

Rwanda has some 28 lakes of significant size. Six among the largest are entirely within the national territory: Runhondo, Muhazi, Mugasera, Ihema, Rwanye and Burera. Three others, Rugwero, Cyohoha and Kivu, are shared with neighboring countries. The largest and most spectacular is Lake Kivu, so large as to seem almost like a sea to the landlocked inhabitants.

Lake Kivu lies at 1, 460m above sea level and is 90 km long (north-south) and 49 km wide (east-west). From an average depth of 220m, it plunges to a maximum depth of 475m. Lake kivu has a rough, jagged coast and contains numerous islands, the largest of which is Idjwi. Lake Kivu lies on the border with Congo in Western Rwanda at the foot of the Virunga Volcanoes. Kivu's shores are densely populated and the principal town on the Rwandan side is Gisenyi. Although it is supplied with fish, the lake is poor in fauna but rich in volcanic substance. Great volumes of dissolved methane gases that may be

developed as energy sources exist in its deep waters. Lake Kivu drains to the south into Lake Tanganyika by the swiftly descending Ruzizi River.

The Central Plains are drained by the Nyabugogo, and Akanyaru rivers. Rwanda's eastern border is formed by the Akagera River on its way to Lake Victoria. The rivers and lake cover some 135,000 ha, or 5% of national territory.

Quality of water

In Rwanda the quality of water is generally good with a pH ranging between 6 and 7.5. Surface water often carries sediments and in mining and volcanic regions, the water can contain arsenic, lead, mercury, fluoride, iodide and other toxic metalloids and heavy metals. The physio chemical pollution of water is not frequent due to the small level of industrialization and use of agricultural chemical inputs. The microbiological pollution is often observed and it comes from various domestic wastes and debris carried by rain water towards the natural environment. The pollution of water courses and lakes by the water hyacinth and other harmful aquatic plants is a phenomenon that is very recent and alarming in Rwanda.

4.1.4 Wetlands

Wetlands cover a total area of 164,000 ha or about 6% of the territory. The wetlands (*marais* in French) include a variety of ecosystems, ranging from large, permanently flooded swampy peat-lands to smaller, seasonally flooded wetlands with a more mineral soil.

The main swamps are Akanyaru (30,000 ha) on the border with Burundi, Mugesera-Rugwero in the southeast, Kagera swamps along the Tanzania border in the east, Nyabarongo (10,000 ha) and the Rugezi wetlands (5,000 ha) in the north.

The wetlands serve as troughs for sediment particles and play an important role in the national water balances by acting as a buffer, thus reducing the maximal flow rates during the rainy season and maintaining a relatively high flow rate during the dry season.

Currently, an estimated 94,000 ha have been brought under agriculture, the large majority of this being spontaneous agriculture with maize, sweet potatoes and beans. In addition, the wetlands are used for a variety of traditional activities including the collection of leaves to make handicrafts, extensive grazing and making of bricks. Wetlands also provide a spawning habitat for fish, and are of great significance for biodiversity conservation.

The wetlands are composed of marshes, lakes, rivers and brooks representing around 14.9% of the national territory of which 6.3% consist of marshes and 8.6% of lakes, water courses and pools of permanent or seasonal fresh water.

In the highlands of the Northwest, there are: lakes Bulera and Ruhondo as well as the marshes of Rugezi. In the Central and the East of the country, wide marshes are those of Nyabarongo, Akanyaru and Akagera rivers. Many cuvette lakes connect with rivers and most of them are located in the Akagera National Park. From the Southeast to the

Northwest, there are lakes like Cyohoha in the South, Mugesera, Rweru, Sake, Cyambwe, Ihema, Milindi, Rwanyakizinga, Kivumba, etc.

Given the importance that the Government of Rwanda attaches to wetlands, in 2003 Rwanda ratified the Ramsar Convention or convention on wetlands and has already registered on the Ramsar list the site of Rugezi and identified other potential sites that will be registered in the future, like the complex of Mugesera-Rweru, Kamiranzuvu marshes and the wet zones of the Akagera National Park. In addition, a plan of action for the implementation of the Ramsar Convention was developed in June 2004.

The wetlands ensure several functions and provide numerous services to people. For instance they ensure control of floods and the recharge of underground waters. They play the role of alleviating the erosive force of water and thus facilitate the deposit of sediments in suspension that could block water courses downstream.

Degradation of water resources

The degradation of water resources is characterized by:

- Frequent flooding and their effects on health, infrastructures, economy, land and aquatic ecosystems.
- The problems linked to water pollution (toxic products, water hyacinth ...);
- Erosion of drainage basins, sedimentation of water courses and silting up of lakes;
- Over exploitation of lakes and water reserves;

4.2 Soils

Pedology

The Rwandan pedology is characterized by six types of soils namely:

- Soils derived from schistose, sandstones and quartzite formations (50%);
- Soils derived from granite and gneissic formations (20%);
- Soils derived from basic intrusive rocks (10%);
- Soils derived from recent volcanic materials (10%);
- Soils derived from old volcanic materials (4%);
- Alluvial and colluvial soils (6%).

The underground earth contains deposits of minerals such as tin, wolfram, Colombotantalite and gold. There are also big numbers of quarries (clay, sand, building stones, limestone, peat, etc). From 1999 to 2001, the mining sector played an important role in the national economy. It contributed to export revenues in the following proportions: 5.9% in 1999; 12.58% in 2000; 42.64% in 2001.

Figure 1: Distribution of arable lands¹

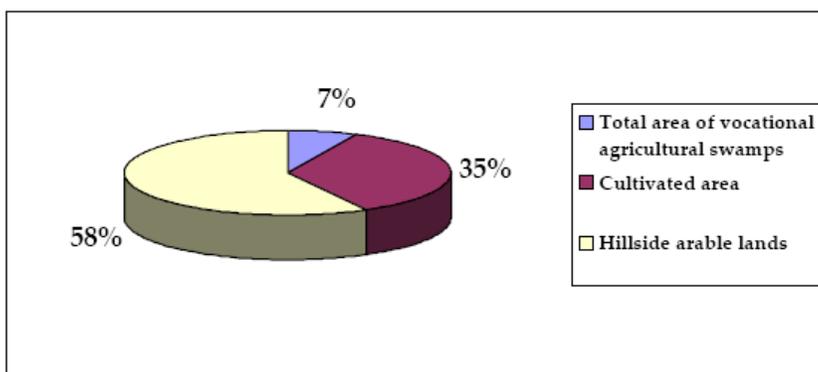
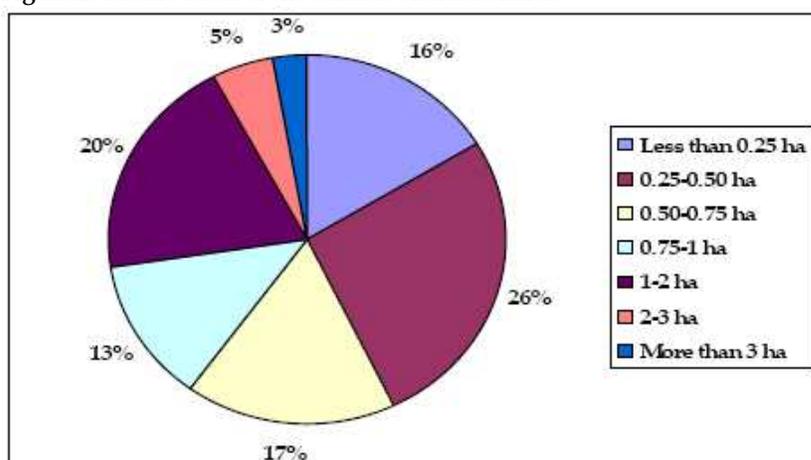


Figure 2: Distribution of the surface of arable lands²



¹ Source : Communication Nationale Initiale sur les changements Climatiques, MINITERE 2005.

² Source : Enquête MINECOFIN 2002/ MINAGRI 2005

Rwanda's soils contain many of the metal compounds found in laterite soils, but are generally lighter, more fertile, more workable, and less problematic to farmers than true laterite soils. There are two sub zones, with vastly different soils. To the northwest and the lower portions of the larger river valleys are very fertile volcanic soils covering approx. 10% of the country. Elsewhere, the largely metamorphic bedrock has produced generally poor quality with fertility varying and depending on extent of erosion and leaching.

About 30% of Rwanda's land is suitable for farming, and another 30% for grazing. Except where the land is seriously eroded or leached by heavy farming, the soils have good humus content and fertility. Intensive food crop production, often on steep slopes, has led to serious soil erosion. Pastureland has also been overgrazed in many areas. Population pressure on the richer lands is sufficiently intense that soil damage, which is due to leaching, erosion, and intensive farming without adequate fertilizer, is an increasingly serious problem.

Many members of local communities complained of problems associated with low soil fertility on levels of food production and household incomes.

Rwanda being one of the most densely populated countries in Africa, and with the mountainous terrain and steep slopes coupled with the expanding growth rate which has been exacerbated by the added pressure for land to support the returnees, agricultural land is becoming increasingly degraded. Farmers are intensifying land use to meet food needs without proper management practices and external inputs. The resulting depletion of nutrients from the soils has caused crop production to stagnate or decline, with a significant adverse impact on Rwanda's food security situation.

Rates of nutrient depletion range from moderate, 30 to 60 kilograms of NPK¹ per hectare per year in the humid forest areas and wetlands to high, above 60 kilograms in the highland areas. It is estimated that in bad years, the difference between nutrient inputs and nutrient losses in Rwanda can be as bad as -136 kilograms of NPK per hectare. Nutrient imbalances are highest where fertilizer use is particularly low and nutrient loss, mainly from soil erosion, is high.

More nitrogen and potassium than phosphorous get depleted because nitrogen and potassium losses primarily arise from leaching and soil erosion. These soil problems result mainly from continuous cropping of cereals without rotation with legumes, inappropriate soil conservation practices, and inadequate amounts of fertilizer use.

Fertilizer tends to be used mostly on cash and plantation crops because of the high profitability of fertilizers in the production of export crops. Food/subsistence crops get less fertilizer because of unfavourable crop/fertilizer price ratios and financial constraints faced by farmers.

Although increasing the use of mineral fertilizer may be the centrepiece of the strategy to balance nutrient depletion and improve soil fertility and productivity, it should not be taken to mean that fertilizer levels should be increased beyond basic requirements. Indeed, surpassing recommended levels for less-responsive varieties and in poorly managed cropping systems can lead to high nutrient losses and low yields. Moreover, to achieve intended goals which are to increase rural incomes through increased agricultural productivity, inter alia, fertilizer use must be combined with a broad spectrum of complimentary practices, such as soil conservation, recycling of crop residues, livestock management, and use of organic fertilizers.

4.2.1 Use of soils

The exploitation of land employs 88% of the active population. The number of agricultural households is about 1.4 million with an average surface area of 0.60 ha. Land resources are thus limited and coveted resulting in overexploitation and inappropriate use of lands with disastrous consequences on land resources and on environment in general. Rwanda has also about 165 000 ha of marshes of which 66 000 ha can be developed into

¹ NPK means nitrogen, phosphorous and potassium.

rice fields. However, there are big differences where the surface of arable land varies from 0.25 ha to more than 3 ha per family according to regions.

4.2.2 Soil degradation

Rwandan soils are naturally fragile. They are derived from physico-chemical alteration of schistose, quartzite, gneissic, granite and volcanic rocks that form, the superficial geology of the country.

The degradation of the natural environment is particularly linked to hydrous erosion that affects a big portion of cultivated lands. It is assumed that the hydrous erosion reduce the capacity to feed 40,000 people per year and causes annual losses of about 15,000,000 tones of soil, due to poor conservation of soils, estimated at 945,200 tones of organic materials, 41,210 tones of nitrogen, 280 tones of phosphorus and 3 055 tones of potassium for the whole country.

The generic impacts of erosion are numerous:

- Loss of soils fertility due to leaching of arable land with its consequences on agricultural production;
- Increase of sedimentation downhill cultivated lands from eroded plots.
- Risk of crops destruction and silting-up in marshes and plains (areas that are more favourable to agriculture);
- Risk of local landslides and mudslides;
- Risk of irreversible leaching of soils.

The hilly nature of Rwandan topography is one of the main factors of soil vulnerability.

4.2.3 Highland soils

The highland soils are particularly prone to erosion and landslides especially regions of the Congo-Nile ridge, valleys and lowlands (peat lands) as well as highland meadows. Soils of foothills of the Congo-Nile Ridge and of other transition regions between the central plateau and highlands are fertile but, due to deforestation and inappropriate agricultural practices, they are vulnerable to erosion.

4.2.4 Soils of the central plateau

The central plateau covers the regions of South and Southeast (former provinces of Gitarama, Butare, a part of Kigali-Ngali and Kibungo). The soil types are hill Ferro soils and valley histosols. The slopes of hills are exposed to erosion notably in the case of clay-sandy or gravely soils.

4.2.5 Soils of the lowlands

They cover the Eastern and South-eastern regions and are Ferro soils with savannah vegetation. Like the region of Bugesera, the river-lake complex along Nyabarongo and Akanyaru rivers underwent serious leaching. In addition, the geological structure of soils

in those regions allows rain waters to infiltrate deeply into soils, and that can partly explain the lack of runoff waters and shallow brooks.

4.2.6 Soils of valleys

These are soils of histosol and peat soil types that constitute potential agricultural and energy wealth (case of intermountain basins of Kamiranzovu and Rugezi). In the wide water surfaces of eastern regions like Umutara and Bugesera, as well as the Rusizi region (Bugarama), the valleys are of vertisols and alluvial types are fertile. The slope slight as they may be, are threatened by erosion due to the weak permeability of soils.

The exploitation of peat for fuel production purposes would require a preliminary development plan for swampy areas. In fact, any extraction of peat is associated with drainage and exudation, two factors likely to impact negatively on the crucial role of wet ecosystems and swamps in regulating the hydrology. Moreover, the exploitation of mines and quarries spoils the landscape and more often constitutes a source of soil erosion, water pollution and pose a danger to human health. A good number of queries are not rehabilitated and always left open.

4.3 Biological Environment

Rwanda is covered with diverse ecosystems that include mountains, ombrophile forests, gallery forests, savannahs, wet and aquatic zones, wood and agro ecosystems. All these ecosystems have a rich flora and fauna.

4.3.1 Protected areas

The fauna and the flora can be better preserved and protected thanks to the establishment of a system made of protected areas like national parks and forest reserves to which the best management is applied. However, through time and due to human activities, these conservation areas have been reduced considerably.

4.3.2 Forests

Rwanda's remaining natural forests, the Nyungwe Forest, the Gishwati Forest and the Mukara Forest, are highland forests around the volcanoes, have a high degree of biological diversity and rare animal species, such as mountain gorillas, Rwenzori colobus monkeys and golden chimpanzees.

It is estimated that there are 2150 plant species to be found in Rwanda, with around 700 species of these acknowledged to have medicinal value. Towards the east of the country lies the Akagera National Park, the Mutara game reserve forests galleries and wooded savannahs.

Population pressures have already drastically reduced the land area of the natural forests of Rwanda from about 30% to presently fewer than 10% in less than a century. The deforestation of Rwanda's remaining forests is also the result of high fuel wood consumption. Heavily populated and cultivated areas adjacent to the natural forest, as well as the recent wars, have resulted in massive deforestation and loss of genetic diversity within Rwanda's natural forest.

Clearance for farming and pasture land has also contributed to the reduction in forest cover, as well as harvesting for fuel wood and timber for housing and small scale mining. Production of export crops is also a factor in forest destruction: half the forests around the volcanoes in the north were cleared for pyrethrum plantations in the 1960's, and areas around the Nyungwe were cleared for tea plantations.

Preliminary estimates indicate that the protected areas and forest reserves were seriously damaged as a result of recent wars. From an estimated pre-1994 total surface area of 417,000 ha, it is thought that they have been reduced to approximately 226,000 ha. Specifically, the Akagera National Park was reduced to less than one-third of its original size when the Umutara prefecture was created in 1996 for the resettlement of returning refugees. The Gishwati Forest has all but disappeared (from a pre-war estimate of 37,000 ha, only about 2,000 ha now remain).

4.3.3 National Parks/Forest Reserves at a Glance

The national parks in Rwanda are:

- Volcanoes National Park
- Akagera National Park
- Nyungwe National Park
- Giswati Forest Reserves

These areas are exclusively reserved for the protection of flora and fauna, eco-tourism, biodiversity conservation, and for geological formations of scientific and aesthetic value.

The geographical distribution of those parks on the national territory is a guarantee of the conservation of biological diversity representative of the fauna and flora of the country.

The Volcanoes National Park (VNP) is famous world wide due to the presence of the mountain gorilla (*Gorilla gorilla beringei*). In addition to the mountain gorilla, the mountain ecosystem (high altitude, plenty of rainfall, humid temperature) induces a variety of biodiversity. The VNP host 245 species of plants of which 17 are predominant, including 13 orchid internationally protected, 115 species of mammals, 187 species of birds, 27 species of reptiles and amphibians and 33 species of arthropods. Some of these species are endemic while others are internationally protected.

The Nyungwe National Park (NNP) is the largest mountain rain forest of Africa with a surface of 101.500 ha. It contains more than 1200 species of flora of which 140 species of orchids, 260 species of ligneous and herbaceous plants, 24 species of trees, 275 species of birds of which 26 are endemic in the Albertin Rift and 3 are on the red list of the IUCN, (*Bradypterus graueri*, *Crypto spiza shelleyi* and *Apdis argentea*), 13 species of primates representing 1/5 of primate species discovered in Africa and the *Colobus angolensis ruwenzori* that appear in group of 300 to 400 individuals.

