NILE BASIN INITIATIVE

NILE EQUATORIAL LAKES SUBSIDIARY ACTION PROGRAMME (NELSAP)

STUDY ON THE INTERCONNECTION OF THE ELECTRICITY NETWORKS OF THE NILE EQUATORIAL LAKES COUNTRIES

FEASIBILITY REPORT

VOLUME 4 B – BURUNDI-RWANDA INTERCONNECTION ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

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GENERAL TABLE OF CONTENTS

The feasibility report includes the following volumes:

- Volume 1: Power supply and demand analysis
- Volume 2: Uganda – Kenya interconnection
- Volume 3: Uganda – Rwanda interconnection
- Volume 4: Burundi – Rwanda interconnections
- Volume 5: Burundi –DRC – Rwanda interconnections and upgrade
- Volume 6: Power system design

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX

oOo

LIST OF ABREVIATIONS

AFSEC	African Electrotechnical Standardization Commission / Commission Electrotechnique Africaine de Normalisation
AfDB	Banque Africaine de Développement
PEAC	Central Africa Power Pool / Pool énergétique de l'Afrique Centrale
CEEAC	Communauté Economique des Etats de l'Afrique Centrale (ECCAS)
CEPGL	Communauté Economique des Pays des Grands Lacs
CES	Consultant's Environmental Specialist
DEM	Digital Elevation Model
DRC / RDC	Democratic Republic of Congo / République Démocratique du Congo
EAPP	East African Power Pool / Pool Energétique de l'Afrique de l'Est
EGL	Energie des pays des Grands Lacs (Burundi, RDC, Rwanda)
ERA	Electricity Regulatory Authority (Uganda)
EDF / FED	European Development Fund / Fond Européen de Développement
INECN	Institut National pour l'Environnement et la Conservation de la Nature / National Institute for the Conservation of Nature and Environment
MEM	Ministère de l'Energie et des Mines / Ministry of Energy and Mining
MoI	Ministry of Infrastructures / Ministère des Infrastructures
MNT	Modèle numérique de terrain
NBI / IBN	Nile Basin Initiative / Initiative du Bassin du Nil
NEL	Nile Equatorial Lakes
NEL-CU	Coordination unit for NELSAP
NELSAP / PAALEN	Nile Equatorial Lakes Subsidiary Action Programme / Programme Auxiliaire d'Action des pays des Lacs Equatoriaux du Nil
PPA	Power Purchase Agreement / Contrat d'achat d'énergie
PREBU	Programme de réhabilitation du Burundi
ORGE	Office rwandais de gestion de l'Environnement/Rwandese Environmental Management Authority
PPA	Power Purchase Agreement / Contrat d'achat d'énergie
ROW	Right-of-Way
SADC	Southern Africa Development Community / Communauté pour le développement de l'Afrique Australe
SAPP	Southern Africa Power Pool / Pool énergétique de l'Afrique Australe

SEO	Contractor's Site Environmental Officer
SINELAC	Société internationale d'électricité des pays des grands lacs
SNEL	National Electricity Company (DRC) / Société Nationale d'Electricité (RDC)
SRTM	Shuttle Radar Topography Mission
UPDEA	Union des Producteurs, Transporteurs et Distributeurs d'Energie Electrique d'Afrique / Union of Producers, Transporters and Distributors of Electric Power in Africa
USAID	Agence pour le Développement International des Etats Unis
WAPP	West Africa Power Pool

1. INTRODUCTION

1.1. PRESENTATION OF THE PROJECT

The study is carried out in the frame of the interconnection of the electricity networks of the Nile Equatorial Lakes Countries under the Nile Equatorial Lakes Subsidiary Action Program (NELSAP). The sectoral objective of this study is to improve the rate of access to electrical power for the peoples of the Equatorial Nile Basin.

The characteristics of the project can briefly be summarized as follows:

Five countries concerned

- Burundi,
- Kenya,
- Uganda,
- Democratic Republic of Congo, DRC
- Rwanda

Four main projects

- Uganda - Rwanda interconnection
- Burundi - Rwanda interconnection
- Uganda - Kenya interconnection
- Strengthening of the interconnection between Burundi, DRC and Rwanda

Three study phases

- pre-feasibility
- feasibility
- detailed studies and tender documents

A. Uganda - Rwanda interconnection

The project consists in constructing an HV power line, 230 km long, between the substations at Mbarara in Uganda and Birembo in Rwanda. This line should enable Rwanda to import 20 MW of power to overcome its production shortfall, thereby benefiting from the development of the Ugandan hydro-electric resources.

B. Burundi - Rwanda interconnection

The project consists in constructing an HV power line, approximately 109 km long, between the Rwegura hydroelectric power station in Burundi and the Kigoma substation in Rwanda. The purpose of the line is (i) to improve the stability of the grid linking the electricity production and distribution systems of Burundi, eastern DRC and Rwanda, and (ii) to improve the security of the electricity supply and the working flexibility of these networks by creating a loop passing through Butari.

C. Uganda - Kenya interconnection

The purpose is to strengthen the interconnection between the Kenyan and Ugandan networks so that the hydro-electric power station at Bujagali, which is planned to be commissioned in 2010, can export surplus power from Uganda to Kenya. The project consists in constructing a 256 km HV power line between Jinja in Uganda and Lessos in Kenya, duplicating the existing 45-year old, double 3-phase 132 kV power line.

D. Strengthening of the interconnection between Burundi, DRC and Rwanda

The purpose of the project is to increase the transmission capacity and working flexibility of the transmission network and to improve the security of the electricity supply in Burundi, DRC eastern grid and Rwanda. The project involves:

- increasing the operating voltage of the 112 km power line between the hydro-electric power station at Rusizi I (DRC) and Bujumbura (Burundi) from 70 kV to 110 kV,
- increasing the operating voltage of the 150 km power line between Rusizi I and Goma in DRC from 70 kV to 110 kV,
- constructing a 62 km, 110 kV power line between Goma (DRC) and Mukungwa (Rwanda), closing thereby the loop around Lake Kivu and
- constructing a 18.9 km, 110 kV power line between Bujumbura and Kiliba (DRC).

Appropriate techniques used to connect the villages along the routes of the different interconnections to the power lines will also form part of the study.

To these characteristics, the large distances between projects could also be added. As an example, the Jinja - Lessos interconnection is more than 800 km from the Bujumbura – Kiliba one.

More specifically, the present Volume 4B of the study concerns the Environmental and Social Impact of the reinforcement of the network (’interconnection) between Burundi and Rwanda.

1.2. CONTEXT AND OBJECTIVES OF ENVIRONEMENTAL AND SOCIAL ASSESSMENT

According to the African Bank of Development (AfDB) and as mentioned under the Terms of Reference for the Study of the interconnection of the electricity networks of the Nile equatorial lakes countries, the project is subjected to an environmental and social impact assessment (ESIA) and envisages a program of compensation of the losses.

The general objectives of the environmental and social impact assessment are:

- To identify the potential impacts environmental and social as well positive as negative of the interconnection;
- To develop an environmental and social management plan (ESMP) including mitigation measures of the impacts and program of environmental monitoring.

The ESIA was prepared in concordance with the guidelines of the governments of Burundi and Rwanda, as well as the policies and procedures of the African Bank of Development (see section 3 on the legal and institutional framework).

1.3. EVALUATION METHODOLOGY

For the elaboration of the study of environmental and social impact of the project of interconnection between Brundi-Rwanda, the consultant has:

- collected relevant information from particularly available regulations and studies;
- effected visits and environmental inventories at site;
- done detailed socio-economic investigations
- consulted people affected by the project, the local, regional and national authorities and NGOs;
- identified the environmental and social impacts;
- analyzed the impacts on basis of below criteria and emerged mitigation measures of negative impacts and optimization of positive impacts
- developed a program of compensation of losses.

All line and substations locations were visited. Data and information was collected from local government at site (technical services, local authorities).

Moreover, a consultation plan consultation was executed in order to collect information from local, regional and national authorities (see section 4).

Moreover, a socio-economic survey was carried out along the future route of the line. This work allows draw up the detailed socio-economic profile of the various zones concerned and the households affected by work.

The study privileged a participative method which will progressively integrate the opinions from different stakeholders and respect their concerns. The Plan of work is based on four major thrusts of intervention:

- The analysis of the project concept paper and other strategic and of planning documents at the national or regional level; consultation of the documents resulting from the preliminary studies; integration of the results from prefeasibility phase. Other external project documents which could be helpful for the study were also consulted. This stage made it possible to identify the complementary data to be collected on site.

- Visits of project sites between Rwegura and Kigoma to collect complementary data on the social biophysical environment, especially on line route, the urban zones and affected human settlements, environmental sensitive areas such as wetlands and forests, agriculture rural areas, etc. Sites visits were effected by experts in consideration of particular concerns for carrying out the EISA;
- Consultation with interested and/or affected local people, the institutional stakeholders mainly concerned by the project (administrative authorities and local government), local associative movements, public technical services, local NGOs and other active organizations in the concerned area, local socio-professional stakeholders. Local meetings were organized with different interested people and institutions;
- The analysis of information and the environmental study includes the following: initial study, impact identification, public consultation, environmental and social management framework which includes mitigation measures, compensation program, training requirements and monitoring program.

2. PROJECT DESCRIPTION

2.1. JUSTIFICATION OF PROJECT

The general objective of the project is to increase the transit capacities and the flexibility of operation of the grid system and to improve sustainable electricity supply in Burundi and Rwanda.

Today, the rate of access electricity is lower than 5% for both countries. The interconnection project will be a main way for economic and social development in the region by improving and increasing power availability. This project will also reduce the imports of the fuel for the existing thermal plant and power generators. This project of modern energy will lead to the cost saving and an environmental profit by air quality improvement and reducing greenhouse gases emissions generated by fossil energies.

The project will bring sustainability in energy supply for these two countries and will increase the power supply in neighboring areas which are still not supplied in electrical power. Indeed, even if the study framework is limited to the interconnections, it appears that this initiative will develop rural electrification projects at a lower cost and increase quickly the power supply for the villages located along the line drawings.

2.2. BENEFIT OF ENERGY ACCESS

The energy being presently a key factor of development, the augmentation of rate to access to the electricity will contribute certainly to reach the Objectives (goals) of the Millennium for the Development as defined by the U.N. particularly the one related to the reduction of the extreme poverty and hunger, Indeed, the energy is (sees) considered more and more as an essential asset without which a real development is impossible.

Thus, the access to energy and in particular to the electricity constitutes an essential lever of development owing to (thanks to) its effects.

- On Poverty and hunger

The access to the electricity enables to have a work day which is very long thanks to the light and savings of time and money (very easiest access to the energy and water). Besides, the use of electrical and energizing equipments for the irrigation enables to get an increase of the agricultural production.

The availability of the energy is also a factor of economic development because it (enables) permits the development of small and medium enterprises together with the mechanization of activities of transformation of agricultural products and their conservation (refrigeration).

- On Health

The presence of the electricity within the health centers enables the conservation of medicines (refrigeration) and an increased safety during the night at the child birthday. Besides, the access to means of communication (television, radio, and internet) facilitates the transmission of knowledge on the issues related to basic health, such as the protection against the HIV-AIDS and malaria together with the telemedicine. Finally, the access to the electricity, by improving life and work conditions of health service providers, inciting them to remain in the villages,

- On Education

The gain of time thanks to the energy and to the access to the electric light enables children to study in the evening in good conductions. The availability of the electricity enables the access to the internet and to the tele education augmenting the access to knowledge. The presence of electricity also incites teachers to remain in rural zones and not to relocate to town. In addition, the access to the electricity and water at school enables to improve the teaching conditions and the organization of courses for adults in the evening.

- On the improvement of life conditions in particular for women

In the family, the domestic tasks are often reserved to women. The access to water may be improved thanks to the presence of pumps. More over, projects of mechanization of certain operation (dissecting etc.) may reduce the time and the effort of work. The projects of agribusinesses' development may enable to hold personal revenues which ensure them an increased autonomy and a best quality of life. Further more, the access to media (television, radio, internet) enables also to let evaluate the woman's image among (inside) traditional societies.

- On the limitation of rural exodus

The improvement of life condition of rural households and the local job creation thanks to economic development enables to reduce the incitement to the rural exodus.

- On the environment

The access to the electricity at home will decrease the use of piles and to batteries but also to the biomass often over exploited. The use of the electricity from hydraulic origin permits also an avoidance of the production of gas with hot house effect such as the CO2 deriving from the combustion of diesel or of the fuel for the existing generators.

2.3. GENERAL CRITERIA OF LOCALIZATION

At the preceding step of the feasibility study, the knowledge of the environment and more specifically to stakes and sensitive elements of the zone of study has enabled to elaborate general criteria that have served as guide within the study of different alternatives. Theses criteria are of two types:

- The restrictive criteria which recommend to avoid in the possible extent, certain elements of environment due to their intrinsic characteristics.
- And the incitative criteria which oblige to seek some elements of environment because they provide mainly a level of low sensitivity.

The general criteria of location considered for the location of transmission lines and the implantation of substations within the context of the present project and which have been taken into account for the elaboration of corridors are presented below. These ones are related to a technical environmental and socio-economic aspect and certain may be classified within more than one category:

- Looking for the more direct orientation between the departure point and the arrival one in order to reduce the perturbations caused to the environment and to social aspect, and reduce the project's cost;
- To avoid divided the territory and the creation of residual spaces in looking for an orientation of the corridor which respects the general structure of the lands' cutting up.
- To exploit the elements of the territory such as the administrative limits and the linear equipments (roods, electric lines, railways etc.), together which the interfaces between the different types of soil's use, to minimize the anticipated impacts, to minimize the corridor size and increase the visual integration of the line;
- To avoid the sectors visually very displayed, either on the dominant tops or on the displayed slopes;
- To walk around the villages and avoid the areas where it is found a large concentration of housings (which are less compatible with the presence of electric infrastructures, and which would require numerous transfer of population and strong compensations).
- To avoid the sensitive environments (natural reserves, humid environments, flooded zones, zones replanted with trees, industrial cultivations, etc,) and go within the areas of little sensitivity able to hold the line with a minimum of anticipated impacts,
- To avoid the areas having large relief and the high slopes, where the accesses are more difficult for the building sites' machines, and where the erosion risks are very high, able to endanger the safety of the connection.

Concerning what is linked to the reception areas for the substation's connections, the location criteria which have been taken into account are the following:

- Avoid the sensitive environments (natural reserves, replanted with tree zones, industrial cultivations etc.) and look for areas of little sensitivity able to hold the substation with a minimum of anticipated impacts;
- Be far from villages and concentration of housings to avoid potential conflicts with the territory's uses (noise and visual nuisances) and foresee the extension of urbanization perimeters;'
- Avoid the humid zones and the zones of rocky surfaces and look for the spaces of good supporting capacity and an adequate drainage;
- Locate the substation at proximity of a road access in order to facilitate the accessibility;
- Bring the substation at the nearest possible point to the existing HV line connections in order to minimize the environmental and visual impacts together with the additional costs able to be arisen by the derivation's lines.

A local optimization of the line has been achieved at the moment of on site studies; this enables to avoid or to walk around certain elements which are the most sensitive or constraining on the crossed territory.

2.4. THE HOLD

The width of the ascending (Hold) must be at maximum of 30 meters. The limits have been determinate by the limit falling over of conductors by the effect of the maximum wind together with the environmental limits such as the audible noise, the electric field and the interference radio and TV. The complete action of clearing of the ascending where the line crosses wooded zones must be limited to a strip of 5 to10 meters of width's length of the axis in order to enable the un-winding of conductors. A part from that strip, but within inside of ascending all the vegetation having a height superior of 4-5 meters must be cleared, including the trees presenting a potential danger but off the ascending (see figure of the following page).

Not with standing which precedes, some plantations and in particular the banana trees should be allowed within the ascending. In all the cases, the cultivations which the height does not exceed 4 to 5 meters are allowed even also the farming or other compatible activities.

Although this approach can be different from the methods used by the owners, the experiment from other projects in the area and at the international level showed that by engaging the local communities present along the line for the maintenance of the hold and the line monitoring, the operational limits of the hold can be respected. This approach is also proved to be effective to the minimum to reduce the theft of metallic material and earthing of the pylons in addition of reducing the maintenance costs related to the control of the vegetation in the hold.

This type of understanding enables the user to maintain his activities (eg. Agriculture, farming, plantation etc.) only if they do not cause nuisance to the line operation.

Furthermore, the final positioning of towers, if well done is a factor which would again reduce the clearing of sails' needs.

The acquisition of the ground will be limited to the towers' location. As the agriculture is focused on a plantation and a manual harvesting the towers basis surface may reach 100 m2 (10x10 meters) , in a normal situation, the lost surface will be limited to 4 columns of reinforced concrete, that is to say at total 6,25m2 (2,5x2,5m). On the soils which are of very little holding capacity, each basis may be located between 0,5 and 1,0 m more wide. Generally, the soils are "excavated" on a depth of 3,5 m maximum.

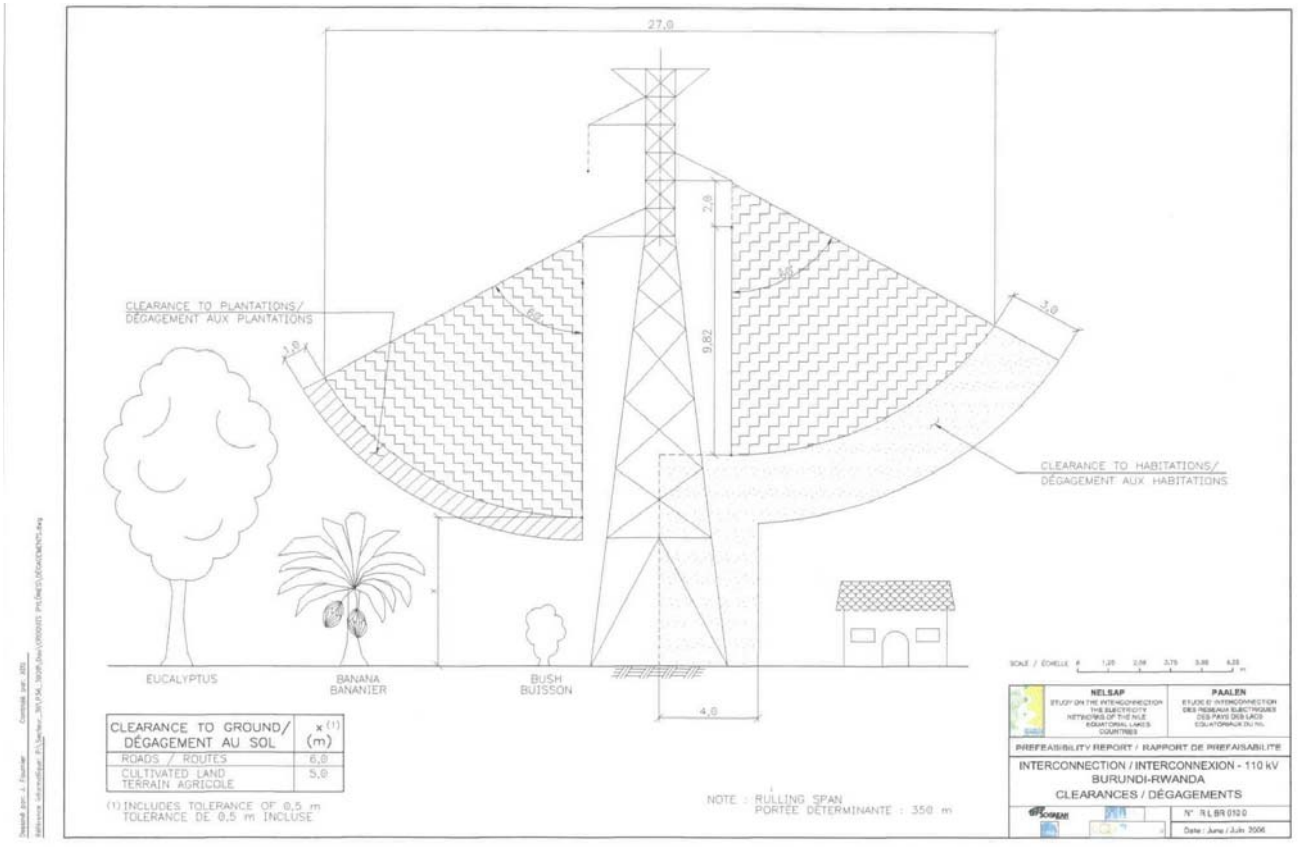

FIGURE 1. INTERCONNECTION - 110 KV- CLEARANCES

2.5. PROVISIONS FOR THE RURAL ELECTRIFICATION

The techniques that give the possibility of connecting the villages located along HV transmission lines of interconnection have been studied and chosen during the pre-feasibility technical study. Thus, the transmission lines and the corresponding power stations were designed to provide a reliable source of electricity to the villages.

It is therefore foreseen that the line will allows supplying about 20 villages located along the line. To that end a substation dedicated to rural electrification is planned in the southern province of Rwanda, to supply non electrified areas.

2.6. INTERCONNECTION BURUNDI-RWANDA

2.6.1. LINE AND LINE ROUTE

In conformity with the designs of NELSAP, the extremities of that interconnection are found at Rwegura in Burundi and at Kigoma in Rwanda. They will be connected on one side to the 110 KV REGISDESO in Burundi and to the 110 KV network of ELECTROGAZ in Rwanda.

The layout of the line of Rwegura-Kigoma interconnection traverses round hills with a more mountainous part in the southern section close to the Burundi-Rwanda border.

The line has an estimated length of 103 km. With a determining span estimated for the line 110 Kv of approximately 380 meters, the height of the towers of the top of the foundations to the cross-piece of bottom must be included between 14 and 28 meters.

Metal towers with self supporting lattices with foundations with metal grids or of the concrete foundations are used on the existing lines. These two types of foundations are possible for the line of interconnection.

Tableau N° 1. LINE'S CARACTERISTICS

Specifications/Caractéristiques	Uganda Section Section burundaise	Rwanda Section Section rwandaise
Length of the line (estimated) Longueur de ligne (estimée)	30,5 km	72,5 km
Voltage level Niveau de tension	110 kV	110 kV
Circuits	1	1
Number and type of phase conductor Nombre et type de conducteurs de phase	1 ACSR	1 ACSR
Number and type of groundwire Nombre et type de fils de garde	1 GSW + 1 OPGW	1 GSW + 1 OPGW
Average length of Span Longueur moyenne de portée	380 m	380 m
Number of pylons Nombre de pylônes	80 pcs	191 pcs

2.6.2. SUBSTATION

2.6.2.1. RWEGURA

Within the context of the present NELSAP mandate, a line span 110 kV will have to be added to the existing substation.

The new line span 110 kV from Kigoma substation will include:

- Lightning arrestors 102 kV ;

- Voltage transformers 110 kV for measurement and protection;
- One communication link by optical fiber ;
- One line disconnecting switch with earthing switch 110 kV;
- Power transformers 110 kV for measurement and protection;
- One circuit breaker 110 kV ;
- One bar disconnecting switch 110 kV.

2.6.2.2. KIGOMA

Within the context of the present NELSAP mandate, a line span 110 kV will have to be added to the existing substation.

The new line span 110 kV from Rwegura substation will include:

- Lightning protector 102 kV ;
- Voltage transformers 110 kV for measurement and protection ;
- A communication link by optical fiber ;
- A line disconnecting switch with MALT 110 kV earthing switch ;
- Power transformers 110 kV for measurement and protection ;
- A circuit breaker 110 kV ;
- A bar disconnecting switch 110 kV.

2.7. MAINTENANCE ACTIVITIES

2.7.1. WAYLEAVE

A permanent area of land will be required to accommodate the transmission line, when completed. A parallel strip of land through those sections of the route which pass through vegetation shall be completely cleared. The width of the strip may vary according to the mean height of the vegetation and shall be determined by ensuring that any standing tree would not cause flashover from a conductor deflected up to 45° from the vertical. In determining the flashover clearance and in estimating the mean height of the vegetation due allowance shall be made for seasonal growth. In addition, any tree that may fall in the direction of the overhead line shall be cleared unless located more than 25 m plus the height of the tree clear of the route centre line.

Routine maintenance is carried out along the ROW to ensure the appropriate clearances between towers, conductors and vegetation and other objects are maintained according to the required safety/operation specifications listed above. A 5 m wide path along the line route could be required in the absence of a public road. Maintenance is normally carried out twice a year (dependent on site conditions and utilities planning).

2.7.2. SUBSTATION

As for the line, a maintenance program will be required for the substations. This will involve periodic replacement of coolants/lubricants in the transformers. Both REGIDESO and Electrogaz have indicated that they will no longer use transformers containing PCBs (as commonly used in old equipment) which are toxic to the environment and humans.

2.8. AREA OF IMPACT

The area of immediate impact will be the line corridor right-of-way (ROW) which will be 30 m in width by 103 km in length (an area of 309 ha) from Rwegura in Burundi to Kigoma in Rwanda. The ROW will be completely cleared of all trees above a height of 4-5 m during the construction stage. Appropriate clearance between conductors and vegetation/structures along this corridor will be maintained throughout the life of the transmission line. Cropping and grazing beneath the conductors is normally permitted. Tower foundations will require a permanent area of approximately 2.5 m x 2.5 m (6.25 m2) based on a typical 110 kV line tower. The temporary area required during tower foundation construction will be 10 m x 10 m. Tower foundation materials and equipment will be stored in the area reserved for stringing along the line corridor.

2.9. PROJECT IMPLEMENTATION

In line with similar projects implemented in Burundi and Rwanda, construction is expected to start after contract signing following international competitive tendering. Pre-construction activities associated with design work include soil investigations and detailed survey of the transmission line route and substation location as well as the constitution of the Project Implementation Unit (PIU), negotiation of assets of the Project Affected Parties (PAPs) for compensation purposes. Actual mobilization for construction work will follow within 6 months of final design of the line. The mobilization period includes activities for preparation of material storage areas, camps, water, power, communication and other site facilities.

Construction of the transmission line will then start by preparation of tower foundations, followed by tower erection and conductor stringing. Works will also be required within the substations of Burundi and Rwanda.

The project is planned to be completed within 19 months from the date of signing of contracts (no date has been set).

2.10. PROJECT COSTS AND SCHEDULE

The total Project cost calculated on August 2007 value and allowing for 10% physical contingency and using an average inflation of 5% per year is estimated at 14 million USD. This value includes costs for both Burundi and Rwanda.

It also includes a cost of 3,5 millions USD for the mitigation program for environmental and socio-economic impacts of the Project, covering compensation for the loss of permanent and temporary assets (4 668 670 USD) and an environmental monitoring program (235 000 USD)

A detailed breakdown of costs associated with compensation for lost assets of project-affected people is given in the Resettlement Action Plan (Chapter 8). Environmental monitoring costs estimate is given in Section 7 of this Report.

The Project implementation schedule is presented on the next page.

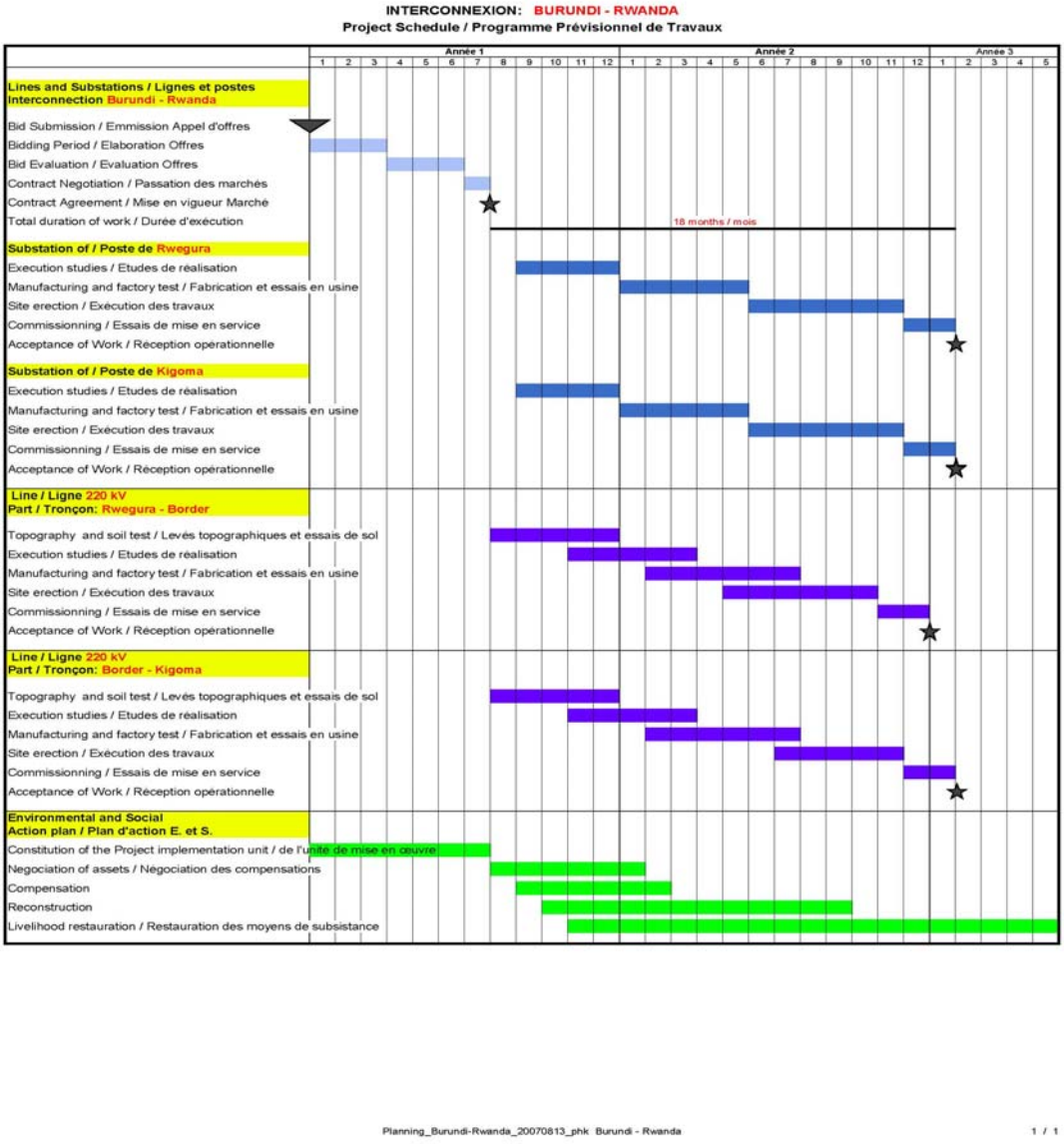

FIGURE 2. SCHEDULE OF WORKS

3. INSTITUTIONAL AND LEGAL FRAMEWORK

3.1. BURUNDI

In a poor country with rapid population growth like Burundi, and where the agricultural sector is taken as the driving force of economy, the environment protection is vital to the survival of the population.