*The Akagera National Park (ANP) covers a surface of about 108.500 ha and hosts more than 900 species of plants, 90 mammals, of which 47 species of big mammals, 530 species of birds, 9 species of amphibians and 23 species of reptiles. Four animal species are protected by the CITES (Convention on International Trade of Endangered Species) namely *Loxodonta Africana*, *Sincerus caffer*, *Panthera leo* and *Tragelaphus oryx*.*

Table1: Reduction of the sizes of protected areas in Rwanda³

Names of parks	Surface in ha (at the time of its creation)	Surface today	Remarks
Akagera National Park	250 000	108 500	Created in 1934, it is the guarantee of the conservation of fauna and flora of the Eastern savannahs ecosystem
Volcanoes National Park	34 000	16 000	Created in 1925, it represents the last refuge of the natural flora of volcanic land and the fauna which is specific to the volcanic ecosystems of the North.
Nyungwe National Park	-	103 000	Created in 2005, it comprises also a small forest of Cyamudongo at 10 km Southwest of Nyungwe. It ensures the survival of the mountain fauna and flora of the Southwest of Rwanda.

Source; Stratégie Nationale et Plan d'action pour la conservation de la biodiversité au Rwanda, MINITERE, 2003.

4.3.4 Relic forests and gallery forests

The Gishwati forest that covered 21.000 ha before 1981, consisted of only 600 ha in 2002. *The natural forest of Mukura* that stretches on 3.000 ha in 1960 covered only 800 ha in 2002. Regarding tree species and altitude, it is similar to that of Gishwati (2000~3000 m).

Relict forests and savannahs in the East are located around the Akagera Park and have a variety of endemic and rare species whose majority is used in traditional medicine.

Gallery forests accommodate an important biodiversity with endemic and rare species. That is for instance the case of the *Blighia unijugata*, *Grewia forbesi*, *Rhus vulgaris*, *Pterygota mildbraedii* and *Ficus sp.*

In general, for a period of about 40 years, the surface area of the natural forests of Rwanda underwent a decrease of about 65% between 1960 and 2002. The search for arable lands, extensive farming, illegal felling of forests for firewood, production of wood for charcoal and poles for building in urban areas, as well as a land mismanagement have drastically contributed to the reduction of the surface area of forests.

4.4 Biodiversity of wetlands

The ecosystems of the Rwandan wetlands inhabit a rich biological diversity in terms of vegetation and animal species (more than 104 plant species have been identified), except for Lake Kivu, Bulera and Ruhondo that have some limnologic problems.

The Lake Kivu contains a very poor aquatic flora and the density of the phytoplankton is relatively low due to the lack of mixture of layers (the nutrients are found at the bottom of the lake). The aquatic fauna is also poor due to the physical isolation of the lake.

Most lakes of the Akagera National Park are very rich in biodiversity with phytoplankton, fish species and ornithological fauna. The flora is dominated by the Cyperus, Phragmites, Phinix, etc. The Water Hyacinth (*Eichornia crassipes*) is present and has started spreading covering more important surfaces of the lakes, thus posing a threat to their biological diversity. Some lakes like Cyambwe, Rwampanga and Rweru are particularly rich in hippopotamuses and crocodiles. One can also find many other lakes such as Nasho, lakes of Gisaka and Bugesera that contain phytoplankton that is very rich in biodiversity and flora that is mainly dominated by papyrus with *Cyperus papyrus* mixed with *Miscandium violaceum* and *Nymphaea nouchalii*. All these lakes are associated with gallery forests onshore or on small islands.

Concerning the Northern lakes (Bulera and Ruhondo), the aquatic flora and fauna are poor due to the physico-chemical situation unfavourable to their development and the isolation of the two lakes. The concentration of the plankton is less important in Lake Bulera than in Ruhondo. They have 48 species grouped in 4 families (chlorophyceous, Cyanophyceous, pyrophytes and bacillariophyceous).

Lake Muhazi is land locked, isolated, and its ichthyologic fauna is very limited. One can find three endemic species and other nine introduced from outside. The lake is very rich in phytoplankton.

The macroflora of the marshes is mostly composed of wide spaces of papyrus with some zones of *Miscanthidium*. The low layer is covered with *Cyclosorus stratus*. The fauna of big rivers and associated marshes comprises ungulates, carnivores, primates, rodents, lagomorphous, insectivorous and birds.

4.5 Biodiversity in agricultural systems

The natural ecosystems that covered the country before the colonial period have been modified by the demographic pressure on more than 90% of the national territory. Human settlement, diversified agro-pastoral practices, consumption of forest products, bush fires and urbanization has caused the disappearance of that climatic formation. Those changes caused secondary formations consisting essentially of graminaceous plants, numerous seasonal or perennial species alternating with crops.

Agricultural land presently covers around 52% of the total surface area of the country and is permanently cultivated. The time between two growing seasons is the only period of

respite. These areas have various crops that play an essential role in the national economy. These crops are usually grouped in two categories: subsistence and cash crops.

Some of the food crops include; sorghum, beans (*Phaseolus vulgaris*), eleusine (*Eleusine corocana*), Colocases (*Colocasia antignorum*), maize (*Zea mays*), rice (*Oryza sativa*), wheat (*Triticum sp*), barley (*Hordeum vulgare*), peas (*Pisumsativum*), soja bean (*Soja hispada*), peanut (*Arachis hypogea*), sweet potato (*Ipomea durcis*), potato, cassava (*manihot esculanta*) and banana (*Musa*).

The importance of each crop varies according to regions. Some crops, like bananas, potatoes, different varieties of wheat, sorghums and beans are subject to high commercial trade. Potatoes, beans, cassava and bananas are present everywhere for the daily diet of the people. The cash crops are very few. They are limited to coffee, tea and pyrethrum.

4.5.1 Pastoral zones

In Rwanda, the essential part of animal husbandry is limited to the family and a small number of animals per household. As agriculture occupies the biggest portion of land, the cows graze in paddocks, on road sides, and in some parts of marginal lands. This obliges farmers to adopt the semi-permanent farming and grow fodder crops such as *Tripsacum laxum*, *Setaria spp*, *Desmodeum spp*, *Pennisetum purpureum*, *Mucuna pruriensis*, *Cajanus cajan*, *Calliandra calothyrsis*, *Leucaena diverifolia*, *Sesbania sesban*, etc. However, we can notice the development of ranching in Umutara and Gishwati. Other pastoral land is very limited and distributed all over the country.

These areas are prone to bush fires, trampling and sometimes overgrazing. The latter is the main cause of reduction of the biological diversity as it exterminates the most precious species along with pyrophyte species with small bromatologic value such as *Eragrostis spp*, *Sporobolus spp* and *Digitaria spp*.

4.5.2 Forestry and tree cultivation

Tree planting in Rwanda was limited to some plants around households such as *Ficus thoningii*, *Euphorbia tirucalli*, *Erythrina abyssinica*, *Vernonia amygdalena*, *Dracaena afromontana*, etc., but the cultivation of woody perennials for timber, energy generation or other services was not part of the customs. That resulted in a massive exploitation that quickly proved its limits.

The first forest plantations were created in 1920 and 1948 and only consisted of *Eucalyptus*. Later on, other species were introduced. These were namely *Pinus spp*, *Callistris spp*, *Grevillea robusta*, *Cedrella spp*, *Cupressus*. The Arboretum of Ruhande (ISAR Station) has 206 species among which 146 feuillus, 56 resinous and a species of bamboo. Those species proved to be dangerous for the biological patrimony because they used to drain and acidify places that are already acid, what caused the reduction or even the extermination of the undergrowth. Thus planting those species would lead to erosion. The covered surface area was estimated at 256,300 hectares in 1998. Despite efforts of diversifying tree species, we estimate that 99% of trees consisted of *Eucalyptus spp*.

A replacement of those trees by agro forestry species such as Grevillea, Cedrella, Maesopsis, Calliandra, Leucena proves to be of urgent need. That is why agro forestry practices have to be developed even in agricultural zones.

Deforestation

The deforestation phenomenon is mostly intensified by the production of fire wood, charcoal, and it constitutes a high threat to vulnerable groups and to the entire population since the main source of energy in Rwanda is timber.

Demographic pressure associated with high demand for wood products and other human activities thus constitutes the main cause of intensive deforestation, and it immediately results in reduction of the vegetation and forest cover. Then soil erosion and land degradation deteriorate during rain season.

4.6 Volcanoes

The Virunga Volcanic range, north of Lake Kivu extends some 80 km along the borders of Congo, Rwanda and Uganda. The range runs east-west, perpendicular to the Rift Valley in which Lake Kivu lies. Of its eight major volcanic peaks, the highest is Karisimbi at 4,507m above sea level. This strotovolcano is part of a group of volcanoes in the Bufumbira field which is an eastern region of the Virunga. Visoke volcano is also located in the Bufumbira field, with a peak elevation of 3, 660 m above sea level.

Individual volcanoes bear Rwanda descriptive names, such as Sabinio (Sabinyo; “Old Man with Large Teeth”) and Muhavura (“Landmark”, or “Guide”).

The six volcanoes of the center and east are extinct. Mikeno and Sabinio are the oldest of these, dating from the early part of the Pleistocene Epoch (the Pleistocene began about 1,800,000 years ago and lasted until about 10,000 years ago); their craters have disappeared, and erosion has imposed a jagged relief. In the middle Pleistocene (900,000 to 130,000 years ago), Karisimbi, Visoke, Mgahinga, and Muhavura appeared, all but Karisimbi possessing a crater summit. The crater of Muhavura contains a small lake.

Not more than 20,000 years ago Nyiragongo and Nyamulagira emerged at the western end of the chain, both with extensive craters. The main crater of Nyiragongo is about 1.2 km across and contains a liquid lava pool. The lava field of these two volcanoes has remained active, and some of the flows have reached as far as Lake Kivu, notable eruptions occurring in 1912, 1938, and 1948. In 2002 lava from Nyiragongo destroyed much of the nearby city of Goma, in Congo, leaving thousands homeless. Many lesser cones flank the major volcanoes.

The Virunga Mountains rise out of densely populated plateaus that are inhabited mostly by Rwandan cultivators and, certain areas, by cattle herders. A wide variety of vegetation grows on the slope of Karisimbi. One type that grows in the lower afro-alpine zones of Karisimbi is the Lobelia or Senecio plant. In Mudende, a commune in Gisenyi, wheat, potatoes and other crops are grown in the rich volcanic soils at the foot hills of Karisimbi. Mudende is also the name of the largest cinder cone in this area, and agriculture

completely covers this extinct cinder cone, and crops are even grown inside that crater itself.

The Southern flanks of the central and eastern mountains comprise Volcanoes National Park in Northwest Rwanda, protecting the mountains alpine vegetation, as well as wildlife that includes the golden monkey and the mountain gorilla. Human activity and settlement is dangerously close to these volcanoes.

4.7 Wildlife

The dense high altitude forests of Volcanoes National Park is home to about half (320) of the World's remaining population (650) of Mountain Gorillas. Mountain gorillas eat large amounts of vegetation from more than 70 different plant species and spend about 30% of each day foraging for food. They consume roots, leaves, stems of herbs, vines from trees, shrub-sized plants, wild celery, gallium, vines, berries, barks and bamboo shoots.

Among the 12 species of primates in the Nyungwe National Park, are the black and white Colobus monkeys that wander around in huge troupes, some of which are made up of over 300 agile individuals. There are also known to be 275 species of birds in the Nyungwe.

In the Akagera National Park is the largest variety of wildlife species that include Buffalo, zebras, antelope, warthogs, chimpanzees, lions, elephants, rhinoceros, hippopotamus, as well as the rare species – such as the giant pangolin, or anteater. The main threat they face is the destruction of their habitats and poaching.

Rwanda as a whole is known for its rich variety of flora is accompanied by an equal variety of fauna, including several species of birds and primates. The country has more than 275 species of birds, 24 of which are endemic to Albert Rift. Thirteen types of primates have been identified, representing fifth of Africa's primate species among which is the most threatened. Most of these species are concentrated in large wetlands of (Kagera, Kamiranzovu Rugezi, and Rweru-Mugesera) and protected areas of Nyugwe and Akagera.

4.7.1 Critical Habitats

As the pressure for access to land increases, human activity and settlement threatens to enter these protected forests and parks and to destroy these natural habitats. In the past, the demand to convert more land to agricultural use for instance, led to the destruction of some of Rwanda's wetlands (marias), which has resulted in flooding, loss of wildlife habitats and sedimentation.

Currently, none of the country's wetlands has a protected status (except the wetlands in Akagera National Park). Nevertheless, five wetlands have been described as crucial for the protection of birdlife. These are Mugesera, Kagera, Nyabarongo, Rugezi Swamp, and the Akanyaru wetlands. These wetlands also support a number of globally threatened species and restricted range species, such as water turtles, crocodiles, snakes, otters and a large variety of water birds including herons, egrets, ducks, warblers and weavers. Some

180 bird species have been identified in the wetland habitats of Rwanda, including 6 European migrant birds.

4.8 Socio-economic Environment

4.8.1 Population and Demographic Characteristics

In August 2002, Rwanda counted 8,128,553 inhabitants with a surface area of 26,338 km², i.e. a physical density of 321 inhabitants/km². Given that the effectively useful land is only of 18,740 km², the physiologic density in 2002 was 378 inhabitants by km². Rwanda is classified among the poorest countries of the world. About 50% of the population is below 16 years of age and 90% live in rural areas.

In 2002, the Gross Domestic Product (GDP) per inhabitant was estimated to be 77,870 FRW. The real growth of the GDP for the year 2002 was 9, 4% compared to the year 2001, mostly due to a good food harvest.

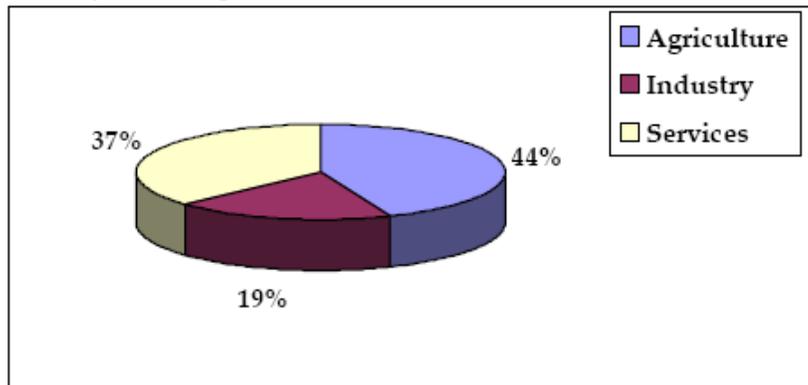
The Gross Domestic Product of Rwanda is dominated by the agriculture sector. In 2002, the portion of agriculture in the GDP was more than 43%, that of industry was 19% and that of services was 37%.

Agriculture is the primary economic activity for the 90% of the population living in the rural areas but Rwanda ran out of new arable land almost 20 years ago and agricultural productivity has been on the decline. The severe degradation of scarce land, forests and water resources that support agriculture has become an obstacle to the revival of the rural economy.

	1980	1990	2000
Population (millions)	5.163	6.879	8.5
% Female	-	51.3	53.5
Fertility Rate	8.3	6.9	5.8
Poverty (Headcount index (%))	40	53	60
Life Expectancy	46	49.5	49
Infant Mortality (per 1000 births)	128	85	107
Under 5 Mortality (per 1000 births)	224	150	198
Maternal Mortality Rate (per 100,000 births)	-		810
HIV/AIDS Prevalence (ages 15-49)	-	-	13.7
HIV/AIDS Prevalence (over 12yrs): rural	-	-	10.8
HIV/AIDS Prevalence (over 12yrs) :urban	-	-	11.6
Literacy	45	50	52
Males	-	63	58
Females	-	44	47.8
Gross Primary School Enrolment	63	70	100
%Girls in total enrolment	48.0	49.6	49.6
Net Primary Enrolment	-	-	73.3
Gross Secondary School Enrolment	3.0	8.0	10.2
% Girls in total enrolment	33.3	39.9	50.67
Higher Education: % girls in total	8.2	16.6	26.9

² World Bank

Figure 3: Composition of the GDP in 2002



Source: MINECOFIN, Edition n°5 August 2002: Indicators of economic development

The health status in Rwanda is poor. The social indicators related to health and survival have more or less stagnated in the last twenty years, with life expectancy of 49 years in 2000 compared to 46 in 1980, and infant mortality of 107 per 1000 live births compared to 128 in 1980. The incidence of HIV/AIDS is high, with 10.8% of the rural and 11.6 % of the urban populations over 12 years of age, seropositive. Water and sanitation services are deficient, with access to potable water by about 52% of households, a decline from 64% at the end of the 1980's. HIV/AIDS, persistent malaria, violent conflicts and their aftermath, malnutrition and poor quality health care have been major factors in poor survival indicators.

In Rwanda, there are three official languages, Kinyarwanda, English and French. Kinyarwanda is the native language of all the Rwandese, irrespective of ethnicity. Swahili is also widely spoken.

4.8.2 Human settlements

The Rwandan settlement pattern has been scattered since time immemorial. It has for long been characterized by the traditional use of land associated with the ancestral lifestyle but which does not correspond any more to the present environmental and economic constraints. It is in that perspective that the present policy of the Government of Rwanda regarding settlement consists of encouraging a clustered habitat commonly known as «IMIDUGUDU».

In urban areas, Rwanda has not yet developed city master plans. There are only plans of different towns of which some have expired and need updating. Urban centres developed spontaneously without taking environmental aspects into consideration.

Sanitary facilities are insufficient and sometimes inadequate in city centres. In peri-urban zones qualified as spontaneous quarters, solid wastes are piled in disorder, drinking water is rare, and rain water draining gutters are insufficient. Thus diseases are frequent in those areas, the degradation of environment is more pronounced and living conditions are poor.

City development should normally be based on urban planning documents like the “Urban management master plan (SDAU)”. Presently, only two centres have got that kind of document and the SDAU of Kigali and Rwamagana are under development. The policy of city development which is under finalization is aimed at supporting districts in their efforts to quickly get urban planning documents integrating environmental aspects.

4.8.3 Energy and transport

In Rwanda, the biomass constitutes the main source of energy as it covers 94% of national needs. Woody fuels and biomass wastes are the sources of energy used in households, industries and handcrafts.

However, the country has also other sources of alternative sources of energy which are not yet exploited namely peat estimated at 155 millions of tones, methane gas of Lake Kivu representing 57 billions m³ and solar energy.

Combined with anthropic factors (agriculture, drainage of marshes, deforestation and overexploitation of river basins), the hydrous deficit is considered to be the main factor of vulnerability of the hydroelectricity subsector of the energy sector. It is evident that the pluviometric deficit leads to the reduction of offer in water resource and, consequently, in hydroelectricity. That was the case for the power plants of Ntaruka and Mukungwa on lakes Bulera and Ruhondo, two main interior sources of electric energy of Rwanda.

Generally, the energy sector is essentially of the traditional type as only wood (15% charcoal, 71 % fire wood and 8% harvest wastes) covers about 94% of the total energy needs of the country, against only 5 % for the contribution of petrol products and 1% for electric energy.

Moreover, the hydroelectricity infrastructure is still weak and the present production does not exceed 27 MW while the demand is more than 40 MW; However, the electricity from diesel thermic sources was recently produced at Jabana and Gatsata, and the mobilization of funds and investors is underway for other hydroelectric projects:

- 28 MW on Nyabarongo River in Bulinga;
- 60 MW (three countries) on Akagera at Rusumo;
- Rusizi II; Mukungwa III; Rukarara and various other micro hydro electric plants.

The transport sector is generally dominated by road transport that totals 14000 Km of roads and tracks. In the sub sector of air transport, the country has two international airports (Kigali and Kamembe) and aerodromes (Huye, Rubavu and Ruhengeri, etc) used in internal transport. Lake transport is used mainly on Lake Kivu for connecting districts of the Western Province. But the construction of certain roads was done without studying the environmental impact, which caused landslides, floods, gullies and sandbanks in depressions (example: Gitarama-Ngororero-Mukamira road.)

4.8.4 Industry and Mining

The industrial sector of Rwanda is modest and recent: 78% of industrial companies were created between 1964 and 1987. In 2002, the contribution of the industry sector to the GDP was of 19% of which the major part was from the agro industry and the rest from small and medium size of companies which produce consumption goods in replacement of importation by using simple technologies.

One of the major problems is related to the location of industrial units as some of them are installed near residence houses, others in valleys (wet lands). These installations are sometimes sources of pollution because of their wastes, liquid (waste waters) or gaseous (dust, smoke, smell), and noise.

In the mining sector, the rehabilitation of quarries was never a preoccupation of those concerned. Many abandoned quarries are not rehabilitated. The exploitation of mines and quarries is often a source of water pollution due to contamination linked with the absence of waste water purification, modern practices of exploitation and soil erosion.

4.8.5 Agriculture

Agriculture is the most important sector of the Rwandan economy with a contribution of 47% to the GDP (12% for livestock) and contributes 71% of export revenue. Coffee and tea are the main export crops, with about 62 millions US\$ of export revenue in 2005, of which 38 millions US\$ were from coffee and 24 millions US\$ from tea.

The agriculture production system is based on small family exploitations whose production is consumed by the owners at more than 80 %. The systems of crops are complex, based on the diversification of productions and the association of crops. Seven main crops, namely banana, bean, sweet potato, cassava, sorghum and potatoes, of which the first five are present in 90 % of production units and constitute the common basis for all the regions of Rwanda.

The little use of chemical fertilizers and pesticides, the low level of equipment and the very limited use of research based technologies result in small yields which are also very vulnerable to climatic changes.

Research and popularisation should normally contribute to growth by the promotion of modern inputs and appropriate technologies, but it was noticed that during the PRSP1, there was no clear strategy concerning research and popularization. That is the reason why MINAGRI has put in place RADA, RARDA and restructured ISAR.

The extensive agriculture practiced by the Rwandan population contributes to the degradation of environment. The agricultural intensification at the level of projects was often realized without taking into account environmental drawbacks accrued from inputs like (mineral fertilizers, pesticides, herbicides and used techniques).

4.8.6 Animal husbandry

Animal husbandry, essentially made of cattle, is extensive. Average milk production is 1 litre / cow/ day for 180 days of lactation (MINAGRI, 2001). The pastures consist mainly of family fallows and marginal lands considered as inappropriate to agriculture such as the undergrowth. The demographic pressure progressively leads to the semi-intensification or intensification of fodder resources used to feed animals.

Data from MINAGRI (2006) show that the number of cows increased by 60% between 2000 and 2005 (see appendix 1.13): the number of cows increased by 43%, goats 67%, sheep 195%, porch 93%, poultry 44% and rabbits 67%. The limited subsisting pastoral areas are badly used because farmers do not master the rotative management of pastures. That is showed by the overgrazing and overexploitation caused by trampling, degradation and disappearance of vegetation cover. The permanent stabulation, the semi stabulation and extensive farming constitute the three main types of animal husbandry.

It should be noted that there is a program in MINAGRI through RARDA, called « *One Cow to Every Poor Family in Rwanda* » that will cover all the districts of the country in order to contribute to poverty reduction and food security.

4.9 The Legacies of the Genocide and other past Civil Strife

The legacies of the genocide continue to weigh heavily on the social and economic recovery of Rwanda. The genocide and the preceding civil conflicts impoverished Rwandese and increased their vulnerability, particularly the widows and orphans of the genocide, recently returned refugees, resettled internally displaced persons (IDP's), and the families of the detained 120,000 (at the peak) suspects of crimes of genocide. In 2000, 40% of children between the ages of 7-14 were orphans (have lost at least one parent). Mental health problems, largely the result of the horrors of the genocide and its aftermath, are widespread in a society that is not equipped to deal with it. A 1995 UNICEF survey found that 96% witnessed violence during the genocide, 88% saw dead bodies or parts of bodies, and 70% witnessed someone being killed or injured.

A recent survey of the population found that poverty/economic hardship, security, health care, and lack of trust/sincerity as the major social problems. The loss of the social capital and community solidarity that help to cope with poverty has increased social and economic vulnerability. The rebuilding of the social fabric will take time; continued assistance to reintegrate the vulnerable populations and the rapid expansion of economic opportunities will accelerate the process.

The largest loss of the genocide was in human resources, with close to a million people killed, two million driven into exile, over a hundred thousand in prison, and thousands handicapped physically and mentally. The professional and technically skilled people (i.e. doctors, teachers, nurses, etc.) were singled out for killing in the genocide. While the majority of the refugees have returned, the educated and qualified among them have largely remained in exile. About 800,000 exiled Rwandese, refugees or descendants of refugees from the ethnic violence of 1959, 1962 and 1973-74 returned to Rwanda after the genocide, bringing with them new skills and cultures.

4.9.1 Characteristics of Poverty

The per capita income, at US\$220, is still much lower than the US\$370 it was, in 1990 and 60% of the households live below the poverty line, compared to about 40% in 1985. 90% of the population are rural and depend on agriculture for their livelihood. In 2001 Agriculture accounted for 40.5% of GDP.

Based on the results of the in-country consultations with local communities, local and central governments and civil society members, during the preparation of this ESMF, the following characteristics of poverty were derived:

Who are the Poor?

- Rural households.
- Female headed households, other households with less than two adult-members, elderly and handicapped persons.
- Large households.
- Recently resettled internally displaced people (IDP's) and returned and returning refugees.
- The historically marginalized communities.

The groups are not mutually exclusive.

Why are they poor?

- **Rural Households**
 - Low agricultural productivity, declining soil fertility and environmental degradation.
 - lack of access to land, land fragmentation, insecurity of land tenure.
 - Lack of access to markets, absence of rural commercial activity and alternative income earning opportunities.
 - Social and economic isolation due to high transport costs and insecurity.
 - Poor health services and health standards and rise in HIV/AIDS incidence, impacting negatively on productivity.
 - Loss of capital stock (livestock and other animals) in the genocide.
 - Poor agricultural extension services, lack of access to and knowledge of the use of improved inputs.
 - Lack of access to low cost capital or micro-credit or micro-grants.
 - Lack of access to affordable and sustainable household energy sources.
- **Female-headed households**
 - Shortage of household labor.
 - Declining soil fertility
 - Many women have to take care of husbands and sons in prison, dependant parents, orphans, handicapped husbands and children, returning refugees, and other dependents.
 - Low education attainment, poor access to land, paid employment and credit
 - Poor social services, e.g. water, health, education etc.

- **Recently returned refugees and resettled IDP's**
 - Lack of permanent housing.
 - Access to social services, water, healthcare and education
 - Lack of land and other assets
 - Loss of capital stock- livestock, coffee bushes, banana plantations, farm implements and supplies.
 - Lack of social support due to disconnection with or dislocation from original/nuclear families as resettlement was arbitrary and not to original home base.

- **Urban Poor**
 - Rapid increase in urban population.
 - No employment opportunities particularly among poorly educated young people.
 - Poor basic social services and infrastructure.
 - Lack of housing.
 - Lack of land.
 - High food prices due to low agricultural productivity, high transport costs and restrictions on petty trade.

- **The Historically Marginalized Communities (Indigenous People)**
 - Discriminated against, excluded from participating in and benefiting from development projects, suffer intimidation and violence.
 - Have no access to social services such as water, health and education.
 - Loss of natural habitats as deforestation continues
 - Landless, no housing.

- **Where are the poor?**

Poverty continues to be essentially a rural phenomenon. All the provinces in Rwanda suffered reductions in household and individual incomes over the last two decades. Even prefectures with high agricultural potential, such as Ruhengeri, have been adversely affected by lack of insecurity due to rebel incursions from neighbouring Congo.

4.9.2 National Unity and Reconciliation

Good governance, national dialogue, resettlement and reintegration of victims of genocide including refugees and IDPs, poverty reduction and the adjudication of cases of the genocide suspects are the hallmarks at the center of Rwanda's development efforts.

5.0 DESCRIPTION OF THE ADMINISTRATIVE, POLICY AND REGULATORY FRAMEWORK

5.1 National Environmental and Social Management Requirements

This chapter of the report describes the institutional, legal and policy framework for environmental and social requirements in Rwanda, the relevant World Bank safeguard operational policies applicable to the project as well as the international laws and conventions that bear relevance to the implementation of this project.

5.2 The Legal, Regulatory and Policy Framework

5.2.1 The 2003 Constitution

The referendum of 26 May 2003 confirmed the new Constitution of the Republic of Rwanda, which states in its preamble, inter alia, that in the wake of the genocide that was organized and supervised by “unworthy leaders” and other perpetrators and that decimated more than a million sons and daughters of Rwanda.

Article 45 of the constitution states that all citizens have the right to participate in government of the country, whether directly or through freely chosen representatives in accordance with the law. All citizens have the right of equal access to public service in accordance with their competence and abilities.

Article 49 states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The state shall protect the environment. The law determines the modalities for protecting, safeguarding and promoting the environment.

5.2.2 Law No. 04/2001

This law establishes the organization and the functioning of Districts, Urban Authorities and Kigali City empowers the Local Administrations to design plans of action, budgets as well as mobilize the necessary resources in accordance with the procedures as provided for by the law.

5.2.3 Environmental Laws

As of September 2004, the Draft Environmental Bill of October 2003 has been passed by parliament and is now law known as the Organic Law on Environment Protection and Management. The law sets out the general legal framework for environment protection and management in Rwanda.

5.3 ENVIRONMENTAL RELATED POLICIES

5.3.1 Vision 2020

Environment protection and management rank among the main pillars of vision 2020. By 2020, the Government intends to have built a nation where pressure on natural resources mainly lands, water, biomass; biodiversity will have reasonably been decreased and the pollution process and environmental degradation reversed. The management and protection of these resources and environment are more rational and strictly under control in order to preserve and conserve for the future generations a basic heritage which is likely to ensure sustainable development.

Therefore, with regard to natural resources and environment protection and management, the Government of the Republic of Rwanda has set on a mission of decreasing the percentage of households involved in direct exploitation of primary agriculture from 90% to 50%; setting up efficient and updated regulations which are appropriate for sustainable protection and management of natural resources and environment; decreasing within the national energy assessment rates of diseases related to environmental degradation and firewood from 60% and 94% to 50% respectively.

To achieve these objectives, Rwanda will ensure: 1) that the environment issue is integrated into all education, sensitisation, and development policies and programmes as well as in all decision-making processes, 2) the promotion of grassroots' communities participation with more involvement of women and the youth in environment protection and management; 3) that the precaution principle is set up to alleviate negative effects of socio-economic activities to our environment; 4) a diversification of energy sources that will be made available to the population to decrease pressure on biomass; 5) that the “polluter-pays” principle as well as preventive and penal measures are set up to safeguard the environment; 6) that a study on environmental impact be conducted for any development project and programme; 7) the planning of industrial sites establishment and control of their effects on environment and the population; 8) the promotion of more environment friendly transport, stocking and industrial products and waste elimination technologies; 9) regulations relating to mine exploitation and mine discharge treatment are applied; 10) rehabilitation of former quarry sites; 11) that the Bureau of Standards for local and imported products is strengthened; 12) a statistic database on natural resources and environment and a quick alert system to mitigate anticipate natural disasters are set up and that a scheme for victims of a natural calamity is created; 13) that Rwanda Environment Management Authority (REMA) is set up and supported, (14) the cooperation with other countries and international institutions in the area of environment protection and management.

Public institutions should sensitize and urge the private sector, civil society, donors and grassroots' communities to efficiently contribute to natural resources management and environment protection. The implementation of laws and regulations, adoption and dissemination of environment friendly technologies will constitute a big priority for both central and local Governments.

Finally, regional and international cooperation will be promoted and strengthened to efficiently contribute to environment protection and management. Public institutions in charge of environment protection and management will be strengthened and the role of the private sector and civil society will be clearly defined and enhanced for a more coordinated and harmonised environmental action.

5.3.2 National Policy on Environment

With reference to the National Policy on Environment (NPE) in Rwanda, as of November 2003, to ensure a sustainable environment protection and management, the following principles mention among others that:

1. It is every person's right to live in a safe and stable environment, but on the other hand, they must keep it salubrious,
2. The national economic growth must be based on rational use of resources and take into account environmental dimensions,
3. Active and effective participation of the whole population for environment protection and management,
4. A special emphasis must be laid on environmental education and sensitisation programme at all levels with more involvement of women and the youth,
5. Environmental impact is to be analysed while conducting studies of development projects.

In addition, some political options and strategic actions have been envisaged. With regard to population and land development, the NPE proposes the elaboration or updating of master plans and special planning in urban areas.

As regards natural resources management (lands and water), the NPE proposes among others:

- Ensure the preservation and protection of soils against any form of degradation,
- Ensure that a prior study of environmental impact which underlines costs and benefits from slopes and underlying ecosystems protection is conducted for any development projects
- Encourage programmes of rainwater collection, stocking and use.

Regarding wetlands management, forests and other reserves and biodiversity, the NPE proposes among others:

- Set up protection measures for slopes to avoid degradation of swamps,
- Promote the rehabilitation of ecosystems under degradation and restoring endangered species;

As regards environmental education, information and research, the NPE proposes among others to reinforce the human and institutional capacity building with regard to environment and to sensitise the population to protect environment.

With regard to health and sanitation, the NPE proposes among others:

- Set up a system of waste collection, transport, disposal and elimination,
- Establish norms of zone protection between dumps, human buildings and water sources,
- Set up an appropriate canal and evacuation system for waste waters and rainwater in towns and resettlement sites “imidugudu”.

As regards the environment decentralised management, the Central Government will be concerned with conservation and protection policies while tourism and environmental management will be transferred to government decentralised services at the District and Kigali City levels. At this level, the implementation capacity of this environmental policy is very low.

The strategy and the national action plan on biodiversity were approved in June 2000, and objectives and priorities for sustainable biodiversity conservation and management were defined. Biodiversity includes slopes and wetlands but also the government strategy on protected areas. According to strategies in the area of environment, environmental concerns rank as follows:

i) Political and legal frameworks relating to environment unknown by the population and/or decentralised entities; ii) low level of awareness among people with regard to environment; iii) inadequate exploitation of forests; iv) erosion; v) exploiting quarry sites without restoring exploited parts; vi) insufficient knowledge on environment status; vii) weakness of decentralised structures in environment management; viii) absence of appropriate environment-friendly technologies.

In general, the national environmental policy is in direct relation with other policies in the area, especially policy on agriculture, land, water and sanitation, forests, energy, industry, gender, etc.

5.3.3 The Ministry of Lands, Environment, Forestry, Water, and Mines (MINITERE).

MINITERE which is the ministry responsible for the environment under the article 65 puts in place Rwanda Environment Management Authority (REMA) which is the institution now charged with the responsibility of ensuring environmental protection by demanding for EIA studies to be undertaken before projects are executed.

MINITERE is responsible for developing land utilization policies (including surveying, land classification, land laws and land tenure); the development of environmental policies

and procedures (including impact assessments), protection of natural resources (water, land, flora, and fauna), environmental legislation, biodiversity, and other environmental aspects.

Chapter IV of the Organic Law Article 65 clearly calls for the need to subject projects to mandatory Environmental Impact Assessment.

Article 65: Further specifies that every project shall be subjected to environmental impact assessment prior to its commencement. It shall be the same for programs, plans and policies likely to affect the environment. Specific details of projects referred to in this Article shall be spelt out by the order of the Minister in charge of environment.