The management decisions must be considered within an adequate institutional and political context that is set up and reinforced by the power of the law. The long-term success of the conservation, the lasting use of biological diversity and the sharing of the advantages from the exploitation of natural resources will then depend, for the institutional and political context.

3.1.1. LEGAL CONTEXT

3.1.1.1. GENERAL MEASURES

3.1.1.1.1. POLITICAL

Up to now, the environment protection orientations have been stated within the context of the Sectorial Policy from the Ministry of National and Regional Development, Tourism and Environment (MINATTE).

Even if this basic text contains essential elements for a conservation Policy, it is still too general in terms of necessary measures for biodiversity conservation. That is why Burundi has developed a national strategy about biological diversity.

MINATTE Sectorial Policy

In the biodiversity conservation domain the Sectorial Policy of the Ministry focusses on the following specific objectives:

- Restoring and maintaining ecological balance in the natural milieus though the conservation of the different wild fauna and flora species as well as the ecosystems that host them;
- Safeguarding natural genetic inheritance in Burundi and biodiversity;
- Promoting ecotourism;
- Involving the populations in the management of protected areas and vulnerable ecosystems;
- Reinforcing international cooperation about environment protection.

The National Environment Strategy in Burundi (SNEB)

The SNEB objective is to determine the steps to be undertaken so that the activities in the each sector may be in perfect harmony with the concept of lasting development. It gives prominence to the guiding priority lines to be integrated into the planning and decision policies, the setting up of strategies allowing to put the guiding lines into practice and to do institutional and legal rectifications that are indispensable to their efficient application.

To correct the condition of the biodiversity degradation in Burundi, national strategies have been taken about the following themes: coordinated environment management, land and water management, living resources and productions, industries and services, human habitat and health, science, culture and education, and additional socioeconomic strategies.

The National strategy about biological diversity

The National strategy about biological diversity is based on the eight strategic axes which are:

- Biodiversity conservation;
- Lasting use of biological resources;
- Fair sharing of responsibilities and benefits in biodiversity management;
- Biotechnologies;
- Education and sensitization of the public
- Training and research ;
- Impact studies and reduction of harmful effects;
- Cooperation and exchanges of information.

So, for the biodiversity conservation, the strategy follows up the objectives hereafter:

- Improving and reinforcing the legal base, its coherence et its efficiency to favour conservation, the lasting use and the fair sharing of the biodiversity resources;
- Improving ecological knowledge that is necessary to the setting up of a quality network and to the safeguarding of the endangered biodiversity elements;
- Setting-up, maintaining and monitoring an integrated network of protected areas or other special representative zones for biodiversity protection;
- Ex-situ conservation of the endangered biodiversity elements;

For the lasting use of biological resources, the objectives below are to be followed up:

- Consolidating the lasting use and the valuation of wild biological resources on basis of concerted management plans and regulations;
- Lasting use of biological home resources.

Concerning the fair sharing of responsibilities and benefits in biodiversity management, the objective to be followed up in the strategy is to set up an integrating policy and a concertation context where the responsibilities of all the participants in the biodiversity conservation and lasting use are clearly defined.

3.1.1.1.2. LAWS AND REGULATIONS

The activities that have impact on biodiversity concern, in a great part, the ministries in change of public works; agriculture and animal husbandry; mining, oil exploitation and quarries; public health and rural development.

Legislation may be necessary in order to set up policies that include all those domains of activities so as to legitimate the administrative and organizational functions of the biological diversity protection programs.

Biodiversity management in Burundi is essentially achieved though legislative texts and regulations as well as the international conventions that have been ratified by the government and are the integrating part of the internal legislation.

Legal texts decreed by the tutelary authority

During the colonial period, many texts of law have been written to control the cutting and selling of state woods (O.R.U. no 29/129 of 27/04/1923) and natural forests (Decree of 18/12/1930), and other texts about fauna protection (Decree of 27/11/1934) made enforceable in Burundi by O.R.U.

no 24/Just. Of 04/04/1935 concerning the protection of animals, Decree of 21/04/1937 concerning the control of hunting and fishing).

Between December 1933 and June 1954, three forest reserves were officially established:

- The forest reserve of Congo Nile Divide in December 1933 (O.R.U. n° 33 Agri. of 24/5/1934);
- The Burundi forest reserve in April 1951(O.R.U. n°52/115 of 15/06/1954);
- The Kigwena forest reserve in June 1954 (O.R.U n° 52/115 of 15/06/1954.

Legal texts decreed after the independence of Burundi

The statutory order no 1/138 of 17 July 1976 concerning the mine and oil code.

This text taken together with the decree no 100/130 of December 1982 fixes the execution measures about mine and oil problems while clearly explaining the government preoccupations concerning environment.

The statutory order no1/6 of 3 March 1980 concerning the creation of National Parks and Natural Reserves

This statutory order determines the legal system about protected areas, especially concerning the ban on their concession and transfer, the special measures of flora and fauna conservation, the ban on population settlement in the proximity of national parks and natural reserves, visits inside the protected areas, etc.

The law no 1/02 of 25 March concerning the forest code

The forest code fixes all the special rules concerning forest administration, development, exploitation, supervision and police.

Even if this code is prior to the Rio de Janeiro convention on biological diversity, it corresponds to many objectives of this convention in this way:

- It plans many measures along the line of the conservation and the lasting use forest resource and other arrangements meant for the integrity of forest systems;
- It imposes a general obligation to any land owner to achieve re-forestation on the one hand, and make sure that care and exploitation are fulfilled so as to ensure its profitability in conformity with the rules of careful economic management; and on the other hand, take necessary measures for the reconstitution of plantings with trees;
- It regulates controlled fire or defines prevention measures;
- It institutes protection forest or forest reserves to fight against soil degradation and for the conservation of plant or animal endangered species.

The land code

The law n°1/008 of 1 September 1986 concerning the creation of the Burundi Land Code has an objective of fixing rules to be applied to the rights that are recognized or may be recognized for all the lands on the national territory as well as for all that is linked to those lands or incorporated into them either naturally or artificially. Notwithstanding the rights that are recognized for private individuals, the state has the eminent right of managing the national land heritage. The state exercises that right in the general interest so as to ensure the economic and social development in the conditions and according to the details defined by the law.

Special laws relating to the territory management and equipment or to the real-estate business investment can, among others, set out special management details for some land categories or for determined areas.

The statutory order n° 1/033 of 30 June 1993 concerning the protection of plants in Burundi.

This statutory order has the objective of protecting the health of plants and products that are intended to multiplication through prevention and fight against the enemies of plants either at the national territory propagation level or at the level of the plants protection technologies dissemination and the popularization by plants improvement.

It forbids to possess, carry on the national territory plant enemies whatever their development stage. It submits them to control at the time of their importation or exportation.

The law n° 1/010 of 30th June, 2000 concerning Environment Code in Burundi.

The code fixes fundamental rules meant to allow Environment management and the Environment protection against all forms of degradation so as to safeguard and value the national exploitation of natural resources, to fight against pollution and environmental pollution, and to improve the population's living conditions while respecting the ecosystem balance (Art 1).

In its part relating to biodiversity, the code develops measures aiming at protecting the fauna and flora, and biodiversity in general so as to ensure national management of the genetic heritage and the preserve the balance of this heritage trough banning attacks on the natural areas and on the animal and plant resources.

Therefore, principles are formulated concerning biodiversity preservation, degraded ecosystem reconstitution and threatened or endangered animal and plant species regeneration. This constitutes an obligation which is entirely the responsibilities, the private and the legal entities or individuals.

In the same way, it plans the possibility of establishing, if necessary, special measures including the creation of full reserves so as to reinforce more the conservation in situ of species, particularly the threatened or endangered ones.

The decree concerning delimitation of a National Park and four Natural Reserves.

This Decree comes to fill the deficiencies of order in council n° 1/6 of 3 March 1980 by proposing delimitations for some protected areas so as to reinforce their protection and reduce the conflicts existing between the managers of protected areas and the other partners.

What is new in this text is that it integrates the interests of the bordering populations in the management of the considered area.

Order in council n° 1/41 of November 1992 concerning Institution and Organization of the hydraulic public domain.

The objective of this order in council is to protect the aquatic area and to preserve water resource. That law allows to regulate some activities that are likely to constitute threats for biodiversity.

Measures may be found in the order in council concerning water quality protection, where water pollution prevention and control are dealt with.

In fact, no one can pour out, let flow out, throw, and make direct or indirect water or matter deposits, and more generally be the responsible of any fact that is likely to alter the physical, chemical, biological or microbiological characteristics of superficial or underground water, without prior permission from the administration having the obligation to purify effluents.

3.1.1.2. INTERNATIONAL CONVENTIONS AND TREATIES

The Republic of Burundi has signed many international conventions relating directly to the management of biodiversity and environment protection. These conventions are presented in table 2.

Tableau N° 2. INTERNATIONAL AGREEMENTS RATIFIED BY BURUNDI

International convention	Ratification Date	Objective of the convention
The convention about biological diversity of 5 June 1992.	1996	Biological diversity conservation, the sustainable use of its elements and the just and fair sharing of genetic resource exploitation benefits.
The convention about the international trade of wild endangered fauna and flora species. **«CITES» 3 march 1971**	1988	species that are endangered or are likely to experience over exploitation international exchanges Controlling.
The convention relating to humid areas of international importance, particularly such as the water bird habitat "Convention RAMSAR" of 1971.	1996	Conservation and rational use of humid areas and their resources.
The Convention about plant protection Between the member states of the Great Lakes Economic Community (CEPGL) Countries of 25 February 1990.	1990	This convention aims at promoting cooperation regarding plant protection between the CEPGL Countries through the CEPGL Institute of Agronomic and Zootechnics Research (IRAZ) and the national organizations in charge of plant protection.
The zoosanitary convention between CEPGL member States of 25 February 1990.	1990	The objective of this convention is to protect animal farming by fighting against the introduction and the propagation of animals diseases.
The phytosanitary convention for Africa of 13 September 1967	1992	The objective of this convention is to reinforce cooperation between African states to fight against the enemies of plants and plant products, and to discourage their introduction all over national territories.
The convention about the sustainable management of Lake Tanganyika	2004	The objective of this convention is to ensure the protection and the Conservation of the biological diversity and the sustainable use of the natural resources of Lake Tanganyika and its environment or basis of integrated management and the cooperation between contracting states.
United Nations outline convention relating to the climatic changes	1997	To stabilize gas concentrations with greenhouse effects in the atmosphere up to the level that would prevent harmful entropic interferences with the climatic system.
United Nations convention about the fight against desertification	1996	Its objective is to fight against soil erosion, desertification in the affected countries.

International convention	Ratification Date	Objective of the convention
Convention of Vienna for the Ozone Layer protection and its Montreal protocol	1996	To protect human health and environment against harmful effects resulting or that may result from human activities which modify or may modify the ozone layer.
Convention of Basle about the control of trans-border movements of harmful waste and its elimination.	1996	The convention is about the control of trans-border movements of harmful waste and its elimination. It aims at reducing the volume of those exchanges so as to protect human health and environment by introducing a system for controlling the exportations and importations of harmful waste as well as its elimination.
Convention of Rotterdam about some harmful chemical products and pesticides.	2004	To promote cooperation and the sharing of responsibilities among the parties in the domain of international trade of some harmful chemical products and pesticides.

Other relevant international conventions relating to biodiversity are in the process of being ratified by Burundi. That is to say the Cartugena Protocol relating to the prevention of the biotechnological risks; the Bonn convention relating to the conservation of migratory species belonging to the wild fauna, and the agreement for the conservation of the Africa-Eurasia migratory water birds.

3.1.2. INSTITUTIONAL CONTEXT

3.1.2.1. THE INSTITUTIONAL ACTORS OF THE ENVIRONMENT

The environment protection sector is within the competence of many institutions that are both national and international and are somehow concerned. The coordination is carried out by the Ministry of the national and regional development, Tourism and Environment. This Ministry realizes the Government policy in the environment sector.

The Ministry of National and Regional Development, Tourism and Environment (MINATTE)

According to the article 23 of the decree no 100/72 of 18th October 2005 determining the Structure and the Mission of the Government of the Republic of Burundi and to the article 1 of the Decree no100/108 of the 22nd November 2005 relating to the re-organization of MINATTE, this latter has these principal missions:

- Conceiving and carrying out the national policy relating to national and regional development and environment;
- To develop anti-erosion and protection against industrial pollution strategies;
- To ensure arranging, parceling and allocating rural lands;
- To manage and arrange natural and state forest;
- To set up and arrange protected areas, including national Parks, Natural Reserves, historical Monuments and tourist sites;
- To set up procedures for environmental impact assessment studies for project promoters;

- Develop and have applied the regulations relating to environment protection

Nowadays, a great number of Ministries are involved into natural resources and environment management. That is mainly the Ministry of Agriculture and Animal Farming, the Ministry of the Interior and Public Security and the Ministry of Public Health.

Nevertheless, other ministries participate in the environment management through the nature of their own activities or through the activities they supervise. That is to say mainly the Ministry of Commerce and Industry, the Ministry of Energy and Mines, the Ministry of Transports, Post and Telecommunications.

The National Environment Commission

The different Environment national's partners act through the National Environment Commission that has been reorganized by the Decree no 100/114. The commission assists the Ministry; whose duties are dealing with environment, in the preparation and implantation of the national environment policy so as to coordinate and facilitate the Government action in this matter through consultative approach.

Environment and Nature Conservation National Institute (INECN)

The INECN has the mission of ensure the environment safeguarding and nature conservation. To this end, it:

- Collects and interprets data relating to the control of the status of environment. These data are provided by both national and international different organizations;
- Has environment norms respected so as to fight against pollution through administrative and judicial follow-up;
- Collaborates with concerned services to ensure national management of natural resources;
- Sets up, arrange and manages parks and natural reserves to ensure sustainability and exploitation for tourism aims;
- Undertakes and encourages research and guiding measures for biological diversity upholding;
- Takes care of the national and international conventions relating to the trade and exchange of wild fauna and flora specimens application;
- Contributes to the promotion of environment education in collaboration with concerned organizations and institutions.

Other institutions

There are also institutions at national and international level that are directly related to the environment conservation.

National institutions:

- Agronomic Sciences Institute of Burundi (ISABU)
- General Direction of Agriculture
- General Direction of Animal Farming
- General Direction of agricultural Popularization;
- University of Burundi
- Province and Commune Administration.

Regional and international institutions:

- Institute of Agronomic and Zootechnic Research (IRAZ)
- The Conference on the Ecosystems of Dense and Humid Forests of Central Africa.(CEFDHAC)
- International Office of Epizooties (OIE)

3.1.2.2. INSTITUTIONAL ACTORS RESPONSIBLE FOR COMPENSATIONS

Institutional responsibilities for carrying out the reinstallation plan are: The Ministry of Public works and Equipment; the Ministry of national and regional development, Environment and Tourism; the authorities of Kirundo province through the cadastral survey; the district authorities of the province, the enterprise in charge of executing works.

Compensations for properties relating to built things (house, shops) and various crops must be done in the strict respect of national laws and regulations. This is to say national edict no 720/cab/667/2003, concerning the updating of the compensation tariffs of lands, crops and constructions in case of expropriation for state-approved cause of the environment code and the land code.