Article 66 states that Environmental Impact Assessment (EIA) shall include at least the following:

- A brief description of the project and its variants.
- Analysis of direct and indirect foreseeable consequences on the environment.
- Analysis of the initial state of the environment.
- Measures envisaged reducing, preventing or compensating for the consequences.
- Reasons for the choice.
- A summary of requisitions from clause 1 to 5 of this article;
- A definition of the evaluation and monitoring methods used regularly and environmental indicators before (initial state), during and after implementation of the project or, as the case may be, at the final evaluation stage of the project;
- A financial evaluation of measures recommended preventing, reducing or compensating for the negative effects of the project on the environment and measures for regular monitoring and control of relevant environmental indicators.

The law gives right to every natural or legal person in Rwanda to live in a healthy and balanced environment. They also have the obligation to contribute individually or collectively to safeguard country's natural, historical and socio-cultural heritage.

The framework of the law on the protection and management of natural resources centers on avoiding and reducing the disastrous consequences on environment. It measures result from an environmental evaluation of policies, programs and projects, aimed at preventing the consequences of such activities.

The principle of sustainability of environment and equity among generation emphasizes human beings at the core of sustainable development. They therefore, have a right to a healthy and productive life in harmony with nature. They must so as to equitably meet the needs of the present and future generation

5.3.4 Rwanda Environment Management Authority

With regards to the management of the bio-physical environment throughout Rwanda, the overall responsibility now lies with the Rwanda Environment Management Authority. In November 2003, the Government of Rwanda approved the law establishing the Rwanda Environment Management Authority (REMA).

The functions of REMA are;

- To implement Government environmental policy and decisions of the Board of Directors.
- To advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements in the field of environment, as the case may deem necessary.
- To take stock and conduct comprehensive environmental audits and investigations, to prepare and publish biannual reports on the state of natural resources in Rwanda.
- To review and approve environmental impact assessment reports of any field of socio-economic activities undertaken by any agency.
- To undertake research, investigations, surveys and such other relevant studies in the field of environment and disseminate the findings.
- To ensure monitoring and evaluation of development programs in order to control observance of proper safeguards in the planning and execution of all development projects, including those already in existence, that have or are likely to have significant impact on the environment.
- To participate in the set up of procedures and safeguards for the prevention of accidents and phenomena which may cause environmental degradation and propose remedial measures where accidents and those phenomena occur.
- To render advice and technical support, where possible, to entities engaged in natural resource management and environmental protection.
- To provide awards and grants aimed at facilitating research and capacity-building in matters of environmental protection.
- To publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.

5.3.5 Organic Law on Environment Protection and Management

The law that regulates the environment in Rwanda is known as the organic law on environment protection and management. The law sets out the general legal framework for environment protection and management in Rwanda. It also constitutes environment as a one of the priority concerns of the Government of Rwanda. Under the fundamental principle on national environmental protection policy develops national strategies, plans and programs, aiming at ensuring the conservation and use of sustainable environmental resources.

The law gives right to every natural or legal person in Rwanda to live in a healthy and balanced environment. They also have the obligation to contribute individually or collectively to safeguard country's natural, historical and socio-cultural heritage.

The framework of the law on the protection and management of natural resources centres on avoiding and reducing the disastrous consequences on environment. It measures result from an environmental evaluation of policies, programs and projects, aimed at preventing the consequences of such activities.

The principle of sustainability of environment and equity among generation emphasizes human beings at the core of sustainable development. They therefore, have a right to a healthy and productive life in harmony with nature. They must so as to equitably meet the needs of the present and future generation.

The protection and management of environment is currently registered in the environmental organic law that has been published in the official Rwanda newspaper in May 1st 2005.

Moreover, the country adheres to several international agreements, treaties and conventions, though management legal tools are not yet well developed. Among other conventions ratified by the Republic of Rwanda, the most important ones which have influenced or influence the national policy with regard to environment are:

- Convention on Biological Diversity of June 10, 1992 ratified on March 18, 1995.
- United Nations Convention Framework on Climatic Changes of June 10, 1992 ratified on August 18, 1998.
- United Nations Convention on Desertification Control of June 17, 1991 and ratified on October 22, 1998.
- Vienna Convention on Ozone layer Protection of September 22, 1987 and Montreal Protocol on substances impoverishing Ozone layer of September 16, 1987, ratified on December 6, 2000.
- Stockholm Convention on Persistent Organic Pollutants (POP) adopted and ratified by the Presidential Order No 78/01 of July 8, 2002.
- Basel Convention on Dangerous Wastes, adopted on March 22, 1989 in Basel and by the Presidential Order No 29 /01 of August 24, 2003 establishing Rwanda adhesion.
- RAMSAR Convention on February 2, 1971 on wetlands

- Kyoto Protocol to the Convention Framework on Climatic Changes of March 16, 1998.

There are also decrees, statutory instruments and ministerial orders which constitute important legal tools in Rwanda; and they concern mainly the prohibition of the use of plastic bags, cutting and selling trees, organisation of forest regulations, underground waters, lakes and streams and their usage, pollution and contamination of springs, lakes, streams, public hygiene and safety, city and country planning, soil conservation and usage, etc.

5.3.6 The Administrative Framework for Energy

The Ministry of Infrastructure (MININFRA) is responsible, inter alia, for policy formulation and oversight of the Energy sub- Sector.

5.4 The Administrative Framework for Governance and Decentralization in Rwanda

The Republic of Rwanda is divided into 4 provinces plus Kigali City, (Eastern, Western, North and Southern Provinces) which are further divided into districts (there are 106 districts), which are further divided into Sectors and the Sectors are divided into Cellules. The Cellules are the smallest administrative bodies and the closest to the local communities.

The provinces are headed by a Governor.

The District is an autonomous administrative structure with a legal status and financial autonomy, with two principal political bodies:

- The District Council – is responsible to enforce the laws of Rwanda, promote governance based on democracy, prepare regulations governing the District, implement Government decisions, to adopt the development action plan of the district, to adopt the district budget and to fix the maximum amount to release from the District's funds, to follow up the activities of the Executive Committee, to coordinate activities of the sectors, to approve grants, bequest and credits that the District may receive, inter alia.
- The Executive Committee – is responsible for administration of the District, preparation of the District Development Action Plan, implementation of the district budget, preparation of quarterly and yearly reports, examination and resolution of problems that could not find solutions at the level of the Sectors, inter alia.

The District Council is composed of the following members:

- Elected Councillors at the level of the Sector

- Women representatives at the District level who are elected from a third of the number of Councillors elected to the District Council as representatives of sectors.
- Youth representatives at District level who are elected from a third of the number of Councillors elected to represent sectors to the District Council.

The District Executive Committee is made up of :

- The District Mayor who is also in charge of policy.
- Vice Mayor/The Secretary in Charge of Finances, Economy and Development.
- Vice Mayor/The Secretary in charge of Welfare and Culture
- Vice Mayor/The Secretary in charge of Women’s Affairs
- Vice Mayor/The Secretary in Charge of Youth Affairs

In collaboration with the District Executive Committee, the Mayor of the District is in charge of day-to-day administration of the District. The Mayor signs minutes, regulations, notices, contracts and all agreements involving the District. The Mayor of the District is the representative of the State at the District Level.

5.4.1 The Commission for National Unity and Reconciliation (URC)

The genocide gave rise to deep mistrust and division in Rwandan society. People were fearful of their neighbours. The victims of genocide had to live alongside the perpetrators and suspects of genocide in the same place, sometimes sharing the same house and/or farming adjacent plots.

The Government of National Unity regarded dialogue between the citizens as the key ingredient to rebuilding social capital. Dialogue was encouraged in communities and high government officials travelled around the country and even the refugee camps outside the country to engage in dialogue. Discussions were initiated within communities across the country. Relief agencies and NGO’s in addition to providing humanitarian assistance, promoted dialogue in the communities they worked. Initially, it was very difficult, as people were either afraid or too angry to talk. But in time, the ice broke and people began to talk and plan and work together for the common good. Today, even though the scars are still present and the hurt and pain are only skin deep, people freely and openly talk and are still encouraged to talk with each other about what happened during the genocide.

In 1998, the President convened the political, religious and civil society leaders for weekly meetings (every Saturday) in Urugwiro Village, to search for solutions to the problems facing the country. Two of the decisions that resulted from these meetings were: (i) to hold elections at grass roots level to promote and formalize regular dialogue around the country, and (ii) to establish the National Unity and Reconciliation Commission (URC) to conduct discussions on national unity and reconciliation across the country. The elections of March 1999 established local committees in every cellule and sector in the country. These committees met regularly (about every fortnight) to discuss their problems and plan and work for the future – contributing to building social capital. Further elections were held in March 2001, to elect decentralized administrations at commune levels.

In 1999, the National Assembly established the URC with the mandate to:

- Organize and oversee national debates aimed at promoting national unity and reconciliation, sensitize Rwandans on unity to lay it on a firm foundation.
- Conceive and disseminate ideas and initiatives for promoting peace and encourage a culture of unity and reconciliation.
- Prepare and coordinate programs of promoting unity and reconciliation.
- Denounce any written or declared ideas and material seeking to divide the Rwandese.
- Educate Rwandese on their rights, and assist in building a culture of tolerance and respect for other people's rights.
- Give views to institutions charged with drafting laws aimed at fostering unity and reconciliation.
- Closely monitor the organs of government and the political parties to determine whether they respect and observe policies of national unity and reconciliation.

Consultations by the URC at the grassroots level started in March 1999 and in a year had held consultations in 154 out of the 180 communes in the country. There was special emphasis in reaching marginalized groups such as the youth and women and also the historically marginalized communities, who had hitherto been ignored in national discussions. People used the discussions to vent years of frustration, to protest powerlessness, poverty and ignorance.

The URC has concluded from the discussions so far that the main obstacles to unity are (i) bad governance and leadership, including corruption, nepotism and exclusion, (ii) poverty and (iii) lack of justice for genocide survivors. The law establishing the URC mandates the commission to organize a National Summit on Unity and Reconciliation on an annual basis to bring together community leaders drawn from all communities of Rwanda to assess the progress and accomplishments on national unity.

The first National Summit, held in Kigali in October 2000, endorsed the approach of the URC and its conclusions from the first year of consultations. National policy initiatives already reflect the conclusions of the URC consultations with the decentralization and related elections, and the ongoing preparations for the use of traditional method of justice (Gacaca) to accelerate the trials of the genocide.

5.4.2 Statutory Land Laws

The Land Decree of July 1960 makes reference to the ownership and use of hillsides, marshlands and other aspects of the environment. The Land Decree stipulates that all marshlands are exclusive property of the State and are available to the people of Rwanda for their use and profit. This decree also states implicitly that the government has an unconditional right to take land back for redistribution or other considerations for public benefit, in which case the original occupiers of the land should be compensated. As a common property resource with open access, there is no security of tenure and this has served as a disincentive to the sustainable management of wetlands.

In February 1999, a draft revised land law was prepared, defining ownership of land, rights and obligations of land owners and transactions of land. The law recognizes private land, land owned by the state, and land owned by the commune.

The current draft Land Law specifies:

- People with customary holdings under 2 hectares, and those with customary holdings between 2 and 30 hectares where the owner has a project and a development plan will be recognized as the owners.
- Transfer of title deeds requires prior consent of all family members.
- A land tax will be imposed.
- Undeveloped land reverts to the states private domain after three years.
- Holders of *ubukonde* land (originally distributed by clan head), known as *abagererwa*, will have the same rights as other customary owners.

5.4.3 Customary Land Laws

Two principal systems controlled land tenure in Rwanda³, the *Ubukonde* System and the *Igikingi* System. These systems were different, but shared notions of collective ownership of land among members of patrilineages (*imiryango*).

In the *Ubukonde* System, predominantly observed then, in the north and north west (currently Byumba, Gisenyi and Ruhengeri prefectures), people gained rights to large tracts of land, by being the first to clear and valorize the land (known as *gukonda*). In this system, a lineage held rights to land corporately and major decisions about managing landholdings were taken by the lineage chef (*umutware w'umuryango* or, in speaking of land specifically, *umukonde*). The *abakonde* lineages held economic and political power over their *ubukonde* and could grant rights to others to use land in their territory through a form of clientship known as *ubugererwa*. Clients were required to make payments to their patrons, most often in the form of a portion of the harvests or in manual labor in the patron's fields or enclosure. There were three specific types of *ubukonde*, including *ubukonde bw'inzogera* (hunting grounds), *ubukonde bw'inka* (grazing lands), and *ubukonde bw'isuka* (agricultural lands). In all three types, the *umukonde* (*ubukonde* owner) allowed others access to these lands in exchange for gifts and/or labor.

³ "Women and Land in Africa", edited by L. Muthoni Wanyeki.

In the *Igikingi* System, predominantly observed then in the central, eastern and southern areas of Rwanda, land was distributed by the *mwami*⁴ or his chiefs (*abatware b'umukenke*) on the approval of the *mwami* to either heroes (*intwari*) from war or other individuals commanding respect in society. *Ibikingi* were vast tracts of land designed for grazing cattle. If the holder of an *igikingi* lost favor with the chief or lost his cattle, through disease, mismanagement, or raiding, the chief seized his *igikingi* from him and gave it to someone else who had cattle. The holders of *ibikingi* had full control over the land and thus could partition it and allot plots (*amasambu*) to others in order to cultivate. These cultivators became clients and owned seasonal gifts and servitude to continue benefiting from the land bestowed on them.

Both these systems have undergone significant reforms due to the socio – political turbulence Rwanda has undergone during the immediate pre-colonial, colonial, post colonial and post genocide eras.

5.4.4 Indigenous and Tribal Peoples Convention

This convention was adopted on 27 June 1989 by the General Conference of the International Labour Organisation at its seventy-sixth session and came into force on 5 September 1991.

Article 4 of the convention calls for the adoption of measures to safeguard persons, institutions, property, labour, cultures and environment of the peoples concerned. In applying the provisions of this convention, the social, cultural, religious and spiritual values and practices of these peoples is to be recognised and protected, and an account taken of the nature of the problems which face them both as groups and as individuals. The convention also provides for the respect of the values, practices and institutions of indigenous peoples. This convention is related with articles 8(j), 10(c), 17.2 and 18.4 of the convention on biological diversity which recognizes the role of indigenous people in the conservation of biodiversity. This convention is relevant to EASP ESMF due to presence of the Batwaa community who could be living in some of the project target areas.

Part 2 of the convention, Article 13 calls for governments to respect the special importance for the cultures and spiritual values of the peoples concerned of their relationship with the lands or territories, or both as applicable, which they occupy or otherwise use, and in particular the collective aspects of this relationship. *Article 14* on the rights of ownership and possession is concerned over the lands which they traditionally occupy and calls for recognition of such areas. In addition, the convention calls for measures to be taken in appropriate cases to safeguard the right of the peoples concerned to use lands not exclusively occupied by them, but to which they have traditionally had access for their subsistence and traditional activities and particular

⁴ The *mwami* was the political and spiritual leader of the central Rwandan kingdom. At the beginning of the twentieth century, the kingdom was in the midst of an expansion (through warfare) into bordering regions (present-day Kibungu and Cyangugu) of kinyaranda speaker.

attention to be paid to the situation of nomadic peoples and shifting cultivators in this respect.

6.0

DESCRIPTION OF WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES AND TRIGGERS

This ESMF has been designed so that all investments under the EASP will comply with the relevant laws of Rwanda and the Environmental and Social Safeguard Policies of the World Bank. In this chapter, the Bank's safeguards policies and their applicability are discussed. The World Bank Safeguard Policies are;

1. Environmental Assessment (OP4.01, BP 4.01, GP 4.01)
2. Natural Habitats (OP 4.04, BP 4.04, GP 4.04)
3. Forestry (OP 4.36, GP 4.36)
4. Pest Management (OP 4.09)
5. Cultural Property (OPN 11.03)
6. Indigenous Peoples (OD 4.20)
7. Involuntary Resettlement (OP/BP 4.12)
8. Safety of Dams (OP 4.37, BP 4.37)
9. Projects on International Waters (OP 7.50, BP 7.50, GP 7.50)
10. Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)

In preparing this ESMF, a consideration of the type of future investments planned vis-à-vis the baseline data presented in Chapter 4 and the requirements of the Bank Safeguard policies, has led to the determination that only the following Bank policies are triggered.

1. Environmental Assessment (OP4.01, BP 4.01, GP 4.01)
2. Indigenous Peoples (OD 4.20) *may apply*
3. Involuntary Resettlement (OP/BP 4.12)

Notwithstanding, since the exact location of the investments was not known at the time of preparation of the EASP, other bank policies may apply and not all policies selected above may apply simultaneously.

Therefore, a complete description of the bank safeguards and their triggers for applicability can be found on the World Bank's official web site www.worldbank.org and summarized in this chapter, to be used as part of the Environmental and Social Management process presented in chapter 7 of this ESMF.

6.1 Environmental Assessment (OP4.01, BP 4.01, GP 4.01)

This policy requires Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed investments under the EASP. The EA process takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property) and transboundary and global environmental aspects.

The environmental and social impacts of the RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) will come from the proposed investment activities under Components a) and b). However, since the exact location of these investments will not be identified before bank appraisal of the project, the EA process calls for the GOR to prepare an Environmental and Social Management Framework (ESMF).

This report which will establish a mechanism to determine and assess future potential environmental and social impacts during implementation of RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) activities, and then to set out mitigation, monitoring and institutional measures to be taken during operations of these activities, to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

Operational Policy 4.01 further requires that the ESMF report must be disclosed as a separate and stand alone document by the Government of Rwanda and the World Bank as a condition for bank appraisal. The disclosure should be both in Rwanda where it can be accessed by the general public and local communities and at the Infoshop of the World Bank and the date for disclosure must precede the date for appraisal of the program.

The policy further calls for the RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) as a whole to be environmentally screened to determine the extent and type of the EA process.

The World Bank system assigns a project to one of three project categories, as defined below:

Category “A” Projects

An EIA is always required for projects that are in this category. Impacts are expected to be ‘adverse, sensitive, irreversible and diverse with attributes such as pollutant discharges large enough to cause degradation of air, water, or soil; large-scale physical disturbance of the site or surroundings; extraction, consumption or conversion of substantial amounts of forests and other natural resources; measurable modification of hydrological cycles; use of hazardous materials in more than incidental quantities; and involuntary displacement of people and other significant social disturbances.

Category “B” Projects

Although an EIA is not always required, some environmental analysis is necessary. Category B projects have impacts that are ‘less significant, not as sensitive, numerous, major or diverse. Few, if any, impacts are irreversible, and remedial measures can be more easily designed.’ Typical projects include rehabilitation, maintenance, or upgrades, rather than new construction.

Category “C” Projects

No EIA or other analysis is required. Category C projects result in negligible or minimal direct disturbance of the physical environment. Typical projects include education, family planning, health, and human resource development.

The RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) has thus been screened and assigned an EA Category B. This category of projects is defined as follows.

Category B projects are likely to have potential adverse environmental impacts on human populations or environmentally important areas – including wetlands, forests, grasslands, and other natural habitats – and are less adverse than those of category A projects. These impacts are site specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. The EA process for category B projects examines the potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

Therefore, this ESMF sets out to establish the EA process to be undertaken for implementation of project activities in the proposed RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) when they are being identified and implemented.

This process requires that UERP and its implementing partners screen their activities to identify their potential adverse impacts and thereby determine the corresponding mitigation measures to incorporate into their planned activities.

6.2 Operational Policy 4.12: Involuntary Resettlement

This policy covers direct economic and social impacts that both result from Bank-assisted investment projects, and are caused by (a) the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets, or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or (b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons. For project activities that impact people and livelihoods in this way, RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) will have to comply with the requirements of the disclosed RPF to comply with this policy.

This policy is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.

The policy promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their

efforts to improve or at least restore their incomes and standards of living after displacement.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to project appraisal of proposed projects. The objective of this policy to avoid where feasible, or minimize, exploring all viable alternative project designs, to avoid resettlement.

This policy covers direct economic and social impacts that both result from Bank-assisted investment projects, and are caused by the involuntary taking of land resulting in relocation or loss of shelter, lost of assets or access to assets, or loss of income sources or means of livelihood. This applies whether or not the affected persons must move to another location; or the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.

The policy requires the displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups. In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder).

Table 3: Summary of World Bank Safeguards Policies

Safeguard policy	Description
OP 4.01 Environmental Assessment	EA to be conducted for all projects that fall into either World Bank Category A or Category B. These categories are equivalent to Government of Rwanda's Schedule 1 and 2 projects.
OP 4.36 Forestry	The Bank's lending operations in the forest sector are conditional on government commitment to undertake sustainable management and conservation-oriented forestry. In forestry areas of high ecological value, the Bank finances only preservation and light, non-extractive use of forest areas.
OP 4.04 natural Habitat	The conservation of natural habitat is essential for long-term sustainable development. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resources management to ensure opportunities for environmentally sustainable development. The Bank does not support projects that involve the significant conservation or degradation of critical natural habitats.
OP 4.09 Pest Management	In Bank- Financing operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties resistant or tolerant to the pest. The Bank may Finance the purchase of pesticides when their use is justified under an IPM approach.
OP/BP/GP 4.12 Involuntary Resettlement	People who have to be removed or who loose their livelihood as a result of the project must be resettled, compensated for all of their losses and they must be provided with a situation that is at least as good as the one from which they came.
OD 4.20 Indigenous Peoples	This policy covers local indigenous people or distinct groups who are marginalized in society and who could be adversely affected by the project. The Bank does not support projects that negatively affect these peoples.
OP 4.11 Cultural Property	Bank supports the preservation of cultural properties which includes sites with archeological, paleontological, historical, religious or unique natural values. It seeks to avoid impacts on such sites.
Op 4.37 Dam Safety	Bank financed new dams must be designed and built under the supervision of competent professionals. Dams over 15 metres in height are of concern particularly if there is a large flood handling requirement or the dam is in a zone of high seismicity and /or where foundations and other design features are complex.
OP BP 7.0 International Waterways	If a project has the potential to negatively affect the quality or Quantity of water of a waterway shared with other nations the Bank will insist that a negotiated agreement be established between the two or more nations involved. Irrigation , drainage, water and sewage, industrial and similar projects that involve the use or potential pollution of international waterways (rivers, canals, lakes or similar bodies of water)
OP 7.60 Disputed areas	Projects in disputed areas could affect relations between the country within which the project is being developed and neighboring countries. Disputes would be dealt with at the earliest opportunity.

Table 4: Activities Triggering World Bank Safeguard Policies

Policy	EASP	Discussions
Environmental Assessment (OP 4.01, BP4.01, GP 4.01)	Yes	The project components a) and b) will trigger EA safeguards. The construction of the distribution networks, the disposal of the CFLs is all likely to pose an adverse impact on the biophysical environment.
Involuntary Resettlement (OP4.12, BP 4.12)	Yes	OP 4.12 is to be complied with where involuntary resettlement may take place. The types of projects which are likely to trigger the involuntary resettlement safeguards include Category B projects such as those that result in restricted access to land. The safeguards require that involuntary resettlement should be avoided through exploration all viable alternative projects designs where feasible, or similarly minimized. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.

7.0 DETERMINATION OF POTENTIAL ENVIRONMENT AND SOCIAL IMPACTS

7.1 Potential EASP Environmental Concerns.

Overall, the EASP is likely to have a positive impact on the environment in Rwanda, both in the short, medium and long term, for the following reasons;

The implementation of this ESMF will continue to significantly introduce in Rwanda the practice of subjecting infrastructure rehabilitation projects to an environmental management process, in the prevailing situation where REMA is building up its capacity to review EIA's and provide oversight monitoring. The ESMF like the original UERP ESMF continues to offer the opportunity for REMA and Electrogaz to work together to identify potential project impacts, mitigate them verifiably through monitoring while building capacity for environmental management within these two institutions and the local communities.

The RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) like the UERP has the potential to alleviate some of the root causes of Deforestation in Rwanda in those areas where electrical power supply is restored on a predictable and more reliable basis, by reducing the demand for fuel wood and charcoal as the main source of energy. Therefore, this will have a cumulative positive impact on the conservation of forest ecosystems and their function as a natural habitat.

The EASP will pose no major or significant risks to biodiversity, natural habitats and wetlands as it will not fund activities in protected areas, national parks or wetlands.

POSITIVE IMPACTS OF UERP CFL PROJECT COMPONENT

- The UERP CFL project is going to be a significant contributor to reduction in energy consumption and cost related aspects while at the same time contribute significantly to GHGs emission reduction. This energy efficiency project, which mitigates the green house gas emissions, is developed as a CDM⁵ project.
- Affordability for the consumers and reduce the need for additional generation resources. The program would include energy efficient CFLs, incentives to promote the use of solar hot water heaters sold through private dealers and specific initiatives to buy down connection costs for the poorest households including mainstreaming of the use of low cost “ready boards” in homes

7.2 Potential Adverse Environmental Impacts

Highlighted in summary below are the possible adverse impacts that could occur when the various different activities in the **Grid Roll Out component** and “*Green*

⁵ CDM is the acronym for the Clean Development Mechanism of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC).

Connections” component above are implemented. The EMP that follows below details the potential adverse impacts for each of the proposed activities.

Transmission and distribution network systems extension can be expected to have minor direct and indirect impacts on villages and hamlets where the proposed transmission lines pass, both positive and even negative if mitigation measures and compensation is not undertaken effectively.

The potential adverse impacts on the environment likely to occur when implementing the component a) **Grid Roll Out Component** will include;

Environmental Impacts

- Localised land degradation and soil erosion related to clearing the project areas for construction related works towards installation of towers, cabins, Right of Way (ROW) etc.
- Localised vegetation in the project area due to clearing to create distribution path, construct substations, install towers or create Right of Way.
- Ecological issues should the network cut across sensitive ecosystems
- Impact on fauna, e.g. birds (Bird strikes on T-lines...)
- Impacts on soil and water from machinery fuel and lubricants contamination from accidental spills or unsound disposal or handling
- Contamination of soil and water resources from poor disposal of CFLs which contain mercury.

Social Impacts

- Loss of land or property/buildings to provide path for Right of Way, distribution line or for construction of LV sub stations. (cabins)
- Localised crop destruction in the project area due to clearing to create distribution path, construct substations, install towers or create Right of Way.
- There may also be minor effects on agriculture, if there would be a restriction on land use in the right of way to the areas where transmission lines pass, and, in any involuntary resettlement requirement.
- Localised dust related impacts during construction
- Aesthetics and visual related impacts
- Workers Health and Safety related impacts due to construction accidents
- Social and cultural interaction impacts between the contractor’s workers and local populations.
- Noise impacts during construction from the machinery and from the sub stations during operation phase
- Dust impacts, vegetation destruction, loss of crops in areas where access roads will be built for the project.
- Establishment of construction camps for the workers likely to cause vegetation and crop destruction as well as camp construction relate impacts

- Possible displacement of local inhabitants to pave way for the network routes
- Impacts on residents if towers are not sufficiently stabilised leading to tower crashes
- Littering during construction and operation phase of the project

The impacts are considered to be localised to the specific project areas, minimal and minor in scale and in terms of magnitude and should be easily mitigated through the preparation of adequate EMPs and RAPs whenever required.

The potential adverse impacts on the environment likely to occur when implementing the component a) “**Green Connections**” **Component** will include;

Adverse Environmental Impacts

- Contamination of ground and surface water resources through unsound disposal of used CFLs. CFLs contain small amounts of mercury sealed within the glass tubing which is hazardous to the environment especially if disposed indiscriminately.
- Contamination of soil resources similarly as above, if the CFLs containing mercury are dumped indiscriminately into the environment, soil and ground resources will be adversely affected.
- Physical waste created by the collection of old, and used light bulbs.

7.3 ENVIRONMENTAL AND SOCIAL MANAGEMENT PROCESS

The Environmental Management Plan outlined here below consists of a set of measures for: a) screening (i.e. determination of potential adverse environmental and social impacts), b) mitigation, c) monitoring and d) institutional arrangements to be undertaken during planning, design, procurement, construction and post-construction stages of the activities to be financed in the EASP, to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The EMP includes the actions needed to implement these measures. Refer *Annex D* for sample EMP to be used in the project.

For the purposes of this Environmental Management Plan (EMP), the activities in the EASP that are likely to have adverse impacts are mainly expected to arise from the **Grid Roll Out** and “**Green Connections**” components respectively.

Table 5; Generic Environmental Management Plan Grid Roll Out					
Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates(USD)	Comments
Grid Reticulation, rehabilitation and strengthening activities include among others clearing of vegetation to create ROW, distribution network paths, substations will cause land acquisition, soil disturbance when undertaking related civil works for installation purposes.	<p>Localised vegetation destruction</p> <p>Localised soil disturbances and erosion</p> <p>Localised crop destruction</p> <p>Housing/structure and property destruction or land acquisition.</p> <p>Localised soil and water contamination from oil spills from transformers</p> <p>Bird strikes on the transmission lines.</p> <p>Noise and dust</p>	<p>Provide compensation for crops and vegetation destroyed in accordance with the RPF</p> <p>Provide compensation for any land acquired in line with the RPF</p> <p>Provide compensation for any house, shelter or building destroyed as specified in the RPF</p> <p>Locate transmission lines along pre-defined servitudes/rights of way to minimize impact on aesthetics and to maximize safety of communities near routes.</p> <p>Locate transmission lines away from areas known to be habitats</p>	<p>Electrogaz and later A unit responsible for projects within the Ministry in charge of Energy” (A UNIT RESPONSIBLE FOR PROJECTS WITHIN THE MINISTRY IN CHARGE OF ENERGY”) once it is formed</p>	<p>3.5 Million USD for mitigation and monitoring including compensation cost for land acquired, structures destroyed, crop loss, vegetation destroyed.</p>	<p>The EASP Environmental Specialist with in put from EA Advisor must work with the Electrogaz design team to ensure mitigation measures are incorporated in the design.</p>

	<p>related impacts during construction and operation</p> <p>Soil and water contamination from oil/lubricant spills.</p> <p>Impacts related to construction of access roads to the substations including land acquisition, vegetation destruction, crop loss, soil run off, dust impacts etc.</p> <p>Impacts related to the establishment of construction workers camp site.</p> <p>Borrow pits related impacts including becoming</p>	<p>or flight paths for birdlife.</p> <p>Consult with affected people and prepare and execute RAP's consistent with project disclosed RPF.</p> <p>Contractors to clean sites/areas contaminated from spillages and leakages and to source backfill material and sand from approved locations only and not from random mining local/close areas for this material.</p> <p>Suitable Storage and transportation of building materials.</p> <p>Select borrow pits in areas not considered ecologically fragile or sensitive, rehabilitate borrow pits, and</p>			
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	breeding sites for malaria vector, hazard spots that could caused drowning, scarring of the environment	ensure that the borrow pits have drains to ensure that stagnant water which are breeding sites for disease vectors do not occur			
Health and Safety	<p>Construction related impacts including accidents experienced by the construction workers or residents likely to occur during the construction and installation phase.</p> <p>Noise related impacts during construction and operation phase</p> <p>Dust related impacts from construction machinery especially motorised vehicles</p>	<p>Provision of suitable and safe clothing, shoes and head protection for site staff.</p> <p>Ensure safe design for MV and LV lines and mount protective barriers around transformers and other potentially dangerous electrical installations.</p> <p>Adoption of best Health and Safety working practices/conditions during construction and operation activities.</p> <p>Work during approved and acceptable hours</p>	<p>Electrogaz and later A unit responsible for projects within the Ministry in charge of Energy once it is formed</p>		

		<p>to minimize noise and effects of air pollution from their equipment.</p> <p>Effective and close supervision of construction activities.</p> <p>Legal Instruments to hold Contractors financially and in some cases criminally liable for adverse impacts that result from failure to implement contracted required mitigated measures.</p>			
Cultural Impacts	<p>Establishment of distribution lines can lead to unearthing genocide sites hence cause cultural strife.</p>	<p>Consultation should be undertaken with local authorities and communities to ensure that potential genocide sites are avoided.</p> <p>Accidental unearthing of such sites should be culturally handled in accordance with the</p>			

		<p>cultural rites and requirements</p> <p>Funds for conducting necessary rituals and ceremonies related to beliefs must be set aside</p> <p>Avoid sitting infrastructure where people will be disturbed and where resettlement could be an issue</p>			
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Table 6. Generic Environmental Management Plan Green Connection Component					
Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Estimated Cost	Comments
Poor disposal of used CFLs and exchanged IBs	<p>Likely to lead to ground and surface water contamination. CFLs contain mercury a hazardous heavy metal (substance) that is harmful to aquatic resources, soil resources and human population.</p> <p>Soil contamination is a likely adverse impact if the CFLs are dumped in an open dumping site without mitigation measures and controls. Soil contamination could impact on agriculture.</p>	<p>Ensure that all the IBs collected in exchange for the CFLs are stored securely by UERP in a warehouse until a disposal plan is prepared.</p> <p>Develop a waste disposal plan for the disposal of the CFL lamps. (The World Bank through ELGZ is planning to commission a waste management study for disposal of the CFLs in 2009.)</p> <p>Identify a suitable store for keeping all the IBs</p> <p>Undertake</p>	<p>Electrogaz and Later A unit responsible for projects within the Ministry in charge of Energy” once it is formed</p>	<p>15,000 USD for the preparation of the monitoring and disposal plan for the IBs. This is the estimated cost that was set aside by the World Bank for engaging a national Rwandese consultant.</p> <p>World Bank is currently preparing ToR and budget for the waste management plan for the CFLs and the total estimated cost is not yet known.</p>	<p>The EASP Environmental Specialist must work with the design and consulting team in developing the disposal plan</p>

		<p>awareness and sensitization to households to inform them of the dangers of indiscriminate disposal of CFLs.</p> <p>Develop a plan for retrieving used CFLs from the households.</p>			
PV System Projects	Localised impacts on Landscape	Considerations of aesthetic and cultural values in design of project features			

7.6 Monitoring Plan

The objective of monitoring is two fold;

1) to alert project authorities (i.e. EASP primarily) by providing timely information about the success or otherwise of the environmental management process outlined in this ESMF in such a manner that changes can be made as required to ensure continuous improvement to EASP environmental management process (even beyond the project's life).

2) to make a final evaluation in order to determine whether the mitigation measures incorporated in the technical designs and the EMP have been successful in such a way that the pre-project environmental and social condition has been restored, improved upon or is worst than before and to determine what further mitigation measures may be required.

This section sets out requirements for the monitoring of the environmental and social impacts of the EASP projects. Monitoring of environmental and social indicators will be mainstreamed into the overall monitoring and evaluation system for the project. In addition, monitoring of the implementation of this ESMF will be carried out by REMA and the key implementing institutions of EASP.

7.6.1 MONITORING OF ENVIRONMENTAL AND SOCIAL INDICATORS

Two opportunities will be taken to build a simple system for the monitoring and evaluation of environmental and social impacts:

The goals of monitoring are to measure the success rate of the project, determine whether interventions have resulted in dealing with negative impacts, whether further interventions are needed or monitoring is to be extended in some areas. Monitoring indicators will be very much dependent on specific project contexts.

Monitoring of participation process

The following are indicators for monitoring of the participation process involved in the project activities.

Number and percentage of affected households consulted during the planning stage;

- Levels of decision-making of affected people;
- Level of understanding of project impacts and mitigation;
- Effectiveness of local authorities to make decisions;
- Frequency and quality of public meetings;
- Degree of involvement of women or disadvantaged groups in discussions.

Monitoring of implementation of mitigation plans lists the recommended indicators for monitoring the implementation of mitigation plans.