The expropriation procedure in force in Burundi successively includes the following stages:

i. The Ministry of Public works and Equipment evaluates the properties to be expropriated with the districts administrations and the concerned population, according to the regulation in force and transmits the file to the Ministry of national and regional development, Environment and Tourism;

ii. The Ministry of national and regional Development, Environment and Tourism stamps the file and send it back to the Ministry of Public Works and Equipment.

iii. The Ministry of Public Works and Equipment transmits that file to the Ministry of Finances so that the compensation sum can be released and sent to the account of the Ministry of Public Works and Equipment;

iv. The Office of Roads in the Ministry of Public Works and Equipment pays all of the compensations to the concerned owners; the next stage consists of conducting a survey on property situation with the objective of making an inventory of all the rights and a census of the beneficiaries; and

v. Generally, the difference is settled out of court. In case of contesting, the plaintiff appeals to the duly authorized courts.

3.1.2.3. INSTITUTIONAL ACTORS IN THE ELECTRICITY SECTOR

The Ministry of Energy and Mines has the mission of conceiving and carrying out the Government policy relating to energy; planning and supervising rural development actions within the context of electrification. It ensures planning, constructing and managing energy infrastructure in collaboration with other concerned services. It participates in exchange and partnership programs relating to energy with regional or international institutions of which Burundi is a member.

The company for Production and Distribution of Water and Electricity (REGIDESO):

The REGIDESO is a personalized or independent organization whose mission is producing and distributing electricity as well as marketing it in urban centre and in centre set to become urban.

The General direction of Hydraulics and Rural Energies (DGHER) has the main mission of supplying regions with water and electricity.

3.2. RWANDA

3.2.1. LEGAL FRAMEWORK

3.2.1.1. THE NATIONAL MEASURES

The vision 2020

The document of the vision 2020 (MINECOFIN, 2020), fixes plans the orientation of the multisectoral development at long term. Among the main objectives (goals) to achieve up to 2020, we may mention:

- The reconstruction of the country and that of its social capital;
- The rational and durable management of the environment and natural resources particularly the land (soil), water, energy and biodiversity;
- The agriculture modernization and his integration to other economic activities;
- The development of entrepreneurial spirit and that of a private sector focused on a strong class of businessmen and entrepreneurs. The contribution of the private sector within the total of investments must be increased and diversified sensibly in order to create jobs and revenues out of the agriculture and then reduce poverty in a perceptible way.

Among the measures linked to the energy sector, the vision 2020 plans the specific objective to achieve a rate of electrification of the population to 35% while it was at 6% IN 2000. The consumption of heaving wood must move from 94%to 50% of the national consumption in energy in order to reduce the deforestation phenomenon. The inadequate and expensive energy procurement constitutes a limitating factor to the economic development.

Rwanda wishes thus to increase and augment its ways an her energy production and improve the distribution and accessibility to that energy. The government will therefore (favour) encourage the participation of the private sector within the energy sector while supporting technically and financially the local institution and organizations in the management of renewable energies.

The pressure on the natural resources must be sensitively lightened and the process of degradation of environment, invented the increase of the Rwandan population. Finally, the management and protection of environment must be more rational and well regulated in order to preserve (conserve) and to devise on the basic inheritance to future generations.

The strategic plan of poverty reduction, 2000

The national strategic plan of poverty reduction is a policy undertaken at middle term of the vision2020. In the sector of electrification, the following action is judged (assessed) as of first priority:

- To propose the options for the rehabilitation, the extension of the connection and the construction of new hydroelectric plants;
- To implement a program of rural electrification after having considered the best balance public private for the service supplying. The accent must be first focused on the availability of the electricity for the economic activities before the households consumption.
- To extend the connection in order to enable by first priority the connection of villages which in proximity of existing lines.

This strategic plan must be provide, besides the orientations within the domain (FIELD° OF ENVIRONMENT PROTECTION. It stresses that the environment is a transverse theme which must be considered within each sector of development.

The National Environmental policy in Rwanda, 2004

This policy rises out the greatest environmental preoccupations within several among which that of energy development. It defines as global objectives the one consisting of improving the human welfare, using strictly the natural resources and protecting and managing rationally the ecosystems for a sustainable and equal development (MINILAND, 2004). Among the principals on which this policy is focused, we find among others;

- The right for any person to live within a healthy and well balanced environment and his obligation to protection the environment's healthiness;
- The establishment of principles of prevention and the one of polluting agent-payer, in order to encourage the promotion of technologies which are less polluting of transport, storage and elimination (destruction) of products or industrial wastes;
- The necessity to analyze the environmental impacts for any project and program of development;
- The increase of the energy provision while minimizing the negative impacts on environment and taking care of the respect of the environmental dimension (size) within the development of infrastructures;
- The diversification and the use of alternative sources of energy to biomass, in particular, the use of electricity;
- The respect of safety principles within the production, transport and distribution of energy.

The national gender policy, 2004

The national gender policy is incorporated within the context of the agenda of sustainable development adopted by the government an his articulated around tree following policies and strategies: the vision 2020, the national strategy of poverty's reduction and the policy of decentralization.

The main goal of the national gender policy consists of defining clearly the process of integration of issues linked to all the development sectors in order to (promote) make the promotion of equality and balance between sexes in Rwanda. A particular attention will be focused on the gender inequalities within the rural zones. So, specific problems to which rural women are confronted will be taken into account in an effective manner (way).

The national gender policy targets different priority's fields among which the environment sector, within this field, the defined objective by the national gender policy consists of ensuring that the size (dimension) gender be systematically and affectively taken into account within policies, programmed activities of environment protection and the management of natural resources. The strategies for the protection of environment tend to:

- Undertake actions which intend to integrate the gender idea within the laws concerning the protection of environment and the management of natural resources.
- Undertake measures which intend to ensure the effective participation of women and to the protection of environment and to management of natural resource.

Within the context of the implantation of this polvey, the role of each actor is defined in reference to the policy of decentralization where the execution role passes from the central administration to the local administration organs. The private sector will take care of the promotion of procedures of recruitment and (ensure) assure a work environment which takes into account the differences and inequalities of the gender. He will implement a policy which tends to develop the feminine entrepreneurship spirit.

The national policy of decentralization, 2000

The policy of decentralization has a global objective to assure the economic, social, administrative and technical habilitation of the local population to fight poverty, by its participation in the planning and management of his development's process.

The district is a legal entity having power to judge and be judged in count a his then considered as a local government. The province, the area and the quarter are political administrative divisions having as task the effective execution of governmental activities, both at central and local levels, together with the local community's development and the services' provision.

The creation of provinces and districts must respect certain criteria among others; the population number, the economic viability, the accessibility to public services and the environmental conservation.

The national forests' policy, 2004

The national forests' policy is concerned with the problem, related to forests, but also the ecologic and economic safety consisting of planting trees, that of forestry research, and forestry in all its forms (aspects) and that of reinforcement of capacities. It enables to orient the forestry towards the rural development in establishing a relation shop between the forestry and other actors in particular the beneficiaries. The objective of this policy consists of making the forestry as one of the key factors of the economy and the ecologic viability nation wid.

The vision of the forestry sector in Rwanda is that in 2020, the populations' requirements in wood and other forestry's resources be covered in terms of energy's production for domestic production. The sector will contribute effectively to generate the households' revenues, to the improvement of the human and cattle feeding, to the signification reduction of erosion of soils and to the improvement of fertility of agricultural lands. In order to materialize that vision, it is planned that the forestry coverage will reach at least 30% of the national territory and the agro forestry will be practiced on at least 85% of the family's agricultural exploitations.

The national energy's policy, 2004

The objective of this policy is to respond to the challenge and requirements in energy of the population of Rwanda for an economic and social development and this is done within the environmental context which is reliable and sustainable. More specifically, the energy's policy tends to:

- Make available a supplying in affordable and sufficient energy within all the country;
- Reform the market of energy services and establish an institutional appropriate institutional context, this one will facilitate the investments, the expansion of services, the effective price mechanisms and the inciting measures related to the financial aspect;
- Reinforce the development and use of energy's sources and technologies which are local and renewable;
- Take into account in an appropriate way the environment considerations within all the energy's activities;
- Increase the sectors (fields);
- Increase the education in the energy field and build a gender balance in the planning, the implementation and control of the energy sector.

3.2.2. THE LEGAL FRAMEWORK

There are many legislative and regulatory wording of law, which would guide one or several activities of the actual project, they mainly the following wording of law.

The constitution of the Republic of Rwanda

Adopted by the Rwandans during the Referendum of 26th March, 2003, it stipulates through different wordings of law the following message:

- Article 29. Each person has right to hold a private property, individual or collective. The private property, individual or collective is in violable. No one can make prejudice on it

unless there is a necessity of public interest, in the context and ways established by the law and in exchange of an equal and previous compensation.

- Article 30. The private property of soil and other real rights putting a strain to the soil granted by the government (state). An Act determines the acquisition, transfer and exploitation means.
- Article 31. The state property consists of the public sector and the private sector of the government together with the public sector and private sector of decentralized public communities. The properties of the public sector are inalienable except in case of their previous disuse in favour of the private concession of the government.
- Article 32. Each person is submitted to respect the public properties.
- Article 49. Each citizen has the right to healthy and satisfying environment. Each person has the right to protect to conserve and promote the environment. The government will take care of the environment protection. An Act defines the procedures of protecting, conserving and promoting environment.
- Article 190. The treaties and international agreements regularly signed and approved have since their making public within the official magazine, an authority superior to that of the organic laws and those of ordinary laws, under reserve, for each agreement or treaty of its execution by the other part.

The organic law related to the Environment, N°04/2005 of 8/04/2005

Published in the official magazine of 1st May 2005 (MINILAND, 2005) it contains several articles which are pertinent for the implementation of this project in particular:

- At the Article 7, paragraph 3, the organic law on payer. Thus, any physical or moral person whose the behaviors and activities damage or are able to damage the environment is submitted to a sanction or a tax (fine). He/she assumes, besides, all the measures of rehabilitation where possible.
- At the chapter concerned with human environment, the article 29 stipulates that the competent authority, in reference to the existing laws can not grant the construction permit in case the buildings tend to bring a prejudice to environment.
- At the Article 37, it is mentioned that the competent authority may take all the appropriate measures to let stop any kind of sound production able to cause nuisance to the health of human being, to constitute an excessive and unbearable discomfort to the neighbour hood or damage the properties.

At the level of the government's obligations, the local communities and the population, the Article 40 reminds that the public authorities, the private enterprises, the international institutions, the associations and the particulars must protect the environment at all the possible levels.

Concerning specifically the studies of impact on environment, the Article 67, stipulates that any project must include a study of previous environmental impact on the granting of each authorization of implementation. It is the same with programmes, plans and policies able to affect the environment.

Finally, the Article 80 related to the preventive measures stipulates that the building and agricultural, industrial, commercial or artisanal establishments or other furniture's, exploited or held by any physical or moral person either private or public should be constructed, exploited or used in the way to respond to technical principals into practice.

The law project related to the Housing

At the Article 34, it stipulates that the achievement of operation of housing development must the start after the compensation of proprietors (owners) or holders or after proving to the competent

authority the amount of compensation done in conformity with the legislation which is current concerning the expropriation.

The organic law related to the Land policy in Rwanda N°08/2005 of 14/07/2005

It determines the terms of use and management of land in Rwanda. It also fixes the principles to be applicated to the recognized rights on the whole lands located along the national territory together with any thing connected to it and which is incorporated to it, either naturally or artificially.

The Article 3, precise that the land is involved (included) within the common inheritance of all the Rwandan people; the ancestors, the presents and future generations. Not with standing the rights recognized to people, only the government (state) holds the distinguished related to the land's management along the national territory that it uses in the general interest of all in order to assure the rational economic and social development in a way defined by the law.

Related to this issue, only the government has power to grant the rights of occupation and use of the land, it also has the right to order the expropriation due to a public cause of public necessity, housing conditions, development (fixing up) of the national territory in the way defined by law against a fair and previous compensation.

The Article 4, mentions that any kind of discrimination, in particular the one focused on gender and to the use of land's rights is prohibited. The man and woman have the some rights related to the land's property.

Law's project on Electricity, 2007

This law's project is presently near being adopted and (published).

The Article 2, precise the extent of this law's project which will be referred to as « The Rwanda Law related to the Electricity ».It will enable the development and the improvement of the demand and connection of electricity in Rwanda and in respect of international obligations and of the promotion of the health, safety and welfare.

The Article 3, defines the objective which consists of establishing a legal context (framework) and provide a regulation of the electricity sector in Rwanda and this one geing within the goal of providing the Rwanda citizens with a service of high quality and at a reasonable (affordable) price. This law project will be applied to all the activities of the electricity sector involving the production, the transmission , the distribution, the procurement (supplying), the operating policy ,the international trade of electricity, the authorizations of construction and maintenance of systems and equipments the electricity consumption and the access to the demand of electricity.

The Act n°18/2007 dated 19/04/2007 related to expropriation due to a cause of public necessity

The quite new Act takes into account:

- The constitution funds related to the request of expropriation (set price);
- The funds of assessment of expropriation's compensation;
- The funds of payment of a fair compensation.

The competent authority together with the decision of expropriation due to a cause of public necessity are reserved to the Ministry in charge of land within its responsibilities (Ministry of Land, Environment Forests, Water and Mining) because the expropriation is to be dealt with in over one district (article 3, 4 and 5).

The examination are undertaken to fulfill (complete) the act referring to the demand's tariff which will be published by ministerial decree and which will be revised periodically. Meanwhile, a letter dated 27 October 2005 N° 2494/16.03/01.03 addressed to districts, towns and the city of Kigali proposes the alternative to proceed to the agreement between the expropriated and the expropriators according to the actual market (contract's) prices.

The article 16, precise that after the publishing of the last decision related to the expropriation due to a cause of public necessity, the competent land commission elaborates (draws up) an exhaustive list of owners and the persons holding right to land and to the achieved work on the funds. That list is displayed within a place which is to be reached by the public at the Office of the District, area and Quarter concerning the ground's location so that the concerned persons may become a ware.

The expropriation process can not extend a period of four (4) months stating from the date of decision – making related to the expropriation by the targeted organs at the article 10 of the present act.

The article 17 stipulates that the works of measuring and calculation of expropriation compensation are carried on in presence of proprietors (owners) or persons holding right or their representatives and the representatives of the local authorities.

The article 24 mentions that the fair compensation determined by the land's commission is deposited within a due time which does not exceed one hundred and twenty days (120) starting from the day of its determination, otherwise the expropriation is annulated and becomes without any effect.

The act n°47/1988 dated 5 December 1988 regulating the forest's organization policy.

It is applied to the whole Rwanda Republic. Its MAIN goal is the maintenance and development of planted with tree surfaces and the institutionalization of the nation land service. It distinguishes the national community and private forests it establishes the terms of their management and is actually near being adopted.

The article 64 precise that except for family consumption requirements any physic or moral person wishing to proceed to a partial or total cutting of trees or line's vegetation with the state's forestry concession, national or private, superior to 2 ha, must be holding a permit of cutting trees provided by the Minister having authority on the forests or his representative.

The article 70 launches a tax of 1% on the product derived from that cutting which was operated within the forestry exploitations which are both national and private of over 2 ha called ''Tax for National Forestry Funds for the benefit of the funds. This tax is not applied to the products oriented to the family national consumption or to philanthropic actions.