7.6.2 Evaluation of Results

The evaluation of results of environmental and social mitigation can be carried out by comparing baseline data collected in the planning phases with targets and post-project situations.

A number of indicators would be used in order to determine the status of affected people and their environment (land being used compared to before, how many clean water sources than before, etc). In order to assess whether these goals are met, the EASP Environmental Specialist with technical support of the Advisor will indicate in the EMP, parameters to be monitored, institute monitoring milestones and provide resources necessary to carry out the monitoring activities.

The following are some pertinent parameters and verifiable indicators/questions to be used to measure the ESMF process, mitigation plans and performance;

- Has the Environment Adviser trained a local social and environmental specialist?
- Have the EMP's and Final Designs been cleared by the REMA?
- Have the Civil Works Contractors got considerable legal muscle to enforce the EMP?
- At what rate are the civil works been monitored by Electrogaz and by the REMA?
- How many violations of the contractors/transporters have been recorded and at what rate are they occurring.
- How many RAPS have been fully executed before PAPs are physically displaced?
- How many recorded grievance cases have been settled within one year?

7.6.3 MONITORING OF ESMF IMPLEMENTATION

In addition to the Project Reports and ESIA studies required under the Organic Law, an Annual Audit on ESMF Implementation will be prepared by the PMU, and delivered to REMA. In addition, each large project that has been subject to an ESIA study (or RAP etc) will also be required to produce an annual audit report, for delivery to REMA.

Table 7. Monitoring Indicators

Project Activities/Impacts	Mitigation Measure(s)	Indicators	Responsibility	Frequency/Cost
<p><u>Activity:</u> <u>Land/Property Acquisition</u></p> <p><u>Impacts</u> <i>Permanent loss of Land. Denial, Restrictive or loss of access to other economic resources.</i></p>	<p>1. Identify land for Transmission and Distribution (T&D) networks or grids, and expansion of sub-stations to house new generators, which does not impact people and their economic resources.</p> <p style="text-align: center;">or</p> <p>2. Prepare resettlement and compensation plans (RAPs) consistent with the prepared RPF.</p> <p style="padding-left: 40px;">Prepare and use cleared engineering design drawings and other contract documents, addressing specific mitigation measures.</p>	<p>Transmission lines and networks located in areas with little or no impact on people and their economic resources</p> <p>RAPs prepared for each subproject and approved by World Bank and REMA</p> <p>Compensation agreements e.g., copies of agreed contracts by PAPs, copies of paid out cheques.</p>	<p>Principal Responsibility- Electrogaz and the A unit responsible for projects within the Ministry in charge of Energy” once it is formed</p> <p><u>Others</u>-Environment Advisor (EA) and EASP Environmental and Social Specialist, REMA</p>	<p>US\$90,000 for EA (who may be an international person, over 6 month’s duration to offer training to the locally EASP recruited Environmental and Social Specialist.)</p> <p>3.5 million USD for compensation for land, crops loss, and vegetation destruction. This figure is derived and estimated using the UERP distribution component project which is similar to the EASP.</p>
<p><u>Activity(s)</u> <u>Construction of Sub stations and Transmission Lines</u></p> <p><u>Impact(s)</u> Crop loss, vegetation destruction, bird strikes, soil erosion/run off, dust impacts, noise impacts, oil/lubricant spills hence contamination of water and soil resources, workers accidents, cultural impacts, access road construction, borrow pit impacts,</p>	<p>Compensate for crops and vegetation, locate the lines away from known birdlife habitats or flight paths, re-vegetate, ensure best practise during construction to reduce noise and dust impacts, provide PPE to all the workers, Install drainage systems for storm water and secondary containment structures in areas where potential oil spills can occur</p>		<p>Principal Responsibility- Civil Works Contractor</p> <p><u>Other</u>-Environment Advisor (EA) and EASP Environmental and Social Specialist, REMA</p>	<p>Cost captured above</p>

Project Activities/Impacts	Mitigation Measure(s)	Indicators	Responsibility	Frequency/Cost
<p><u>Disposal of CFLs</u></p> <p>Pollution of land (soil), river and other natural water sources.</p>	<p>Develop a waste disposal plan for disposal of the CFLs</p>	<p>Availability of effective Waste disposal plan for CFL approved by World Bank and REMA.</p> <p>Level of mercury in nearby water and soil sources where the disposal occurs</p>	<p>Principal Responsibility- Electrogaz and the , A unit responsible for projects within the Ministry in charge of Energy once it is formed.</p> <p><u>Others:</u> Environment Advisor (EA) and EASP Environmental and Social Specialist, REMA</p>	<p>The sum of <u>15,000 USD</u> for development of the disposal plan for the IBs. The cost of the development of the overall waste disposal plan for the CFLs cannot be determined until World Bank provides this information which is currently under preparation.</p> <p>The sum of <u>US\$15,000</u> per year for the entire subproject has been budgeted for REMA for cost of Monitoring. REMA is mandated to undertake monitoring and has a budget for this. However, this sum is for meeting travel costs and allowances for REMA staff while visiting the subprojects.</p>

7.6.5 Monitoring Roles and Responsibilities

Electrogaz

The EMP will address with specific details how the environmental and social impacts and their designed mitigation measures are to be monitored during implementation (construction/rehabilitation works) and operation (including maintenance stages). No assignment of its monitoring responsibilities by Electrogaz to other parties, contractors, agents should absolve it, Electrogaz of their responsibility to successfully manage, mitigate or monitor any adverse impacts caused by their activities under this project. The main roles and responsibilities of Electrogaz for monitoring impacts of their activities and their corresponding mitigation measures will be as follows; Electrogaz assisted by its Environment Adviser and the RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) local environmental specialist will monitor the environmental and social impacts and mitigation measures of their own planned activities as contained in their cleared and approved EMP and technical designs.

Environmental Adviser (EA)

The Environment Adviser will monitor and evaluate the environmental and social impacts at all project sites, regularly and as frequently as required and will maintain suitable records to be made available to the REMA. The Environment Adviser will also be responsible for monitoring impacts and mitigation measures resulting from the actions of their contractors, transporters, suppliers and all third parties in the course of their duties under this project.

Therefore, wherever environmental and social impacts are or can be attributed to Electrogaz's project activities the appropriate mitigation measures will apply consistent with this ESMF and their EMP, and the EA would be responsible for monitoring and evaluating the same. The EA will prepare and submit periodic monitoring reports to Electrogaz and the REMA.

EASP Locally Based Environmental and Social Specialist

EASP will recruit a locally based environmentally specialist who will be paired by the EA for a period of 6 months to learn and acquire on the job skills related to preparation of EMPs and monitoring. After this period the EASP local environmental specialist will take over all the duties of the EA. The EA advisor will be assessed at the end of the 6 months to determine the extent to which he ensured know how transfer to the local specialist and how well the specialist learned from the EA advisor.

Rwanda Environment Management Authority

REMA will play the leading oversight role of monitoring the activities of this project. The REMA will carry out this role by ensuring that the environmental management plans (EMPs) contained in the cleared design package is being implemented as specified therein. REMA will monitor the reports on a regular basis, perhaps quarterly. They will rely on a bottom up feed back system to them from the ground by going through the monitoring reports prepared by the EASP's Environmental and Social specialist as well as consultants in cases where they will be used in preparing of the EMP. REMA will also

make regular site visits to inspect and verify for themselves the nature and extent of the impacts and the success or lack off, of the mitigation measures.

REMA will prepare brief consolidated periodic monitoring reports for submission to the World Bank.

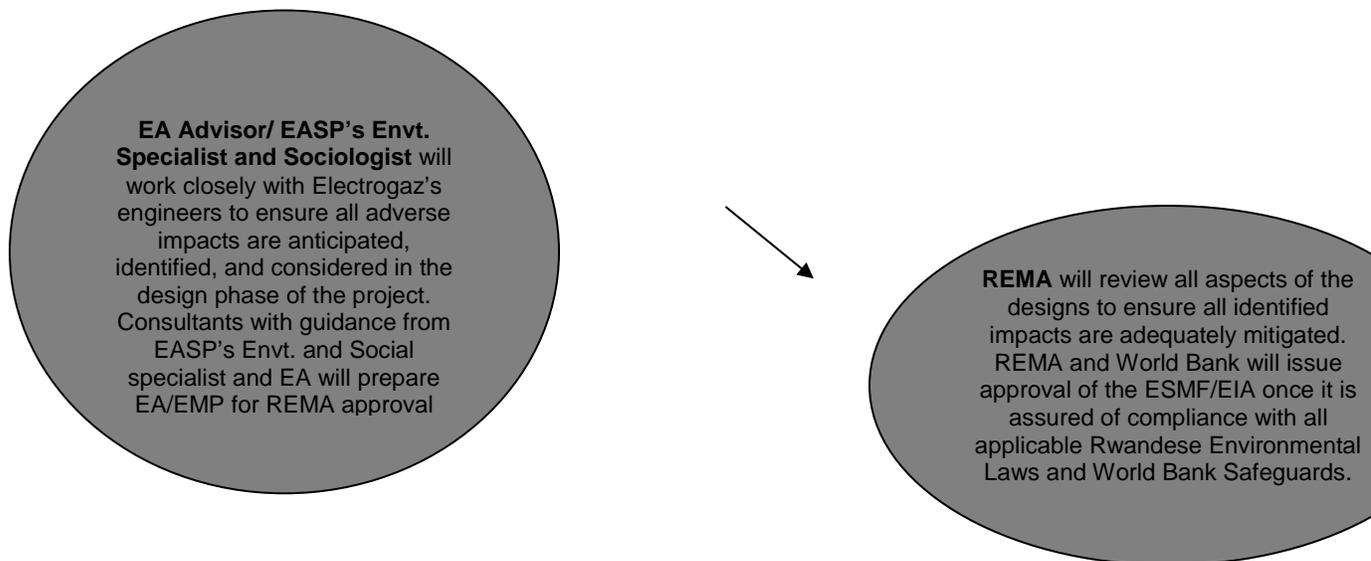
For the Grid Roll Out Component

- The Environment Advisor (EA), RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) local environmental specialist and using external qualified environmental consultants will screen the design (using all drawings, specifications for workmanship and materials, screening checklist and review forms in section 8.2), for the rehabilitation and new works, at the sub stations and along the existing and proposed extension transmission and distribution grids, that all planning, building and environmental laws and requirements are complied with, and to identify any adverse potential and social environmental impacts of the designs.
- The Environmental Adviser and the EASP local environmental specialist will work with the team of Electrogaz engineers to ensure that any adverse environmental impacts identified will be mitigated in the designs, before they are finalized. Some mitigation measures would be adjustments to the technical drawings, while others may require incorporation/adjustment of clauses to contract conditions or specifications for goods and workmanship. The Electrogaz engineers will also be provided with adequate training in environmental best practice aspects and management procedures related to design of sub stations and transmission/distribution lines, effective mitigation and monitoring measures and reporting.
- Where land acquisition that leads to resettlement is expected, such as at the sub stations or possible expansion of the transmission grid, the Environment Adviser and Social Specialist to be hired locally will use the separately prepared and disclosed Resettlement Policy Framework for this project, to guide and manage external consultants to prepare on behalf of Electrogaz, the appropriate Resettlement Action Plans (RAPs), one for each affected site.
- The Environmental Adviser and the EASP local environmental specialist using external qualified consultants will the prepare an Environmental Management Plan (EMP) to accompany the final designs (including complete set of contract documents) which will include details of all mitigation measures, including RAPs, where required, to be sent to the REMA and the World Bank for review and clearance.
- Only after clearance of the EMP and the Final Designs from the REMA, can tenders be launched to select contractors to carry-out the works. REMA may require certain revisions to the EMP, final designs and RAPs before granting its clearance. Additionally, for sites affected by resettlement, activities that lead to impacts on

affected people requiring them to be physically resettled will not commence until the RAPs are fully implemented.

- The RAPs will be reviewed for compliance with the disclosed RPF.
- Any part of the EMP and Final Design that does not comply with the requirements of the Environmental Laws of Rwanda and the requirements of the World Bank Safeguards policies will not be cleared by REMA.
- The Environment Adviser and the EASP local environmental specialist will monitor as stated in the cleared EMP, during construction and installation, the activities of the contractors to ensure that the works are being carried out as stated in the approved designs.
- The Environment Adviser and the EASP local environmental specialist will also monitor Electrogaz's implementation of the RAPs.

Summary of Key roles in the Environmental and Social Review process:



8.0 PROJECT COORDINATION AND IMPLEMENTATION ARRANGEMENTS

8.1 Projects and Sub-Project Preparation, Approval and Reporting

This section of the ESMF describes the process for ensuring that environmental and social concerns are adequately addressed through the institutional arrangements and procedures used by the project for managing the identification, preparation, approval and implementation of subprojects. This section sets out the reporting systems and responsibilities of the institutions in implementing the ESMF including the details to be addressed by the ESMF and the specific steps to be undertaken to ensure adherence to the ESMF.

8.2 Subproject Review

Subprojects and activities will each need to be reviewed for potential environmental and social impacts. The EASP is expected to produce net benefits. However certain project activities may have environmental and social impacts that will require mitigation. For this reason, this project has been rated as Category B under the World Bank Policy on Environmental Assessment (OP 4.01), requiring Environmental Assessment.

Subproject Screening and Screening Checklist

Subprojects and activities that fall under component the Grid connection and Energy Efficiency (Green Connection) components will each need to be reviewed for potential environmental and social impacts. The RWANDA Electricity Access Scale-up Project - Sector wide Approach (EASP) is expected to produce net benefits however; certain project activities may have environmental and social impacts that will require mitigation. For this reason, this project has been rated as Category B under the World Bank Policy on Environmental Assessment (OP 4.01), requiring Environmental Assessment. Using the screening and review process for subproject identification presented here, will, therefore help determine which of the safeguard policies are triggered and what measures will need to be taken to address the potential adverse impacts.

The screening will further ensure that subprojects that may have potential adverse impacts are studied in greater detail including need for subproject specific EIA.

As part of the identification of sub-projects, the project proponent will prepare a simple screening checklist (*Format 1.0*). The screening checklist will be prepared by the project proponent. As part of the identification of sub-projects, the project proponent will prepare a simple screening checklist. The screening checklist will be prepared by the project proponent.

The screening checklist will lead to the preparation a Project Report for review by REMA. Project reports will be prepared by independent consultants as registered by

REMA, who will be paid by the EASP. The EASP's environment and social specialist will offer guidance in the preparation of the screening forms and project reports with oversight in put from the EA advisor.

Screening Checklist Review Form

Based on this application, the proposal will be reviewed and selection for the next stage of evaluation undertaken. At this selection stage, a first level of environmental screening takes place on the basis of the screening checklist completed by the proponent.

The screening checklist will be reviewed using the Review Form, to be completed either by the district environment officer or the EASP's Environmental Specialist. Where there are social impacts indicated, the form will have to be reviewed in addition by EASP's Social Specialist. The form prompts the reviewer to verify the information provided by the proponent, and confirm the best course of action. The reviewer must consider the nature and location of the project and the anticipated impacts, and based on his/her judgment, confirm or propose the best course of action.

EASP Project: Select relevant project

Sub-project name [type here]

Location [type here]

Estimated cost (USD) [type here]

TYPE OF PROJECT OR ACTIVITY

Sub Project Type

Construction of Sub-station

Design and installation of a transmission and distribution network

Disposal of CFLs

Rehabilitation of networks

Other

Please give more details: [type here]

For all projects, an Environmental and Management Plan (EMP) will be required. In addition, the following studies may be required:

Yes No

Will this project affect Indigenous People? If yes, an Indigenous People's Plan will be required

Will the project require land for its development, and therefore displace individuals, families or businesses from land that is currently occupied, or restrict people's access to crops, pasture, fisheries or forests, even, whether on a permanent or temporary basis. If yes, a Resettlement Action Plan will be required

Will the Project:

Yes No

Adversely affect natural habitats nearby, including forests, rivers or wetlands?

Require large volumes of construction materials (e.g. gravel, stone, water, timber, firewood)?

Use water during or after construction, which will reduce the local availability of groundwater and surface water?

Lead to soil degradation, soil erosion in the area?

Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater

Create pools of water that provide breeding grounds for disease vectors (for example malaria or bilharzia)?

Involve significant excavations, demolition, movement of earth, flooding, or other environmental changes?

Affect historically-important or culturally-important site nearby?

Require land for its development, and therefore displace individuals,

families or businesses from land that is currently occupied, or restrict people's access to crops, pasture, fisheries, forests or cultural resources, whether on a permanent or temporary basis?

Result in human health or safety risks during construction or later?

Involve inward migration of people from outside the area for employment or other purposes?

Result in conflict or disputes among communities?

Yes No

Affect indigenous people, or be located in an area occupied by indigenous people?

Result in a significant change/loss in livelihood of individuals?

Adversely affect the livelihoods and /or the rights of women?

If you have answered Yes to any of the above, please describe the measures that the project will take to avoid or mitigate environmental and social impacts [type here]

What measures will the project take to ensure that it is technically and financially sustainable? [type here]

CONCLUSION

Which course of action do you recommend?

ESMP RAP

There are no environmental or social risks

Type here

If a RAP is required, will the project Displace or restrict access for less than 200 individuals, or if over 200, are losses for all individuals less than 10% of their assets?

If Yes, prepare an abbreviation RAP

If No, prepare a full RAP

Full details of resettlement requirements are provided in the accompanying Resettlement policy Framework.

Completed by: [type here]

Name: [type here]

Position/: [type here]

Date: [type here]

Based on the location and the type of project, please explain whether the Proponent’s responses are satisfactory.

Yes No

Their description of the compliance of the project with relevant planning Documents

If ‘No’, please explain: [type here]

Their responses to the questions on environmental and social impacts

If ‘No’ please explain: [type here]

Their proposed mitigation measures

If ‘No’ please explain: [type here]

Their proposed measures to ensure sustainability

If ‘No’, please explain: [type here]

REVIEWER’S CONCLUSION

Which course of action do you recommend?