The other relevant articles to that study of electric interconnection are particularly:

- The article 71: The request for the obtaining of the cutting of the tree permit is addressed to the competent authorities under care of, if the case arises, the owner of the forestry property.
- The article 73: The cutting of tree permit must be kept during the operations of tree cutting and presented to any requisition of the competent authorities.
- The article 75: Any clearance of a forest or a land of grounded forestry is submitted to a permit of clearance. The application for the obtaining of a clearance permit is addressed to the Minister having the forests within his responsibilities or his representative

3.2.2.1. THE INTERNATIONAL AGREEMENTS AND TREATIES

Rwanda has signatory of international treaties and agreements of which the most important at the environment level are the following:

Tableau N° 3. INTERNATIONAL AGREEMNTS RATIFIED BY RWANDA

Agreement/Conventions	Date of signature Date de signature	Date of ratification Date de ratification
Agreement on the biological diversity	10/06/1992	18/03/1995
Agreement - Context of the United NATIONS on the climate changes	10/06/1992	18/08/1998
Agreement related to the fight against desertification	10/06/1992	22/10/1998
The agreement Vienna on the protection of the ozone layer		6/12/2002
Agreement of Ramsar related to humid zones of international importance particularly the wild housing	1971	6/6/2003
International Agreement for the trade of the species in the process of disappearance (IATSPD)	20/10/1980	18/01/1981
Conservation Agreement of the animals of the migrating wild species (CMS)	23/06/1979	06/06/2003
African Agreement on the nature conservation and natural resources	15/09/1968	20/05/1975

These treaties and international agreements are relevant for the protection and the conservation of the environment and in particular the biodiversity in Rwanda together with the mobilization of funds as well at the bilateral and multilateral level.

3.2.3. THE INSTITUTIONAL FRAMEWORK

3.2.3.1. INSTITUTIONAL ENVIRONMENT'S ACTORS

The Ministry of land, the Environment, the Forests, Water and Mines (MINITERE) is in charge of the legal policies and contexts within these fields. It must ensure the perfect of electric interconnection with the legal policies and contexts undertaken with the fields of its intervention.

The Rwandan Office for the Environment Management (ORGE) is the main organ of control, follow-up and evaluation of the integration of the environmental aspects in all the programs of development. It inspects and approves the studies reports of impact of environment on all the socio-economic activities fields submitted by any entity.

Moreover, he ensures the follow-up and the assessment of the development programs in order to control the respect of the environmental standards in the planning and the execution of all the projects of development, including those which are already undertaken and those that are able to have significant impact on the environment.

For this project, he will contribute to the acquisition of a compliance certificate to the organic Law related to the environment. The obtaining of this certificate requires a study of the environmental impact approved by the office.

The Ministry of Agriculture and Farming (MINAGRI) has the task of ensuring the agricultural and farming development's promotion at the national level. Within this project, he will accompany the programmes of relocation of households affected by the electric line's opening up. In reference to his intervention's fields of activities.

The Rwandan Office of Tourism and National Park is in charge of promoting the tourism industry in Rwanda and conserving the fauna and flora savages. Its tasks are related to:

- To ensure the tourism promotion;
- To preserve and protect the environment in the tourism's areas;
- To advise the government in the tourism's field and the protection of the tourism's areas;
- To determine the tourism sites and to propose the classifying of buildings which are of historical interest, intellectual, archaeological, cultural or tourist.

Within the framework of this project, he will intervene in the conservation of fauna and the flora savages (particularly those from humid zones) and the sites of tourist interest.

The Ministry of Gender and Family Promotion (MIGEPROF) plays a key role in the promotion of the equality and equity between sexes within the process of Rwanda's development and the reinforcing of the women's empowerment with all the field of activities. Its intervention with this project will be focused on the integration of the gender aspects within the programmes of the project in conformity with the political and legal context undertaken.

The Ministry of the Local Administration and social Affairs (MILASA) plays a role of first importance within the policies and the legal programmes of decentralization and community's development. It plays a great role inn the facilitation between local administrative entities with the structures of elaboration of program of this project together with the integration of the project's components within the community's development within the zones served by the project. This concerns more particularly the programmes of sensitization of the population the relocation of residences to be expropriated and the rural electrification.

The Local Administrative Authorities (the city of Kigali, Districts and Areas) have a role of intervention is multidisciplinary at the local scale. They play an important role within the sensitization and relocation of residences which are found within the ascending of the electricity line together which the programmes of rural electrification.

The Non governmental Organizations work together with the communities, either in the national or international context. They play an important role in the sensitization of the communities affected, within the relocation programmes of the population and the programmes of rural electrification. During the consultations with the local and public authorities in general, two groups of national (local) NGOS have proved a representation at national level and within several fields of activities of the community's development. We refer to the Board of Meeting of the Organizations Supporting the Basics Initiatives (BMOSBI) and the group of Rwandan Organizations for the Promotion of Woman, peace and Development (Pro woman - Twese Hamwe).

3.2.3.2. ORGANIZATIONS RESPONSIBLE FOR THE COMPENSATIONS

About the organizational plan, the Ministry in charge of Lands as aimed in the Decree - Law of 1979 is actually the Ministry of Lands, Environment, Forests, Water and Natural Resources. The latter is in charge of evaluating the property relating to built things, land and farming and becomes active at the time of the operations aimed at informing the population and of the follow-up of the expropriations.

To that effect, the land reform, in coherence with the decisions relating to decentralization, should confirm the pre-eminent role of territorial communities in the management of land matter either in urban area or in rural area. The payment of compensations will be done by the Government (Ministry of Finances) and will be followed up by the Ministry of Infrastructure and by the local authorities.

According to the terms of the Decree - Law of 1979, the lands (or land) are only eligible to compensation when they are registered (article 19). On the other hand, exploitations on those non

registered lands may be eligible to compensation ("constructions, plantations and other things carried out on the registered or non registered land", article 19).

The Decree - Law of 1979 (article 14, paragraph 2 and article 19, paragraph 2) also provided for supplying the tenants affected by expropriation with a rehousing land in case they do not own any other land. Nevertheless; the amendments proposed and presently discussed by the Parliament go back to this clause by replacing the supply of a rehousing land by compensation in cash that is equivalent to the investment value.

The expropriation procedure in force in Rwanda comprises successively following stages:

- An expropriation request issued by MININFRA is transmitted to the Ministry of lands. If this one accepts the request, it must issue an order about expropriation request. It is this order that suspends constructions in the expropriation area;
- An expropriation plan is established. Its decree-law determines the content that is submitted to a public inquiry for thirty days in the concerned districts;
- The next stage consists of conducting a real estate survey having the objective of making on inventory of all the rights and all the beneficiaries;
- On the basis of the public survey and the real estate inquiry, a public notice is issued, either trough a presidential decree or a ministerial order from the Ministry in charge of Local Administration, and the expropriation is made enforceable.

The Ministry of Infrastructure (MININFRA) is in charge of policies and legal frameworks in the domain of infrastructure development on national level. It intervenes in the development of interconnection electric lines as well as in the programs of rural electrification. It takes care of the orientation and the conformity of project activities with the policies and legal frameworks in force in the energy sector.

ELECTROGAZ is the national utility in charge of the production, transport and distribution of electricity and water. So, it plays a key role in the setting up and in the management of infrastructure relating to the high voltage interconnection electric lines and in the programs of rural electrification. It also intervenes in the domains of equipment distribution, fixing tariffs and equipments maintenance.

3.2.3.3. THE INSTITUTIONAL ACTORS OF THE ELECTRICITY SECTOR

The Ministry of Infrastructures (MININFRA) is in charge of the policies and legal contexts within the field of development of infrastructure nation wide .It Intervenes within the development of electric interconnection lines also within the programmes of rural electrification. It takes care of ensuring the orientation and the conformity with the activities of the projects in relation with the legal policies and the context within the energy's sector.

Electrogaz is the national company which is in charge of the production, transmission, and distribution of the electricity and water. It plays a role of first importance in the implementation and management of the interconnection infrastructures of the electric lines of high voltage and within the programmes of rural electrification. It intervenes within the sectors of distribution, tarification and maintenance of the equipments.

3.3. INTERNATIONAL FUNDERS POLICIES, PROCEDURES AND GUIDELINES

3.3.1. AFRICAN DEVELOPMENT BANK

The environmental and social policies of the African Development Bank were developed over the years and evolved to support the main objective of the Bank to provide assistance to African Regional Member Countries in their economic and social development. To reach this objective, the Bank will ensure that environment and gender issues are mainstreamed in each broad sectoral area and in a fully participatory manner.

Policy on the environment, 2004

The environment policy framework has been anchored in the concept of sustainable development and recognizes that economic growth will be the main engine of growth in Africa, and will aim to ensure its sustainability by preserving and enhancing the ecological capital that nurtures such growth.

The policy sets out the broad strategic and policy framework under which all Bank operations will henceforth be made. The traditional sector-by-sector approach in the management of natural resources has been replaced by cross-sectoral environmental policy actions based on an integrated approach where the participation of a wide spectrum of stakeholders in protecting and managing the environment is essential. In addition, the policy has the goal to strengthen existing environmental assessment procedures and develop new environmental management tools.

Involuntary resettlement policy, 2003

African Development Bank has put involuntary resettlement policy in place and this covers involuntary displacement and resettlement of people caused by a Bank financed project. This policy applies when a project results in relocation or loss of shelter by the persons residing in the project area, assets being lost or livelihoods being affected.

The primary goal of the involuntary resettlement policy is to ensure that when people must be displaced they are treated equitably, and that they share in the benefits of the project that involves their resettlement. The objectives of the policy are to ensure that the disruption of the livelihood of people in the project's area is minimized, ensure that the displaced persons receive resettlement assistance so as to improve their living standards, provide explicit guidance to Bank staff and to borrowers, and set up a mechanism for monitoring the performance of the resettlement programs.

Most importantly, the resettlement plan (RP) should be prepared and based on a development approach that addresses issues of the livelihood and living standards of the displaced person as well as compensation for loss of assets, using a participatory approach at all stages of project design and implementation.

Compensation at the full replacement cost for loss of lands and other assets should be made before projects implementation. The improvement of these living standards should also apply to host communities. In addition, the needs of disadvantaged groups (landless, female headed households, children, elderly, minority ethnic, religious and linguistic groups, etc.) must be at the centre of the development approach.

Economic benefits and costs should be applied to determine project feasibility with regard to resettlement. The full costs of resettlement activities necessary to achieve the objectives of the project should be included in the total costs of the project. The costs of resettlement like the costs of other project activities are treated as a charge against the economic benefits; and any net benefits to resettles (as compared to the "without-project" circumstances) should be added to the benefits stream of the project.

Economic and social considerations should be taken into account in determining the requirements for compensation. Under the present policy, only displaced population having formal legal rights to land or assets and those who can prove entitlement under the country's customary laws are considered and will be fully compensated for loss of land or other assets. However, a third category of displaced persons who have no recognizable legal right or claim to the land they are occupying in the project area will be entitled to resettlement assistance in lieu of compensation for land. Land, housing, and infrastructure will be provided to the adversely affected population, including indigenous groups, ethnic, religious and linguistic minorities, and pastoralists who may have usufruct rights to the land or other resources taken for the project.

The developer will be required to prepare a full resettlement plan (FRP) for any project that involve a significant number of people (200 or more persons) who would need to be displaced with a loss of assets, or access to assets or reduction in their livelihood.

For any project involving the resettlement of less than 200 persons, an abbreviated resettlement plan will be produced. According to the Bank's disclosure policy and the Bank's Environmental and Social Assessment Procedures (ESAP 2001) a full resettlement plan and the abbreviated resettlement plan should be posted in the Bank's Public Information Center (PIC) and the Bank's web site for public review and comments.

Gender policy, 2001

The goal of the policy is to promote gender equality and economic and social development in Africa. Gender is singled out as a priority cross-cutting issue which must permeate all Bank operations and the Bank has to work closely with Regional Member Countries to mainstream gender and promote measures that will lead to the empowerment of women. The focus of the policy is on gender equality as a development goal rather than on women as a target group.

Integrated environmental and social impact assessment guidelines, 2003

The major objective of these guidelines is to provide reference material to the staff of the Bank and Regional Member Countries on how to adequately consider crosscutting themes while assessing the environmental and social impacts of a project. Moreover, the guidelines can greatly assist in the project design, as many potential adverse impacts can be avoided or mitigated by modifying or adding certain project components to the initial design. As well, improvements in the project design can enhance several beneficial impacts at a minimal cost.

Appendix 8 of the guidelines is related to the specific sector of hydropower production, transportation and distribution and includes the typical environmental and social issues to consider in the description of the project environment, and the most frequent potential impacts and enhancement/mitigation measures that should be integrated as early as possible, preferably in the project design.

3.3.2. WORLD BANK SAFEGUARD POLICIES

The World Bank Resettlement Policy Framework (OP 4.12 and BP 4.12) is usually applied for projects that require international financing. The World Bank OP 4.12, Annex A (Paragraphs 17-31), describe the scope (level of detail) and the elements that a resettlement plan should include. These include objectives, potential impacts, socio economic studies, legal and institutional framework, eligibility, valuation and compensation of losses, resettlement measures, relocation planning, community participation, grievance redress procedures, implementation schedule, costs and budgets, and monitoring and evaluation. This report conforms to the WB policy requirement on contents and structure. In the following the most relevant paragraphs from the policy is listed.

WB OP 4.12.(6a) demands that the resettlement plan includes measures to ensure that displaced persons are (i) informed about their options and rights, (ii) consulted on, offered choices among and provided with technically and economically feasible resettlement alternatives, and (iii) provided prompt and effective compensation at full replacement costs

WB OP 4.12 (8) requires that particular attention should be paid to the needs of vulnerable groups among those displaced such as those below the poverty line, landless, elderly; women and children and indigenous peoples and ethnic minorities.

WB.OP 4.12 (13 a) stipulates that any displaced persons and their communities and any host communities receiving them should be provided with timely and relevant information, consulted on resettlement options and offered opportunities to participate in planning, implementing and monitoring resettlement.

WB OP4.12 (12a) states that payment of cash compensation for lost assets may be appropriate where livelihoods are land-based but the land taken for the project is a small fraction (less than 20%) of the affected asset and the residual is economically viable.

WB OP4.12 Para (6 b & c) state that in case of physical relocation, displaced persons should be (i) provided assistance (such as moving allowances) during relocation; and (ii) provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.

In addition displaced persons should be offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; and provided with development assistance in addition to compensation measures such as land preparation, credit facilities, training, or job opportunities.

WB OP4.12 Para 13 (a) requires that appropriate and accessible grievance mechanisms are established to sort out any issues arising.

The World Bank's Operational Policy on Environmental Assessment (WB. OP 4.01 - point 14a and b) prescribes that public consultation is carried out at least 2 times, after environmental screening or during the process, and after submission of the EIA.

4. THE MEASURES OF CONSULTATION OPERATED

4.1. THE COMMUNITY'S CONSULTATIONS

Within the context of project of interconnection a socio – economic survey has been initiated among the communities affected by the project .This study aimed to enable the quantification of the socio- economic conditions of the communities within the zones of the project. A questionnaire has then been carried out in order to collect the data and the public consultations have been done among the concerned communities. The socio-economic questionnaire and the communities wish are presented in enclosure N°1. The reports of consultancies achieved by the consultants in Burundi and Rwanda are respectively found in enclosures 2 and 3.

Burundi

In Burundi, communities concerned by the project were consulted by the intermediary of the assistant managers of sectors who provided various socio-economic data on communities and reported the main preoccupations of their communities as well as the various reasons for wishing of access to electricity. Fifteen representatives were thus met for the villages indicated to the table 4. The names of the people met are in appendix 4.

Tableau N° 4. LIST OF VILLAGES-COMMUNITIES CONSULTED IN BURUNDI

Province	District Commune	Villages/sous-collines
Bubanza	Musigati	Non consulted due to insecurity Non inventorié pour cause d'insécurité
Kayanza	Muruta	Ruharo
	Kabarore	Bambo, Cagula, Cewe, Kabatwa, Kirehe, Mugera, Munege, Nyamabuye, Nyamisagara, Nyarubuye, Rugerero, Rusebeyi, Rutega, Ryamukona, Sakariro, Shorero Wabicobogo Wanteko

R
wanda

The consultations with the communities have been made through different public assemblies (gathering) with the population within their villages « imidugudu ». Most of the meetings have been done within the shopping centers or within the primary schools according to the recommendations of the chief of the village.

The goals of the public consultancies were those of several aspects among others:

- To inform the public on the project and particularly the persons who would be potentially affected by the project;
- To collect the requirements, priorities of the populations bordering an implantation site of the project and their reactions on the project;
- To identify the preoccupations of the population and the acceptance of the project.
- Promote the public cooperation and that of the bordering communities to different phases of the project's achievement.

After the presentation of the project, the population was invited to express its different questions and/ or its preoccupations on the project.

In total, an audience of 522 persons has responded to the consultancy of communities among them 30.9 % are women. The importance of the audience per district relied on the number of villages crossed by the ascending of the electric line within each district. The majority of the audience was composed of farmers and breeders. The other professions were also represented: bricklayers, carpenters, teachers etc. The details related to the audience per district are found within the following table. The list of persons who were (consulted) contacted was found in annex 5.

Tableau N° 5. RWANDA/ LIST OF VILLAGES-COMMUNITIES CONSULTED IN

Province District	Villages "Imidugudu"	Nb of people presented Audience	Women Femmes %
Ruhango	Kigimbu, Gasharu	26	50
Nyanza	Kigufi, Butara, Kirambo, Marongi, Gitare, Kibaza, Bayi, Kibaza, Nyarutovu, Kigufi, Butara, Kirambo, Gasharu, Buhaza, Migina, Rwimpudu	190	34,2
Huye	Kigali	13	15,4
Gisagara	Nyarubare, Kaduha, Rusenyi, Kibarama, Agahehe, Janja, Gitozo, Murama, Kabahizi, Kabagagi, Nyesonga, Umubezi, Ruhangaye, Umugobe, Karambo, Nyaburondwe, Kigarama	265	24,9
Nyaruguru	Karambo, Umugobe, Ururambo	58	39,7
Total		552	30,9

4.2. CONSULTATIONS OF HEADS OF VILLAGE

Burundi

As it was mentioned at the previous point, the representatives of the basic communities, the heads of the sub-sectors, were consulted within the framework of this project. Moreover, several authorities, leaders and representatives of the municipal authorities were also consulted. The list of the consulted people is in appendix 6.

Rwanda

Previously referring to consultation among the communities, the consultations have been carried on at two levels in Rwanda:

- At central level is among the resource persons having on skill (a valuation) in are of the other field concerned by the study (land policy, the forestry, environmental, energy's field of activity etc.
- At the level of decentralized structures: the local administrative authorities have been consulted from the level of the province, district until the areas particularly within the zones which will be affected by the ascending of the electric line.

The consultations have taken the form of conversations or that of focus group conducted within all the provinces, the districts and the areas.

The authorities and experts consulted hold various services particularly: the Mayors (districts), the Executives secretaries (provinces, districts, areas), planning , social affairs, agriculture and farming, infrastructure development, conservation of land titles, the good governance, the energy, human resources, economic affairs and development. The details related to the consultations of community leaders are found at the appendix 7.

4.3. HOUSEHOLDS SURVEY

A socio-economic survey has also been initiated among the households living or having (holding) properties (infrastructures) within the zones of the project. The data collected must help to identify the impacts and to propose alleviation measures including a programme of relocating and compensation of the persons affected. See in chapter 5 the details on households characteristics In Rwanda and Burundi.

4.4. CONCERNS AND ISSUED RAISED

Burundi

In order to have a precise idea about the way in which questioned persons have received the project, two elements in the questionnaires (aimed at the chiefs of villages and at the affected households) have been analyzed. On the one hand, the concerns of the visited households have been synthesized and, on the other hand, the answers provided by the community representatives about the question relating to the reason for electricity demand have also been studied in detail.

Generally, the visited households and chiefs of villages look at the project with approval as for as this project allows them to benefit from electricity. Furthermore, households and chiefs of villages have particularly insisted on getting fair compensation for the relocalization, the loss of land or crops because of the project.

Rwanda

In Rwanda, the consultations that have been done with local authorities and communities have shown similarities about expressed concerns and comments. The main problem seems to be linked to the land shortage in almost all the visited administrative entities. Among the lawsuits received by the local administration, the most mentioned ones are the lawsuits linked to land concerns. The concerns noted at the time of the consultation are described in detail in the Table 9.

Tableau N° 6. CONCERNS AND ISSUES RAISED FROM CONSULTATIONS ACTIVITIES IN BURUNDI AND RWANDA

Component	Issues and concerns
Compensation measures for loss of land, properties, income, etc.	A preoccupation of legal reference has been expressed by the authorities of the Ministry having the land in its responsibilities, the authorities of the provinces and districts. The recent legal document is dated 1996. It consists of a ministerial decree n° 1808/1185 of 22/4/1996 wich fixed the tariff of the compensation rate to the expropriation due to a cause of public necessity. It was planned that this decree should be applied within all the18 months and during the consultation it was without any use. As an alternative, we refer to that decree in applying the double of the tariff for the leasing (renting) and 10 times for the sale. Besides, specifically for the rural are (the new act of expropriation was either not yet promulgated), a letter dated 27 October 2005 n°2494/16, 3/01, 03 addressed to district, the city of Kigali proposes to proceed to an understanding between the expropriated and the expropriator according to the actual market price. Most of the authorities consulted are not yet aware of that letter. The communities have said that the lands are small, rare and expensive. They ask if where they will find the land any more. They have expressed the wish to be compensated the earliest possible and at satisfying rate in order to enable them to buy (purchase) lands and reconstruct. In case the compensations will take a long period of time, their properties, will be recounted because the value of lands and properties (assets) vary each year. The population is also wondering if the banana trees and trees cut will be compensated by the land surveyor's during the line indication. Very often, problems arise at the stage of compensations' payment; the population has wished that the compensations should be paid to the atraight holding rights.
Displacement and resettlement of people	The local authorities and leaders of communities have said that the policy of the government is the promotion of the gathered housing called « Umudugudu ».The authorities should be implicated in order to find a place of relocation of the affected population. In collaboration with that population, it should be preferable to pay them the balance of the compensations related to expropriation after having constructed houses or find for them new plats. The main preoccupations of communities related to the relocation are in particular: Be transferred towards another location to which they are not familiar, probably (undergoing) running the risks of being settled within the zones which is inoculated against malaria or near swamps or flooded zones. The lands are not yet fertile and should regularly during the manure. In case of resettlement for from their lands ,it will be difficult to put the manure on their remaining lands and there is the risk of theft within their fields They are tired to reconstruct particularly the former refugees newly resettled. They need more explanations and facilitations. Certain persons have said that they will not support the physical destruction of their houses if the case arrives. In case they are provided with houses constructed for them, it should be better to construct them nor for from the rood and from the new electric line so that they can benefit from the development arriving in their region. Other persons say that the electric cables are aerial and wonder why these cables will be exploited while the people will be relocated (transferred) to another place. The relocation may disturb their farming and feeding activities or lead to starvation if there is no helping measures.

Component	Issues and concerns
Job opportunities	Within the context of the poverty reduction, the government supports the initiative and the project of high voltage (intensity) undertaken. All the authorities have wished that the project should contribute to create jobs in rural areas and to augment the purchasing capacity of the population and lighten the poverty effects. All the population encountered has expected the job creation from this project. The professional persons having shown their expectations for jobs are particularly the brick layers, the welders, the carpenters. They have shown hostility towards other projects which do not recruit the local labour and consequently the affected population does not benefit from the project.
Social disruption	Certain person encountered has expressed their regret to the transfer of some (certain) households who have been found within the ascending although they live together within many years. They have also mentioned the disintegration of families whose certain members will be obliged to be transferred far from their own extended households.
Access to electricity	The consulted local authorities find a solution in this project to solve the frequent problems unballastings because of the deficit of power. It is also a hope to make operational the planned projects relative to the agricultural transformation and to honour promises given to the population with the gathered housing. The access to sufficient energy and new connections was largely mentioned by all the authorities met. -Agricultural projects of transformations and livestock products are in progress and the great noted constraint was the availability of energy : Rice husking Unit (Nyanza and Gisagara), development of hotel trade and settlement (Nyanza), Nyanza Olympic Stadium (Nyanza). - The other infrastructures which will benefit from the project are the offices of the areas and certain districts and the markets, the agglomerated housings, the prisons, the military barracks. The policy of housing construction in rural areas consists of moving from the isolated housing to the agglomerated one. The availability of the electricity is one of the attracting factors of the population to the agglomerations which will be the roles of development in rural area. The consulted population expressed its whole support for the project if there are rural connections. Thus the project will enable them to leave the enclosing and the darkness..
	The population has expressed a quick need in electricity in order to facilitate the conservation of agricultural perishable products and also the milk products. A particular accent was (put at) focused on the markets and other trading centers in order to colder the drinks for sale. However, the costs of electricity are very high and have required a reduction of the consumption price adapted to their capacity of purchase. The access to electricity will enable them to be developed in the same way as the urban, to leave the enclosing and the obscurity. However, the population is wondering if everyone will have access to electricity.
Integration to other projects	The provincial authorities and those of districts have strongly emphasized the importance of the projects of development of planned infrastructures. The infrastructures consisting of attracting the population to live in villages are particularly the electricity, roads, water conveyance, the schools and health facilitations. The axis of low altitude starting from Ruhango-Ntyazo - Gikongo-Ndora and Gisagara constitute an axis already wedged in and which will be in the future a pole of transformation of the agricultural products (rice, corn, tomatoes, cassava) According to the Executive Secretary of the District of Nyanza, connection in electricity will be integrated into other projects of water piping, development of the infrastructures of transport, and regrouping population in villages.
Health and safety	The authorities have expressed their preoccupations on the risk of electrocution

Component	Issues and concerns
	accidents in case the population is not educated on the risks and the dangers that represent the electric power. The population contacted has expressed a need of being protected against short circuits and the over voltages. It has required an education and a large sensitization so as to be protected against the eventual accidents linked to electricity. It wonders if in case of eventual accidents for both properties and persons, who will bear the responsibility. Will there be insurance? An example may be linked to a strong rain which may let the towers and cables fall and consequently cause damages.
Division of land	The communication having no sufficient lands are preoccupied by the dividing up of their lands. The divided lands loss their worth and at that moment they would wish to take into account all the lands from the household which the lands' surface which are involved within the ascending and superior to the residence's land.
Population sensitizing	The consulted authorities think that the project will be a main asset to sensitize the population to the ' 'gathered human settlement ' ' program. They are trustful that the rate of gathered human settlement will increase along the axes of rural electrification. The other programs which will be facilitated by the project are the objectives of the durable development, the vision 2020 and the strategy of poverty reduction, as well as other programs of Community organizations development.
Education improvement	Rwanda launched a program "one computer laptop one student" and another program of distance learning. The provisioning of electricity for the secondary and primary schools will contribute to the effective application of these programs especially in the zones which had not electricity. So, this will improve the quality of teaching, the development of the ICT (Information Communication and Technology), tuition by correspondence and education for all.

5. ENVIRONMENT BASELINE CONDITIONS

5.1. PHYSICAL ENVIRONMENT

5.1.1. CLIMATE

Burundi

The zone of study is mainly located within the natural region of Mugamba and for a smaller part in the area of Buyenzi, The area of mugamba is marked by a climate of high altitude which is sufficiently cold mainly during the dry season where over 2000m of altitude negative temperatures are registered. The average temperature varies between 15,8°C(recorded at Rwegura, at an altitude of 2,320m) and 18°C. The rainfall is relatively abundant and is over 1,600mm as an annual average. The zone is marked by two great seasons: a rainy season from October to May and dry season from June to September. These climatic conditions (high rainfall and less temperature) in tropical mountain's zone favors this environment as a privileged place for the formation of "shadow" forests.

The natural area of Buyenzi is characterized by an average altitude ranging between 1 500 and 1 900 m, a wet tropical climate with an annual average pluviometer included between 1 200 and 1 500 mm. The average temperatures are between 17°C and 20°C, the greatest variations in temperature appear in dry season.

Rwanda

In Rwanda, the study area is located in the country's southern extremity and extends from Kigoma within the district of Ruhango in the Southern Province, until reaching the border with Burundi on the high part of Akanyaru.

The climate of the zone of study is always of tropical type, temperate by altitude with an average temperature of 19°C and an annual rainfall which varies between 900 and 1 600 mm.

There are two rainy seasons alterning with two dry ones. The main rainy season begins in mid-February and ends in late May. The minor rainy season begins in mid-September and ends in mid-December. The main dry season runs from June to mid-September and the minor one from mid-December to mid-February

Precipitations vary from the north to the south. Precipitations analysis of the weather station of Byimana located close to Kigoma for the period of 1959 to 1990 and that of the Aerodrome of Butare (1967-1990), located in the south do not prove any difference of annual average precipitations, that is to say almost 1 230 mm per year. Precipitations have two annual peaks of which the most significant is that of April and the other less significant in November. The month of July is the period with the least amount of rain (see fig 3).

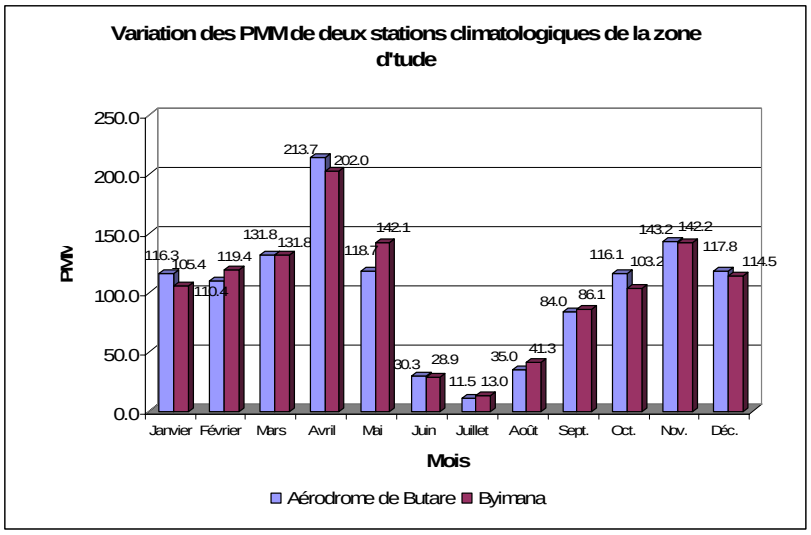

FIGURE 3. AVERAGE TEMPERATURE, RWANDA

The average annual temperatures in that region are similar to the ones of the central high plateau, between 19°C and 20°C and that of a daytime amplitude situated between 10°C and 12°C for a great part, but they may fall around 15 to 18°C with an amplitude which is less than 10°C for the riversided zones of the high land.