ESMP; RAP

There are no environmental or social risks

[Type here]

If a RAP is required, will the project displace or restrict access for less than 200 Individuals, or if over 200, are losses for all individuals less than 10% of their assets?

If Yes, prepare an abbreviated RAP

If No, prepare a full RAP

Full details of resettlement requirements are provided in the accompanying Resettlement Policy Framework.

If this differs from the Proponent’s recommended course of action, please explain:

[type here]

Preparation of a project Report, based on field appraisal by REMA District Officer, is required to investigate further, specifically to investigate:

[type here]

Reject

Review form completed by: [type here]

Name: [type here]

Position / Community: [type here]

Date: [type here]

The reviewer of the screening checklist has an option to determine whether a more detailed Project Report, based on a field appraisal, is required. A Project Report will require the DEO to briefly visit the proposed project site, interview the project proponents, and assess the project's impacts in view of their knowledge concerning environmental and social risks and concerns in the area.

Project Reports are normally prepared as a means of informing REMA of the proposed development such that after review of the report, REMA advises on the need or otherwise for a full EIA. The EIA regulations allow for approval of proposed projects at the Project Report Stage and have been effectively used by REMA to grant Environmental Licenses to small projects without requiring a full EIA.

Table 8 : The REMA Process for Approving Project Reports

Steps	Action	Actor	Time requirement
One	Submission of PR to REMA. REMA receives PR, issues a receipt and acknowledgement.	EASP/UERP	To be undertaken by EASP/Electrogaz environmental and social specialists with input from the Safeguards Advisor
Two	REMA mails PR to Lead Agencies	REMA	7 days assuming all requirements are fulfilled
Three	Lead agencies review PR and issue comments	Lead Agencies	21 days (minimum) after receipt of PR from REMA.
Four	Review of PR by REMA	REMA	30 days after receipt of PR.
Five	Communication of findings from REMA review	REMA	45 days after receipt of PR.

Typical outcomes of review of Project Reports from REMA are likely to be as shown in Table 9 below. These are as follows:

Project is approved. Where REMA and Lead Agencies ascertain that a project report has disclosed adequate mitigation for identified impacts, the project is approved by REMA upon which, conditions attached to grant of an Environmental License are issued. Once these are fulfilled, an Environmental License is also issued subject to conditions which will be specific to the scheme in question. Among these is the requirement that the scheme design should not be altered without approval by REMA. As well, an audit report is required of each project after the first year of completion.

Project Report discloses potential for major irreversible adverse impacts. In this case, REMA may not approve the project.

Table 9: Possible Outcomes of REMA Review of Project Reports

Outcome	Recommendation	Important precautions
Project found to have no significant Social and Environmental Impacts or Project report discloses sufficient mitigation measures	An Environmental License will be issued by the Authority	Project report must disclose adequate mitigation measures and show proof of comprehensive consultations within the area of influence.
Significant adverse social and environmental impacts found or Project Report fails to disclose adequate mitigation measures.	A full cycle EIA will be required by REMA	As above
A proponent is dissatisfied with the outcome of the REMA review.		

Format 3.0 Project Report Form

PROJECT REPORT FORM

EASP	Select relevant project
Sub-project name	[type here]
Estimated cost (USD)	[type here]
What are the project objectives and Activities	[type here]

Reason for field appraisal, based on Issues in screening checklist
[type here]

Approximate size of the project in land area [type here]

Approximately size of the project in terms of affected individuals [type here]

How was the site of the sub-project chosen? [type here]

Does the project comply with the most Relevant planning document, for example the Development Plan? [type here]

Will the project:

Yes No

Adversely affect natural habitats nearby, including forests, rivers or wetlands?

If 'Yes,' give details: [type here]

Is the project sited within a strict protected area, national park, nature reserve, natural/historical monument or area of cultural heritage?

If 'Yes,' give details: [type here]

Require large volumes of construction materials e.g. grave, stones, water, timber, firewood)?

If 'Yes', give details: [type here]

Use water during construction, which will reduce the local availability of ground water and surface water?

If 'Yes', give details: [type here]

Lead to soil degradation, soil erosion or soil salinity in the area?

If 'Yes' give details: [type here]

Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater?

If 'Yes', give details: [type here]

Create pools of water that provide breeding grounds for diseases vectors (for example malaria or bilharzia)?

If 'Yes', give details: [type here]

Involve significant excavations, demolition, movement of earth, flooding, or other environmental changes?

If 'Yes', give details: [type here]

Affect historically-important or culturally-important site nearby?

If 'Yes', give details: [type here]

Require land for its development, and therefore displace individuals, families or businesses from land that is currently occupied, or restrict people's access to crops, pasture, fisheries, forests or cultural resources,

If 'Yes', give details: [type here]

whether on a permanent or temporary basis?

If 'Yes', give details: [type here]

Result in human health or safety risks during construction or later?

If 'Yes', give details: [type here]

Involve inward migration of people from outside the area for employment or other purposes?

If 'Yes', give details: [type here]

Result in conflict or disputes among communities?

If 'Yes', give details: [type here]

Affect indigenous people, or be located in an area occupied by indigenous people?

If 'Yes', [type here]

Result in a significant change/loss in livelihood of individuals?

If 'Yes', give details: [type here]

Adversely affect the livelihoods and /or the rights of women?

If 'Yes', give details: [type here]

MITIGATION MEASURES

If you have answered Yes to any of the above, please propose adequate mitigation measures.

[type here]

ALTERNATIVES

Is it possible to achieve the objectives above in a different way, with fewer environmental and social impacts? If yes, describe these alternatives, and state why they have been rejected.

[type here]

OTHER OBSERVATIONS

Please describe any other observations, especially any related to the reason for the field appraisal.

type here

CONCLUSION

Approval:

There are no environmental or social risks

Independent preparation of a Detailed Plan is Required:

ESMP

IPP

RAP

If a RAP is required, will the project displace or restrict access for less than 200 individuals, or if over 200, are losses for all individuals less than 10% of their assets?

If Yes, prepare an abbreviated RAP

If No, prepare a full RAP

Full details of resettlement requirements are provided in the accompanying Resettlement Policy Framework.

Reject

Review form completed by [type here names of all contributors to the appraisal]

Name: [type here]

Position/ community: [type here]

Date: [type here]

In the eventuality that a Project cannot be approved by REMA on the basis of a Project Report, the proponent will be advised to undertake full cycle ESIA leading to development of a fully fledged Environmental and Social Impact Assessment Study Report.

Scoping Report

Firstly, on advice from REMA, the proponent will prepare a Scoping Report specifying the project's area of influence, the thematic scope and depth of assessments required, the composition of the required EIA team, and the probable budget required to mount the EIA Study.

ESIA Study

Upon review and approval of the Scoping Report, REMA will advise that an ESIA Study be undertaken. The ESIA Study will entail a systematic investigation of all impact areas as identified in the scoping report, taking care to document the current baseline environment, resource exploitation patterns and ecological pressure points. It is mandatory for the ESIA study to undertake public consultation with all stakeholders in the project's area of influence. The ESIA Team should note and understand all stakeholder interests so as to cater for them in the ESMP. All accruing information will be written into a Draft ESIA Report prepared in the same format as the project Report and submitted to REMA for review. Upon review of this report, it will be subjected to public review.

Public Review of the ESIA Report

This will entail exposure of all the EIA documents at strategic points within the project's area of influence so as to allow all stakeholders to read and understand how they stand to be affected by the project. The public review has to be advertised twice in local dailies that are widely read in Rwanda, and are often supplemented by public hearings organized by REMA where the project is explained to local stakeholders. Upon expiry of the public review period, the ESIA team will organize the written comments either into an additional chapter or a volume to the ESIA report. This chapter will clearly explain how each of the comments and concerns have been addressed and resolved. This will be issued under the same conditions as is the case of the project report.

9.0 CAPACITY BUILDING, TRAINING AND TECHNICAL ASSISTANCE –EASP

Effective implementation of the Environmental and Social Management Framework will require technical capacity in the human resource base of implementing institutions as well as logistical facilitation. Implementers need to understand inherent social and environmental issues and values and be able to clearly identify indicators of these.

Technical Capacity Enhancement

Awareness creation, training and sensitization will be required for personnel of the following institutions.

- Rwanda Environment Management Authority
- UERP relevant project staff
- Electrogaz Engineers at the national level and district level
- EASP Environmental and Social specialist to be hired soon
- Local Engineering Contractors who will be contracted or sub contracted to undertake the construction works
- National Energy Development Agency A unit responsible for projects within the Ministry in charge of Energy” staff once this institution is established.

Training will Focus on:

- Stakeholder engagement, consultation and partnerships;
- EIA law, relevant environmental policies;
- Development of mitigation measures and Environmental Management Plans
- Thorough review of Country EIA procedures, Environmental Management policies & guidelines and WB safeguards as well as their implementation and enforcement.
- The group will also be trained on use and application of ESMF tools (Screening checklists, EIA, EA), their review, implementation and enforcement.
- Participants will be trained on environmental reporting, monitoring and follow-up of ESMF
- Significant emphasis will be placed on understanding EIA procedures, Environmental Management policies & guidelines, WB safeguards, implementation and enforcement
- Reporting, monitoring and follow-up of ESMF

9.1 ESMF IMPLEMENTATION BUDGET

The breakdown of estimated costs for implementing the ESMF is provided in Table 10. This includes costs for undertaking capacity building as outlined below.

Table 11: Estimated Capacity Building Budget							
Component	subcomponent	Activity	Budget US\$				Total US\$
			Year 1	Year 2	Year 3	Year 4	
Grid Roll out/Green Connections	District level Training (REMA District Environment Officers, Electrogaz staff	Detailed training on use implementation and management of ESMF and associated tools (EA, Screening checklists) EA Process, Impact identification and mitigation, reporting and monitoring, using the screening checklist,	50,000	50,000	50,000	50,000	200,000
Grid Roll out/Green Connections	National Level (UERP/PCU, Electrogaz, A UNIT RESPONSIBLE FOR PROJECTS WITHIN THE MINISTRY IN CHARGE OF ENERGY” , RURA,REMA, MinInfra	Training on fundamentals of ESMF, application and use, EA Process, Impact identification and mitigation, reporting and monitoring, using the screening checklist,	50,000	50,000	50,000	50,000	200,000
Grid Roll out/Green Connections	Training for National Engineering Contractors	Training on environmental best practise aspects and inclusion during the engineering and design stages as well as during the construction phase of the project					
		TOTAL					400,000

***The cost for the training include cost of preparation of training materials, delivering the training, cost for venue booking, stationery and other training related materials. The figure has been arrived at using the estimates for Training planned under the UERP ESMF.**

9.1.2 ESMF Implementation Budget for EASP Project

The estimated total cost of EASP is an initial IDA grant of US\$ 50 Million spread over 4 years. The total estimated cost for mainstreaming environmental and social concerns over an indicative period of 4 is approximately US \$ 5 million or 10% of the total project cost. This is an estimate cost covering compensation requirements which is based on the compensation given out for the UERP distribution component which has similar activities like the EASP. The cost also includes training and capacity building costs, cost for engaging consultants to undertake the preparations of EMP/EA and screening as well as the cost for the EA advisor. The figure of 5 million USD also includes the cost for mitigation and monitoring measures as will be specified in each EMP.

Limited human resource capacity to identify and implement Safeguard mitigation measures is a possible major challenge in the project implementation. Under ongoing UERP project a functioning safeguards framework and mitigation procedures have been established. Under the proposed project, the number of parallel investment activities will increase manifold. Each activity is expected to have only minor adverse impacts but the sheer volume of activities spread across the country that need safeguard assessments and follow-up of mitigation measures will pose a challenge for the project management team and require considerably increased safeguards capacity on a permanent basis.

The project will finance the hiring of 2 specialist staff for EASP - one for environmental issues related to implementing the ESMF and the other one for social management of the RPF - to be recruited to the project management department to oversee the program. These new staff will be paired with the existing safeguards advisor for the first 6 month of implementation to assist the Electrogaz team to establish appropriate procedures. Electrogaz field staff will be trained in stakeholder consultation and documentation of mitigation measures undertaken in their distribution zone.

9.1.3 Mainstreaming Costs

Costs related to the required mitigation measures for sub-projects are not set out in the budgets presented here. These will be assessed and internalized as part of the overall sub-project cost.

For the smaller projects, it is extremely difficult to estimate the proportion of the sub-project cost that can be expected to be devoted to mitigation and monitoring measures. However, they should be expected to cost between 2% and 5% of the total project cost.

9.1.4 Cost of Training

The cost related to training and capacity building and monitoring including sensitization is estimated to be approximately **400,000 USD** spread out through the project period. As indicated in the introduction, the project partners will be trained on the aspects of ensuring effective implementation of the ESMF. Staff from Electrogaz, a unit responsible for projects within the ministry in charge of energy”, REMA, and EASP will be taken through a 5 day training course during the start up of the project. Refresher training and sensitization sessions will be planned through the project life.

9.1.5 Cost of Recruitment of Local Environment and Social Specialist

The EASP will also recruit 2 local staff to work in the project as specialist in environment and social issues. The salary of the project staff cannot be determined at this point however, the environmental advisor will provide technical and mentoring support for a period of 6 months to the local specialists in order to build the local capacity and reduce the dependency on the use of international experts.

9.1.6 Compensation/Resettlement Costs

The costs that will be incurred in relation to compensating the PAPs for loss of land, crops, vegetations etc has also not been factored in this section because of the difficulty in determining or providing a reasonable estimate.

1.0 Annex

A. Suggested Format for EA Studies

The environmental impact assessment study report will incorporate, but not be limited to, the following information:

- (a) the proposed location of the project;
- (b) a concise description of the national legislative and regulatory framework, baseline information, and any other relevant information related to the project;
- (c) the objectives of the project;
- (d) the technology, procedures and processes to be used in the implementation of the project;
- (e) the materials to be used in the construction and implementation of the project;
- (f) the products, by-products and waste generated by the project;
- (g) a description of the potentially affected environment;
- (h) the environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long term effects anticipated;
- (i) alternative technologies and processes available and reasons for preferring the chosen technology and processes;
- (j) analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies;
- (k) an environmental management plan proposing measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;
- (l) provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;
- (m) the measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;
- (n) an identification of gaps in knowledge and uncertainties which were encountered in compiling the information;
- (o) an economic and social analysis of the project;
- (p) an indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures; and
- (q) any other matters as REMA may require.

B. Technical guidelines for environmental assessment and impact mitigation

1. Baseline studies

Baseline studies are the first stage in the EIA process. The goal of collecting baseline data is to determine the value of natural and human environments (high to low value) to be affected by project activities. With this pre-project baseline information, it will then be possible to identify and measure impacts of future project activities and preparation of a monitoring plan. Much of the baseline information may be contained in the project brief. However, during the baseline study any gaps should be identified and filled.

The baseline study will make use of a number of standard methods, including surveys, field visits and review of existing literature. Baseline studies for EASP may consist of the following main elements, depending on the type and scale of the specific project.

- Description of terrestrial vegetation, including important or rare species, account of human interventions such as clearing, cutting wood fuel and grass fuel and the agro-ecosystem
- Description of fauna and habitats, including important or rare species, interaction with human population and hunting practices.
- Description of the aquatic ecosystem, including physical and chemical features, sediments, river flow characteristics, zooplankton, macro-invertebrates, fish species and fish migration, fishing practices, aquatic plants, water hyacinths and wetland vegetation
- Identification of conservation status of project area in relation to natural environment and biodiversity issues on an international, national and regional/local basis
- Demography: sample population and house hold surveys to provide information on number of households and affected people; population profile, birth and mortality rates, ethnic composition
- Cultural Heritage: account of history and mitigations, settlement patterns, household composition, religious practices and survey of any archaeological finds or cultural heritage sites
- Gender Issues: household composition, division of labour, women's position in society
- Resource Use: agricultural production, land holdings, cropping system, livestock, fishing, use of forests, water sources and energy use (particularly wood fuel)
- Economic activities: characteristics of the household economy, trading centres, account of skills and description of the standard of living

- Health and education: health and education facilities, major diseases, sanitation, education levels and literacy levels
- Infrastructure and Service: Roads, waterways and other forms of transportation, community water supply, electricity and sewage systems
- Visual and aesthetic aspects: local perceptions of landscape and cultural; importance and tourism potential of site
- Stakeholder: District and local authorities, local groups related to project, national and international NGOS operating in the project area, International Donor programmes as well as public perception of the project

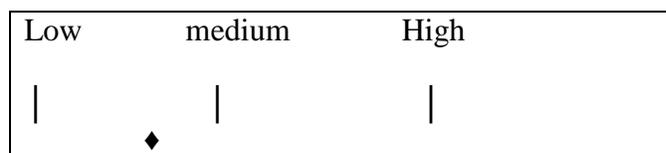
All baseline data should be examined according to designated Direct and Indirect Impact Zone of the project, Direct Impact Zone refers to any area that is subjected to physical disturbances caused by project activities. Indirect Impact Zone refers to any other influences or charges caused by project activities on adjacent areas or surrounding communities.

2 Analysis of Impacts

The methods used for assessing project impacts and arriving at recommendations and conclusions is based on a three-step procedure of making assessment of impacts, conclusions and recommendations more objective, easier to understand and possible to trace back if desired. The core of the procedure is to combine the ‘value’ of the affected environment and the ‘magnitude of impacts’ to arrive at an ‘overall impact assessment.’

Step 1

Firstly baseline conditions, both environmental and social, are described in detail and a value, on a scale from ‘low value’ to high value’, is assigned to the impact zones and the characteristics thereof. This value is related to international, national or local guidelines, standards and evaluations. In the case of the human environment, people, cultures and health cannot be ranked in such a manner and, unlike the varying values of the biophysical environments, should be all classified as having a ‘high value’.