5.1.2. GEOLOGY, TOPOGRAPHY AND SOIL CONDITION

Burundi

Geology

The geology of Burundi comprises four great unities that are from the most recent to the most ancient:

(i) The Cenozoic formations and Quaternary formations;

(ii) The Malagorasian which corresponds to the high Protezoic and which comprises rocks of weak metamorphism;

(iii) The Burundian which constitutes the middle protezoic belongs to the Kibari's chain:

(iv) The "Archean" formed by "migmatites", gneiss

The zone of influence of the line is in Burundien, or super group of Burundi, which occupies the major part of the country. It is made of sedimentary rocks with high metamorphism and contains basic and ultrabasic rocks. In the part of the municipality of Musigati which is in the western slope of the Congo-Nile ridge, it is rich in granitic and basic intrusions and where we find sedimentary rocks with pelitic prevalence.

Topography

The relief of the part of the area of Mugamba is broken including the Congo-Nile ridge and its slopes. The part crossed by the line in the area of Buyenzi is characterized by relatively weak slopes and marshes irrigated by rivers and brooks: Mwogere, Kayave and Kanyaru which make the limit between Rwanda and Burundi.

Soils

The soils of the zone consist of kaolisols, ferrisols and ferralsols. The soils crossed by the line in the municipalities of Kabarore and Muruta are anthropic ferrisols clayey and improved by frequent ploughings and the organic contributions. These grounds have a very good productivity. However, the strong slopes on which they are subjected to intense erosion.

Rwanda

Geology and Soil

The region is dominated by granite and gneiss formation. The dominant soils drift away from the alteration of these two geologic formations. Concerning the part located in the south, schisto-quartzite formations and sand stone formations are dominant, having some intrusions of granitic formations towards the border with Burundi.

The disorganization of drainage due to tectonic movements of pleistocene has provoked the formation of flat alluvial bottoms in the steep-sided valleys which are actually exploited. They are composed of alluvial deposits and “colluvians” resulting of the erosion. Their soils are generally varied (silted sanded clay, etc.) We find here colluvial and alluvial deposits associated with the great swamp of the Akanyaru which is located in the east.

Collinary soils of the granitic part of the northern zone derive from alteration products oft the granite and gneiss with some compacted and rounded parts shown on the surface which have rested to the erosion, on the tops of “collinary” granitic banks. The southern part, starting from Gisagara is composed greatly in soils derived from the alteration of “schist” formations, of sandstone and “quartzite”. The soils is generally deep, having lateric stratum of high agricultural potential. However, due to the over exploitation of these soils and without application of protection measures, the soils have recorded a high erosion of the arable stratum with the progressive loss of their original agricultural potentiality.

Topography

Le Rwanda is subdivided into three altitude zones:

The zone of low altitude inferior to 1.500 m which cover all the Eastern part of Rwanda; it extends from the Akagera national park, the Umutara until Bugesera passing by Gisaka.

The zone of average altitude (1500m- 1900m) which is located from part to another of lands of the Congo-Nil ridge.

The zone of high altitude, higher than 1.900m including the high lands of the Congo-Nil ridge and the high volcanic land.

The natural environment in the Rwandan part is also characterized by a relief of central plateau. It is about a landscape of hills whose average altitude undulates between 1 500 and 1 800 m while minimal rise is 1 407 m on the level of the marsh of the Nyarwambu river, close to the ex-station of ISAR Songa. The hills are intersected with swamps often marshy. There we can find little space of natural vegetation, the whole zone is occupied by food crops or cash crops like coffee trees on the hills and some afforestations.

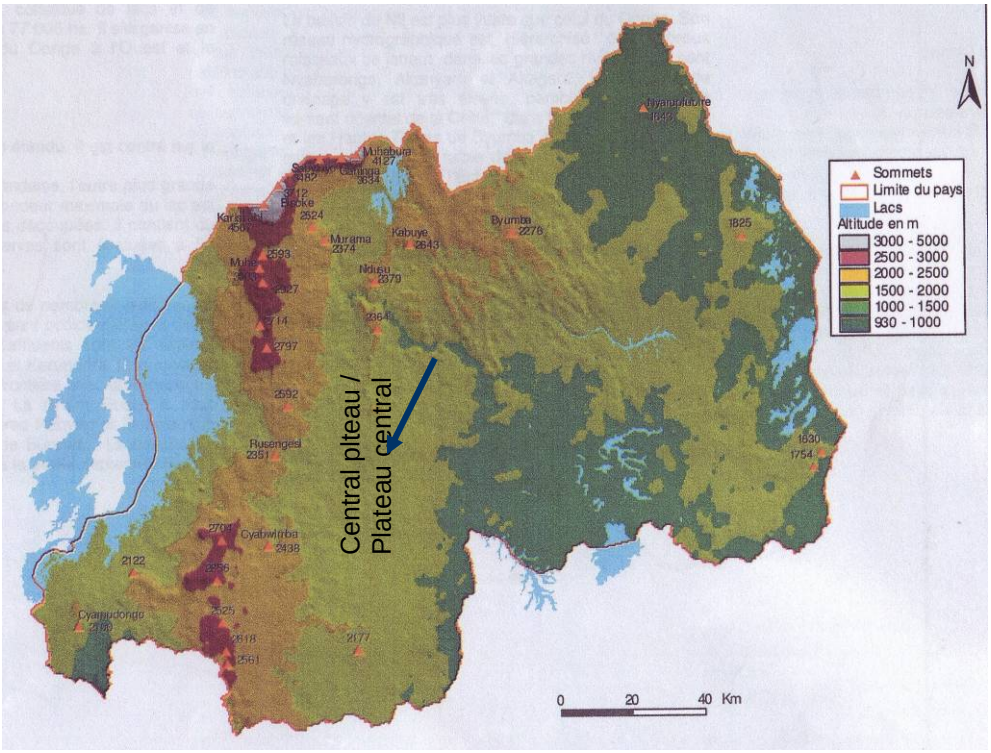

FIGURE 4. MAP IN RELIEF OF RWANDA

5.1.3. SURFACE AND GROUNDWATER RESOURCES

Burundi

The line crosses three districts, and particularly the Muruta and Kabarore districts, swamps irrigated by rivers and streams which, for must of them, have their source on the Congo Nile crest, especially in the natural forest of Kibira. The main ones are the Gitenge river in Muruta district that supplies the lake of the Rwegura dam, the most important hydropower plant in the country. The Mwogere, the Kayave and the Kanyaru that forms the border between Rwanda and Burundi are the main rivers crossed by the line in the Kabarore district.

The region of the Congo-Nile ridge is of first importance for the hydrologic balance of the country. Indeed, it is the source of all the waterways and rivers of the Congo watershed and of many waterways and rivers of the Nile watershed. It requires a great protection and people estimate that the destruction of the ecosystem of the Kibira forest would cause catastrophic consequences on the hydrologic regime of many waterways and rivers of the two watersheds.

Several waterways are captured and developed for drinking water supply of the population however the needs remain important.

Finally, we have to mention the storage reservoir of the Rwegura dam, on the river Gitenge, which supply the most powerful hydroelectric plant of the country. Its watershed is greatly protected by the forest of Kibira, but there are risks of silting up as we observe progressively the surrounding natural lands and hills being used for agricultural purposes, even within the zone which is supposed to be protected.

Photo 1. Rwegura reservoir

Rwanda

The analysis of the conditions that favour hydrology, particularly the geomorphological and climatic factors show that the granite outcrop area has a very low aquiferous potential. This area is confined to the eastern side of the central plateau to the northern part of the study area, from Kigoma to one part of the Nyanza district. On the other hand, the schizo-quartz substratum part presents a great aquiferous potential and it is exploited by bordering communities. On the whole, there has been an inventory of 43 water courses that are associated with the largest swampy areas (Table 10). Upstream from water courses and small affluent in that part, we find springs which, being fitted out or not, are largely used by the population to satisfy their consumption needs, to water cattle and to irrigate rice plantations and vegetable farming. The other source of water supply for the population in this zone is done by public drinking fountain and gravitating adduction particularly for the urban centers (MINITERE, 2004). The flow of these rivers is permanent for all the year with a reduction in the flow in period of great dry season.

Tableau N° 7. STEAMS AND RIVERS ASSOCIATED TO WETLANDS IN THE STUDY ZONE, RWANDA

District	Area / Secteur	Steams and rivers / Cours d'eau
Ruhango	Ruhango	Gisuma
Nyanza	Kigoma	Rukiri, Nyabitare, Cyaruhogo, Ruhoboba, Micuro
	Ntyazo	Rukiri, Buki, Muhunde, Agasasa
	Muyira	Kajinya, Kiruhura
Gisagara	Gikonko	Cyiri, Rurongora, Rwasanzu, Umusyoli, Rwasengare
	Musha	Kabogobogo, Kigaga, Nyarwambo,
	Save	Migina
	Kigembe	Kizusi, Nyakagezi, Mihoyano, Nkomane, Nyabwira, Cyahafi, Kigaga, Mpatsi
	Ndora	Cyahafi, Rwakarunga, Ingarane, Kabyira,
	Kansi	Byunyu, Gisuma, Migina
	Rusatira	Cyili
Nyaruguru	Ngoma	Migina, Cyogo, Gaseke, Agatobwe, Nyamitukura, Nyirahishuka

5.2. BIOLOGICAL ENVIRONMENT

5.2.1. FLORA

According to the National strategy of Environment in Burundi (NSEB, 1997), the tree cover of the study area, which is remarkable and presenting a great interest for the biodiversity, is constituted by the rain forest of Kibira. It is a forest of mountain developed with stratum having a varied vegetation and form, and of which certain species are endemic. Globally, more than 644 vegetal species are known.

The main vegetations met in this park are:

- Vegetation with Polyscias fulva and Macaranga neomildbreadiana and Syzygium parvifolium;
- Side forest with Hagenia abyssinica (kosso) correspondent to a less advanced phase of recolonization of the area and with Faurea saligna correspondent to a purpose of crest;
- Forming of altitude in Philippia benguellensis and Protea madiensis;
- Formings with Arundinaria alpina with two facies: a pure bambousaie and a mixed bambousaie;
- Basic formation of thalweg corresponding to the marshes of high altitude.

Rwanda

There are different ecosystems in Rwanda: natural forests, tree plantations, swampzones which are still at a natural state, hill crops mixed with agroforest species and zones of meadows and pastures.

The study area is characterized by an ecosystem modified by agricultural activities on hills and within the mineralized valleys. Apart from the subsistence crops mixed with the agroforest trees and fruit trees, hills' ridges and the sides of abrupt hills are occupied by tree plantations, mainly of eucalyptus (*Eucalyptus sp*.) and by pines at some places (*Pinus sp*). A great part of tree plantations are found within the zone of altitude within the western section of the study area.

The main cultivations on the hills are dominated by the sorghum, the beans, the sweet potatoes on the hills and the dry low-bottoms. At the level of low-bottoms, within certain swamps, rainfed lowland cultivations are practiced. Actually, within most of swamps, the cultivation of rice is spreading mainly within the north zone of the district of Gisagara, between the sectors of Gikonko and Ntyazo (swamps of rivers Agasasa and Cyili). The fallow swamp zones may be temporally colonized by a vegetation of Cyperaceae often used by the population for the mats confection.

Perennial crops are represented by the banana tree plantations, often mixed with other food-producing crops, particularly within the region of the district of Gisagara (sectors Kibirigi, Kansi and Kigembe) within the eastern part of the study area. Other commercial perennial crops are: the coffee trees on small patches among food-producing crops and tea plantations. The coffee trees plantations are frequently practiced on deep soils, receptive and slight; a great part of the study area is found within the intensifying zone of coffee plantations.

The agroforest trees species which are most common are natural fig tree species (*Ficus sp.*), *Markhamia lutea*, *Vernonia amygdalina (*Bitter leaf), *Sesbania sesban*, etc. The exotic trees are represented mainly by *Grevillea robusta* (Silky oak), *Cedrela sp*., *Maesospsis sp*., *Acacia mearnsii* (Black Wattle) and *Leucaena leucocephala* (Coffee bush). Market garden crops are particularly represented by avocado, orange, citrus, pineapple and papaya trees.

The inventories in the zone of hold showed that afforestations are dominated by the Eucalyptus (5691 ares), secondly pinus (333 ares) and finally Gevillea (84 ares).). However, the last one is in the agricultural fields like agro-forestry trees. The traditional crops are primarily made up of banana trees, coffee tree, cassava and sugar cane. The fodder crops are represented mainly by reeds.

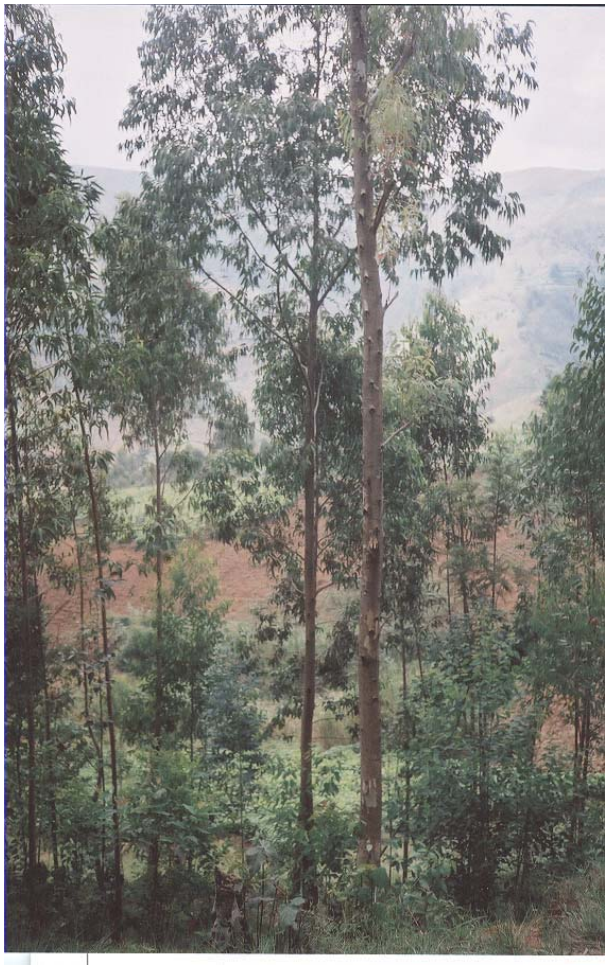

Photo 2. Eucalyptus plantation

5.2.2. WILDLIFE

Burundi

In the zone crossed by the electric line, fauna is relatively varied in the part covered by the Kibira national park that, as a whole and more in the better preserved sectors, in spite of the degradation which it has undergoes since 1996, remains rich in animal biodiversity.

The terrestrial fauna of the Kibira park counts approximately 98 species of mammals. Among those, the insectivores are 20 species of which several are endemic like the shrews Myosorex blarina, Crocidura lanosa and Crocidura niobe. Eight species of chiroptera were also identified and ten species of Primates of which most frequently met is Cercopithecus mitis dogetti (cercopitheca with diadem), Pan troglodytes (chimpanzee), Colobus angolensis and Cercopithecus the hoesti.