Step 2

The second step is to describe and evaluate the magnitude of potential impacts. The impacts are measured in terms of their extent in time and space, the vulnerability of the environments affected, the probability that impacts will occur and the reversibility of impacts. The magnitude of impacts is evaluated on a scale from ‘high negative’ to ‘high positive’. In addition, distinction between the construction (i) and operational (ii) phases

of the project. The example below is for terrestrial vegetation such that possible disruption during construction would cause some negative impacts but after construction there would be little or no negative impacts.

Phase	Magnitude of impact on Terrestrial vegetation.
	Negative High Medium Little/no medium High
i	--◆--
ii	--◆--

The third and final step is combining the “value” (step) and “the magnitude of impacts” (step 2) to obtain the “overall impact assessment:” (step 3). This assessment evaluated the importance of an impact on a scale from “very large negative” to “very large positive”. For instance, an area of ‘high value’ affected by a ‘High negative impact’ results in an overall impact assessment of very large negative impact’, while an area of ‘low value’ affected by a ‘high negative impact;’ may give an overall assessment of ‘small negative impact’. It is then possible to illustrate how different mitigation measures can reduce, offset or even eliminated negative impacts or how interventions can enhance benefits. An example is given below of the overall impact assessment:

	Overall Impact Assessment	
Study	Without mitigation	With mitigation
Terrestrial Vegetation	Medium Negative. (--)	Little or no impact (-/0)

As a result of this procedure, positive and negative impacts are ranked in a relatively objective manner. An additional benefit of this approach is that the overall impact assessment also generates a priority list for mitigation and monitoring activities as well as priority of measures to optimise potential project benefits.

2 Analysis of Alternatives

The analysis of alternatives for UER projects should seek to compare various alternative options that may be available for any project, and thus determine which represents the most desirable in view of environmental and social factors. The process should therefore include an analysis and discussion of a range of alternatives to the proposed project that could feasibly meet the basis GoR and Bank environmental and social standards. The analysis and discussion should include an evaluation of the merits of each alternative with respect to the following.

- Nature of the alternative sites/locations of the EASP
- Feasibility of the alternative
- The trade-offs of advantaged and disadvantages of each alternative

- Cost effectiveness, including associated environmental costs and benefits of each alternative
- Technology and engineering design
- Interference and/or harmony with the surroundings and future plans
- Construction practices for each alternative
- Operations, including associated demands for energy and other inputs by the various alternatives
- Risk associated with the alternative e, including potential risks to human health
- Existence of important cultural and sensitive ecological systems and habitats in the proposed projects area
- Presence of endangered, rare and/ or threatened species that may be at risk if the project is implemented
- Conformation to existing policies, Plans, laws, regulation, etc.
- The “No Project” alternative

During alternative analysis, the environmental losses and gains associated with the various alternatives are compared to provide a balanced and full picture for energy development. A recommendation and indication of the preferred alternative and why it was chosen shall normally be given in the discussion of alternatives. If the preferred alternative is not the one with the least impacts, the discussion shall normally indicate why it was chosen. The environmental and social analysis associated with alternative analysis is an important aid to the decision- making process.

Where it may not be possible to qualify or attach monetary value to a certain set of environmental impacts for purposes of comparing the various alternatives, other approaches may be adopted for placing value on such environmental impacts and thus permitting a decision to be made on the alternative to be implemented. This may involve holding meetings, seminars and /or round table discussions involving stakeholders, and /or ranking the alternatives using various important weighting techniques adopted on a project-by- project basis.

4 Impact Mitigation Guidelines

The purpose of impact mitigation is to look for alternative and better ways of implementing the proposed project or associated activities so that the negative impacts are eliminated or minimized, while benefits are enhanced. Impact mitigation requires that the full extent of the anticipated environmental problems be understood. In the following

sections key environmental issues are outlined as guidelines for assessing impacts and formulating mitigation measures.

Avoidance of Areas of High Biodiversity

The important guidelines in relation to the development of EASP or any project of this kind is the avoidance of sensitive and high biodiversity sites as locations for projects. This would relate to hydropower and diesel generator schemes since PV systems would be preferable in such areas as National Parks. This includes avoidance of National Parks and other areas with a high biodiversity or conservation value. Avoidance of these areas concerns not only project impacts but also the anticipated population influx and human development that may remain after project completion

Soil Degradation and Erosion

Soil degradation and erosion due to construction activities and potential increases in agricultural activities in EASP project areas. This may be primarily in the case of hydropower project but population increases can be expected in areas where electricity is made available given the advantages of electricity and the relatively few rural areas that are presently supplied. Increased demand for food could result in shorter fallow periods, use of areas prone to erosion and other negative impacts that degrade the soil and caused erosion.

Impact on Vegetation

Charting potential and actual changes in the biological environment will form an important part of assessing and monitoring of impacts. Many EASP projects will involve some clearing activities, potential population influx into new areas and possible destruction of natural habitat. Measures to control negative impacts may include demarcating areas, limiting project activities away from sensitive areas and conducting environmental awareness programs. The latter would be imperative when projects are located near National Parks or other areas of important biodiversity. After project construction, revegetation programs and reforestation programs may be undertaken and should be funded by the project developer as part of the overall mitigation plan.

In addition to the above, a number of social-economic impacts could occur and these need to be addressed in a similar manner.

5 Identifying Opportunities from Positive Impacts

The EIA study should address positive impacts that may arise from the electrification. It should also explore opportunities for environmental enhancement. The involvement of local communities is essential in developmental enhancement. The involvement of local communities is essential in developing ways to enhance positive impacts.

6 Environmental management Plan

Goals and Objectives

An environmental Management Plan (EMP) should clearly define all environmental requirements for the successful integration of measures to eliminate, offset or reduce the expected impacts as identified in the EIA the EMP forms the link between the impacts and mitigation measures presented in the EIA and the implementation of a range of management activities. The EMP should outline the mitigation measures, Monitoring activities and institutional arrangements to be followed during the pre-construction, construction, operation and decommissioning (if applicable) phases to avoid or control impacts as well as indicating the scheduling, budgets and responsibilities for the recommended mitigation and monitoring activities.

EIA studies for EASP should identify a variety of impacts that a particular projects is likely to have on the natural and human environments, Timely and efficient implementation of mitigation measures and monitoring activities should be recommended in the EIA in order to endure the environmental and social sustainability of the project, which is the overall objective for the EMP.

Stakeholders

A large number of stakeholders or partners are likely to be involved in the EIA consultation and project planning of EASP. These could include the MININFRA, District Authorities, Local Councils, REMA, ORTPN, NGOs and the local population. The involvement of these groups should be maintained during the implementation of mitigation measures and monitoring. Certain mitigation and monitoring activities, in terms of project design, construction methods and project operation are clearly the responsibility of the developer. However, other stakeholders could be heavily involved in the implementation of the EMP, particularly in the mitigation and monitoring activities relating to such issues as conservation areas, agricultural intensification and social development strategies. It is especially important to involve relevant stakeholders in these types of 'development' activities in order for the benefits to be maintained in the long term. The project developer has the financial responsibility for the EMP. However, particular activities may be the responsibility of other stakeholders who will also participate in the implementation.

A table outlining mitigation measures, responsible party, involved other parties and cost will need to be presented as part of an EMP.

Mitigation Measures

Mitigation measures, depending on the scale and type of project, may divide into two levels; level I will include measures that are required by WB and REMA guidelines as conditions for approval of a project. Level II will include measures that are highly recommended although not considered of such importance that they should be set as conditions for project implementation. Although not conditions for development these mitigation measures could still have major positive effects.

An approximate cost should also be presented with each main mitigation measure. Budgeting must be further detailed during the refinement of the plan by those responsible for implementation of the EMP. In order to implement the recommended mitigation measures effectively and in a timely manner it is considered important that adequate organizational and managerial bodies are in place.

Capacity building is an important element in any project that has long term objectives. In case of EASP projects, efforts to maintain the environment and improve social conditions will be greatly enhanced by improving the capacity of local and district organizations to deal with new situation. Regular meetings and workshops will be needed to discuss ongoing concerns and improve understanding.

The district and local authorities will also be involved in a number of activities that will require training and capacity building in areas such as social development programmes and conservation awareness. Some of these programmes could be run with the involvement of experience NGOs.

**C. Projects which require an Environmental Impact Report (REMA GUIDELINES)
FIRST SCHEDULE**

PROJECT CATEGORY		DESCRIPTION
1	Infrastructure Projects.	
	a) Road and highway projects, bridges and tunnels.	Includes construction and rehabilitation of all these categories of infrastructure.
	b) Airports, airstrip, heliport.	
	c) Landing sites or boat marinas on lakeshores.	
	d) Railway line and tramways.	
	e) Dams, reservoirs or other installations for storing water on a long-term basis.	
	f) Pipelines, sewers and underground electricity or communications infrastructure.	
	g) Solid waste management (collection, transportation and disposal) facilities.	Including landfills, transfer stations, incinerators, recycling facilities and waste processing/treatment/destruction plants.
	h) Liquid waste management facilities.	Including industrial wastewater and sewage treatment plants.
	i) Car depots, car washing bays garages, facilities for storage of scrap metal and scrap vehicles.	
	j) Water treatment, supply and distribution infrastructure.	
	k) Telecommunications infrastructure	Including masts, base stations and optical cable networks.
2	Land use and built development projects.	
	a) Urban development projects including commercial buildings, residential, or conference halls that sit more than one hundred (100) people.	
	b) Business parks, modern markets, international markets, free trade zones.	
	c) Hotel, holiday village or tourist and recreation developments.	
	d) Theme parks.	
	e) Recreation and sporting facilities/activities.	Including permanent racing tracks, cable cars and campsites.
	f) Golf courses.	
	g) Industrial estates/ parks.	
	h) Defense facilities.	Defense developments may require EIA depending on their type/effect, proposed site and land area to be occupied.
	i) Stadiums of capacity of more than 1000 people.	
	j) Construction of schools	
	k) Construction of hospitals and healthcare facilities.	

	PROJECT CATEGORY	DESCRIPTION
3	Developments on lakeshores, riverbanks, rivers, lakes and wetlands.	
	a) Reclamation of land from wetlands.	
	b) New resorts, beach or beach enhancement.	
	c) Dredging/ mining on lake bottoms and riverbeds.	
	d) Ports	
4	Extractive industry.	
	a) Hard rock quarry.	Including restoration of disused quarries.
	b) Soft rock quarry.	
	c) Murram (gravel) quarries.	
	d) Sand quarries.	
	e) Clay quarries.	
	f) Drilling for petroleum and natural gas.	EIA is required for each contact production contact area.
	g) Commercial mining on more than one-half (0.5) hectares.	
	h) Groundwater abstraction wells and artificial recharge schemes.	
	i) Mineral processing industries.	Including cement processing plants, rock processing plants, ready-mix concrete plants, concrete block/brick plants, tarmac production plants and lime kilns.
	j) Salt extraction schemes.	
5	Agricultural projects.	
	a) Reclamation and drainage of swampland of more than 5 hectares.	
	b) Irrigation projects on land exceeding 5 hectares.	
	c) Commercial livestock projects.	Including commercial rearing of poultry, pigs, rabbits, beef cattle, dairy cattle, ostriches and crocodiles (and any other animals which can create an ecological imbalance if they escaped into the wild).
	d) Aquaculture projects (farms and hatcheries) rearing aquatic plants or animals on more than 5 hectares.	
	e) Commercial fishing.	
	f) Greenhouses and protected crops.	
	g) Crop and animal farming activities on more than 50 hectares that use fertilizers and chemicals to increase production.	
	h) Agricultural activities that use hybrid seeds.	

	i)	Agricultural activities that use of pesticides.	
	j)	Farming of non-indigenous crops and animals.	

6		Energy projects.	
	a)	Crude oil refining facilities.	
	b)	Industrial briquetting of organic residues.	
	c)	Thermal power stations for electricity generation.	
	d)	Hydroelectric power dams.	
	e)	Commercial renewable power plants (wind farms, solar, geothermal).	Including installation and harnessing of wind, sun and geothermal for commercial energy generation.
	f)	Nuclear energy facilities.	Including storage, reprocessing and disposal of radioactive waste.
	g)	Storage depots, petrol stations and transportation networks of gasses, fossil fuels and petroleum and petrochemicals.	Including petroleum or petrochemical storage depots, resale stations, surface and underground storage of combustible gases and petroleum, pipelines for transportation of gas, steam or hot water.
	h)	Commercial steam, hot water and ice plants.	
	i)	Electricity transmission lines.	Transmission of high voltage electrical energy by overhead cables.
7		Industrial developments and operations.	
	a)	Construction of industries facilities	
	b)	Industrial smelting of iron and steel.	
	c)	Manufacture of asbestos cement and other products containing asbestos.	Including clutch plates, brake linings, insulation materials etc.
	d)	Manufacture, recycling and storage of chemicals.	Including organic/inorganic chemicals, plastics, fertilizers, pesticides, paints, vanishes, pharmaceuticals, soaps and detergents, explosives and any other related products.

	e)	Processing of metals.	<p>Including:</p> <ul style="list-style-type: none"> i) Roasting, palletising and sintering of ores. ii) Iron and steel works including foundries, forge, smithery, drawing plant and rolling mill, not being works falling within (i) above. iii) Pressing, drawing and stamping of large castings. iv) Installations for production (including smelting, refining, drawing and rolling) of non-ferrous metals including precious metals (e.g. gold, silver mercury). v) Installations for surface treatment and coating of metals and plastics using electrolytic or chemical processes. vi) Boiler making or manufacture of reservoirs, tanks and other sheet-metal containers. vii) Boat-making facilities. viii) Manufacture or assembling motor vehicles or their engines. ix) Installations or manufacture or repair of aircraft. x) Installations for the application of fused metal coats (e.g. zinc plating).
8		Glass and ceramics	
	a)	The manufacture of glass and fiberglass.	
	b)	The manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, floor tiles, stoneware or porcelain.	
9		Food processing.	
	a)	Manufacture of vegetable or animal fat.	
	b)	Packing or canning of animal or vegetable products.	
	c)	Manufacture of dairy products.	
	d)	Beer brewing.	
	e)	Bottling of beverages.	
	f)	Baking and confectionery.	
	g)	Animal slaughter houses and abattoirs.	
	h)	Manufacture of industrial starch.	
	i)	Fish meal or fish-oil industry.	
	j)	Sugar processing.	
	k)	Commercial production of livestock feeds.	
	l)	Commercial grain storage and milling.	
	m)	Coffee processing plants	

10	Textile, leather, wood and paper industries.	
	a) Manufacture of fibreboard and plywood.	
	b) Manufacture of pulp and paper.	
	c) Fiber drying factories.	
	d) Cellulose processing and production facilities.	
	e) Tannery and leather industries.	
	f) Timber treatment & processing facilities.	
11	Rubber industry.	
	a) Manufacture, treatment and recycling of rubber products.	
12	Forestry.	
	a) Planting commercial forest plantations on more than 5 hectares.	
	b) Harvesting more than 2 hectares of forest cover at once.	
	c) Planting non-indigenous trees.	
	d) Making more than half a tonne of charcoal.	
	e) Activities carried out in national parks or around national parks.	
	f) Commercial mining on more than 0.5 hectares.	

D. Suggested Format for a Simple EMP

The ESMF emphasizes that an environmental management plan (EMP) should fit the needs of a subproject and be easy to use. The basic elements of an EMP are:

- A description of the subproject activity;
- A description of potential environmental impacts;
- A description of planned mitigation measures;
- An indication of institutional/individual responsibility for implementing mitigation measures (including enforcement and coordination);
- A program for monitoring the environmental effects of the subproject both positive and negative (including supervision);
- A time frame or schedule; and
- A cost estimate and source of funds.

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility (including enforcement and coordination)	Monitoring Requirements (including supervision)	Time Frame or Schedule	Cost Estimate
[type here]	[type here]	[type here]	[type here]	[type here]	[type here]	[type here]
[type here]	[type here]	[type here]	[type here]	[type here]	[type here]	[type here]
[type here]	[type here]	[type here]	[type here]	[type here]	[type here]	[type here]

The above matrix should be filled out for each subproject that will have the need for a separate EMP (the screening process using the screening checklist should determine this).

EMP contents usually are:

- Description of adverse impacts: The anticipated impacts are identified and summarized.
- Description of Mitigation Measure: Each measure is described with reference to the effects it is intended to deal with. As needed, detailed plans, designs, equipment description, and operating procedures are described.
- Description of monitoring program: Monitoring provides information on the occurrence of impacts. It helps identify how well mitigation measures are working, and where better mitigation may be needed. The monitoring program should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental impacts are monitored is discussed below.
- Responsibilities: The people and organizations that will carry out the mitigation and monitoring activities are defined, as well as to whom they report and are responsible. There may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies.
- Implementation Schedule: The timing, frequency and duration of mitigation measure and monitoring are specified in an implementation schedule, and linked to the overall sub project schedule.

- Cost Estimates and Source of Funds: These are specified for investment for the mitigation and monitoring activities as the project is implemented. Funds to implement the EMP will predominantly come from Electrogaz with possible assistance from the UERP.

Monitoring methods:

Methods for monitoring the implementation of mitigation measures or environmental and social impacts should be as simple as possible, consistent with collecting useful information, so that Electrogaz can apply them. For instance, they could just be regular observations of the project activities or sites during construction and then when in use. Are plant/equipment being maintained and damages repaired, does a water source look muddier/cloudier different than it should, if so, why and where is the potential source of contamination. Most observations of inappropriate behavior or adverse impacts should lead to common sense solutions. In some case, e.g. high emission of green house gases or loss/death of flora and fauna, there may be need to require investigation by a technically qualified person.