The avifauna is very diversified with about 200 species of which the most remarkable are Lophaetus arcipitalis (huppard eagle), corythacola cristata(giant touraco) and bycanistes subcylindricus (grey-cheeked hornbill) and species of precarious status such as Bradypterus graueri (Grauer's bouscarles), Apalis argentea (Moreau's apalis) Falco noumani and cryptospiza shelleyi (shelley's Senegali). A large number of Burundi endemic bird species have been observed in the mountain dark some forest. There are 27 species of those birds divided up into 22 types and 14 families. Birdlife international lists up 25 species of precarious status in Burundi (see the farther on table). The lake of Rwegura dam shelters among others water birds (Dendroswans, pelicans and cormorants) and fishes.

Even if the reptile populations of the park are unknown, the chamaeleonidae family (chameleons) has been abundantly found in Kibira. The most frequently observed ophidians are specially Atheris nitschei (tree viper) and Bitis gabonica (viper of Gabon)

Photo 3. Baboons observed in the Kibira national park

Tableau N° 8. BURUNDI - ENDANGERED, VULNERABLE OR THREATHENED BIRDS

Species	Category
Ring-necked Francolin Francolinus streptophorus	NT
Lesser Flamingo Phoeniconaias minor	NT
Madagascar Pond-heron Ardeola idae	EN
Shoebill Balaeniceps rex	VU
Lesser Kestrel Falco naumanni	VU
Red-footed Falcon Falco vespertinus	NT
White-backed Vulture Gyps africanus	NT
Rueppell's Vulture Gyps rueppellii	NT
White-headed Vulture Trigonoceps occipitalis	VU
Pallid Harrier Circus macrourus	NT
Denham's Bustard Neotis denhami	NT
Great Snipe Gallinago media	NT
Black-tailed Godwit Limosa limosa	NT
Black-winged Pratincole Glareola nordmanni	NT
African Skimmer Rynchops flavirostris	NT
Grey Parrot Psittacus erithacus	NT
European Roller Coracias garrulus	NT
Red-faced Barbet Lybius rubrifacies	NT
Papyrus Gonolek Laniarius mufumbiri	NT
Kungwe Apalis Apalis argentea	EN
Grauer's Swamp-warbler Bradypterus graueri	EN
Papyrus Yellow Warbler Chloropeta gracilirostris	VU
Red-collared Mountain-babbler Kupeornis rufocinctus	NT
Kivu Ground-thrush Zoothera tanganjicae	NT
Shelley's Crimson-wing Cryptospiza shelleyi	VU

Source :

BirdLife International, 2007

NT : Vulnérable/Near Threatened

EN : En danger/Endangered

VU : Vulnérable/Vulnerable

Rwanda

Besides domestic animals (caws, goats, sheeps, pigs and poultry) that are now kept in semi-stabulation within the cowsheds, the fauna is represented by seedeater birds (attracted by the grains crops) and certain species of waterbirds observed in the valleys during flood periods or in the rainfed lowland rice cultures.

Rwanda holds 730 species of birds, of which 11 are considered as being globally threatened by Lepage (2006), whereas Birdlife International found 28 threatened species .

Civil war and continual fighting have got devastating effects on the wildlife.

A study made in 2001 by the MINAGRI in the marshes of the area, had drawn up a list of birds of which most commonly met in the marshes of the central plateau are the ibis tentales, biblicus ibis the black ibis, the crowned ibis, the crowned cranes, who are currently rare in these marshes, ashed herons, the large brushes, the wild ducks, the scopus umbretta in the zones annually flooded. The majority of the ibis and of herons are protected by CITES (Convention on the international trade of the species of fauna and flora savages threatened of extinction). The swallows, the tisserins, the nectarins, the wagtails, the Dominican widows also were observed at the time of the inventories in the zones put in cultivation particularly the cereal cultivations.

Tableau N° 9. RWANDA - ENDANGERED, VULNERABLE OR THREATHENED BIRDS SPECIES

Species	Category
Ring-necked Francolin Francolinus streptophorus	NT
Maccoa Duck Oxyura maccoa	NT
Madagascar Pond-heron Ardeola idae	EN
Shoebill Balaeniceps rex	VU
Lesser Kestrel Falco naumanni	VU
Red-footed Falcon Falco vespertinus	NT
White-backed Vulture Gyps africanus	NT
Rueppell's Vulture Gyps rueppellii	NT
White-headed Vulture Trigonoceps occipitalis	VU
Lappet-faced Vulture Torgos tracheliotos	VU
Pallid Harrier Circus macrourus	NT
Denham's Bustard Neotis denhami	NT
Great Snipe Gallinago media	NT
Black-winged Pratincole Glareola nordmanni	NT
African Skimmer Rynchops flavirostris	NT
Grey Parrot Psittacus erithacus	NT
Albertine Owlet Glaucidium albertinum	VU

Species	Category
European Roller Coracias garrulus	NT
Red-faced Barbet Lybius rubrifacies	NT
Dwarf Honeyguide Indicator pumilio	NT
Lagden's Bush-shrike Malaconotus lagdeni	NT
Papyrus Gonolek Laniarius mufumbiri	NT
Kungwe Apalis Apalis argentea	EN
Grauer's Swamp-warbler Bradypterus graueri	EN
Papyrus Yellow Warbler Chloropeta gracilirostris	VU
Red-collared Mountain-babbler Kupeornis rufocinctus	NT
Kivu Ground-thrush Zoothera tanganjicae	NT
Shelley's Crimson-wing Cryptospiza shelleyi	VU

Source : BirdLife International, 2007

NT : Vulnérable/Near Threatened

EN : En danger/Endangered

VU : Vulnérable/Vulnerable

5.2.3. PROTECTED AREA

Burundi

The study area comprises a protected area of great importance : the National Park of Kibira. Its limits are formalized by the chart bellow. The park has been recognized by the Act n° 100/007 of 25/01/2000 referring to the delimitation of a National Park and of four natural reserves. According to the legal text, the Park has kept its former limits and has an area of about 40.000 ha. The forest of Kibira actually depends of the Ministry of territory Development, Environment and Tourism (MATET) and from the National Institute of Environment and Nature conservation (INECN).

The National Park of Kibira protects a forest which formerly was part of a large mountain rain forest ridge, covering from the North to the southern extremity of Rwanda. The forest covered, some years ago, 104.000 ha and it remains only around 55.000 ha, of which 50.900 ha are protected. These forests have been destroyed by cultivators and farmers in search of agricultural fertile land and pastures for livestock.

The National Park of Kibira consists in three great mountain forest complexes (between 1.600 and around 2.800 m) yet partly primary and covering the Northern part of the Congo – Nile ridge in Burundi. It lengthens from Burundi to the forest of Nyungwe, in Rwanda. This park covers over 40.000 ha and extends over 80 Km of length and around 8 Km of width.

Deforestation still occurs today and some people think that a quarter of the forest cover of the National Park of Kibira has been destroyed during the last years, particularly due to the 1993 crisis.

It is in particular the case in the sector crossed by the line which has undergoes a strong degradation of its forest cover and a significant reduction in its biodiversity due to the many pressures of anthropic origin.

The figure below illustrates the park zone crossed by the powerline. We immediately notice the plantations of tea (pale colour green) in East edge. The wooded zone crossed by the line adds up less than 800 m length for a total surface of 2,4 hectares.

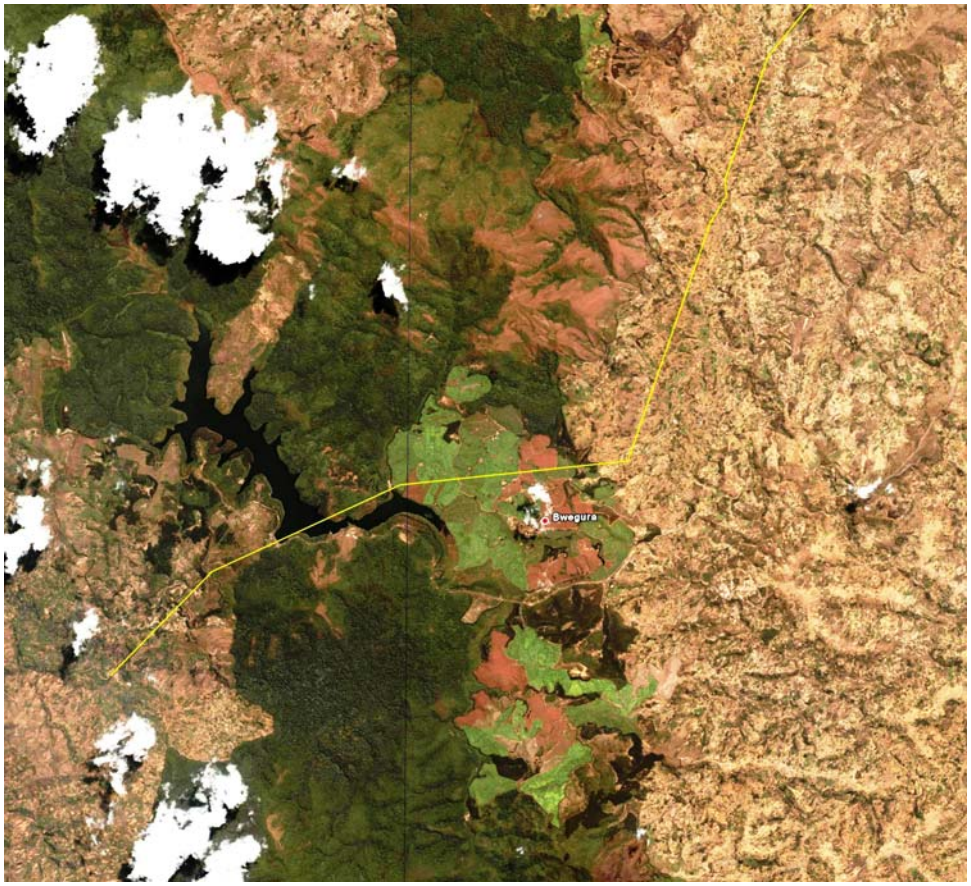

FIGURE 5. KIBIRA NATIONAL PARK CROSSING

The principal vocation of the park is the ecotourism because it is the single forest of mountain of Burundi. Thus, they arranged 25 km of tourist paths and three campsites.

Photo 3. Kibira national park with tea plantation in front

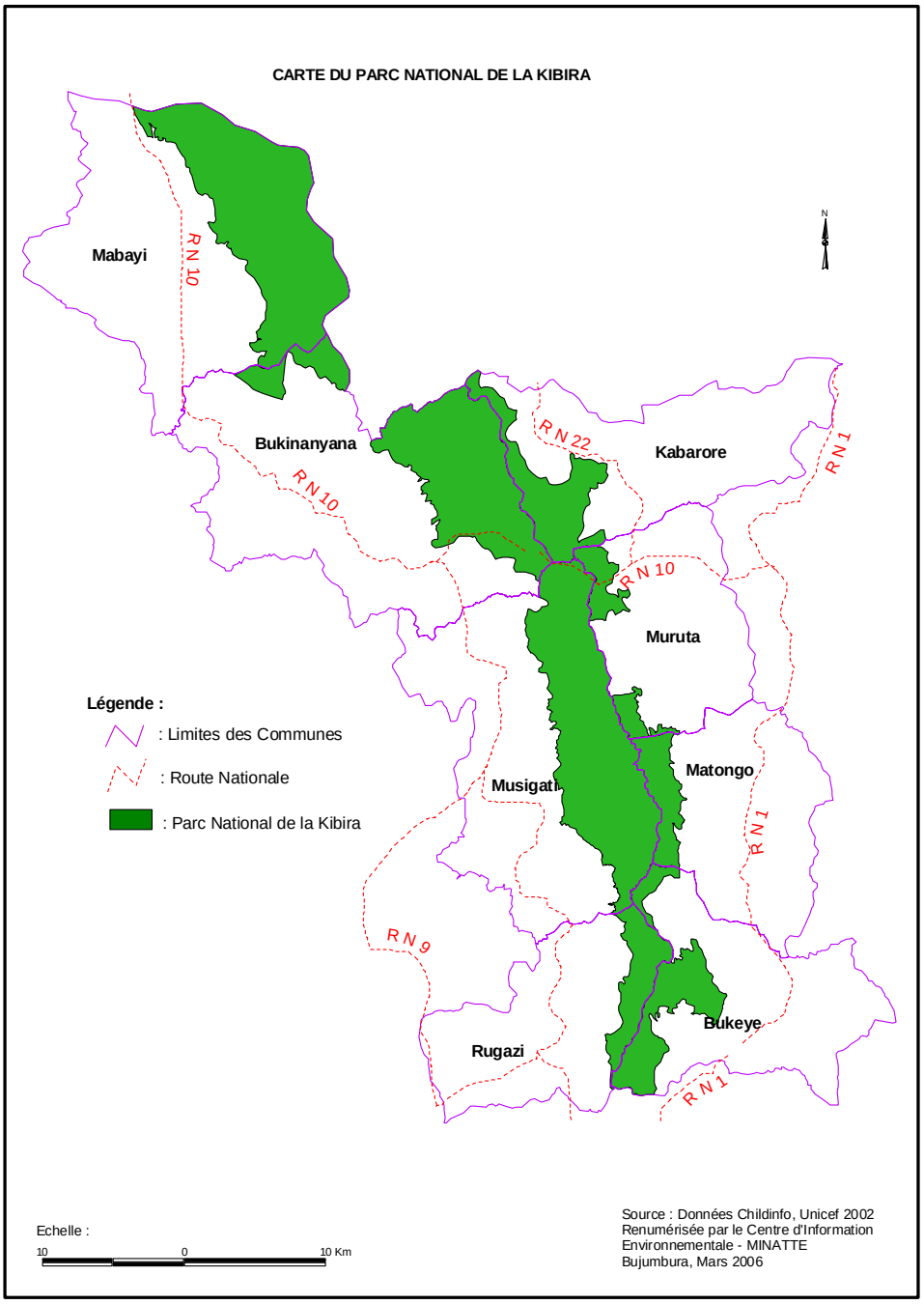

FIGURE 6. NATIONAL PARK OF KIBIRA

Rwanda

There is no protected area within the Rwandan part of the study zone.

5.3. NATURAL ENVIRONMENT

5.3.1. TERRITORY ORGANIZATION AND FRENCH SYSTEM

Burundi

The line crosses three districts which are located in two provinces; those are Kayanza and Bubanza.

Tableau N° 10. LIST OF PROVINCES, COMMUNITIES AND ZONES CROSSED BY THE LINE IN BURUNDI

Province	District / Commune	Area / Zone
Bubanza	Musigati	Masango
Kayanza	Muruta	Rwegura
	Kabarore	Jene
		Kabarore

In the zone crossed by the line, most of the lands belong to the population which uses them for the agricultural activities. These lands are for the majority the legacy of the grandparents..

The lands which belong to the districts, is the lands of the Rwegura complex tea cultivation and the Kibira forest managed by the National Institute for the Environment and the Nature conservation (INECN), are state lands.

The possession of a land right on the land does not involve right on the subsoil, either on subsoil waters or of surface which it carries or contains naturally.

Any individual or legal entity can buy and sell his land subject to the respect of the rights of others and the restrictions resulting from the law.

Rwanda

Rwanda is subdivided into 4 administrative provinces (the Eastern, the Northern, the Southern and the Western) together with the city of Kigali. At the decentralized lever, the country is subdivided into 30 districts, 416 are and 9221 quarters, Each quarter in turn is subdivided in community villages called "imidugudu". The province is ruled by a governor and the districts by the mayors called Mayors of districts. Are as and quarters are ruled by an Executive Secretary (GIS, UNR, 2006). The line row coming from Kigoma is totally inside the southern province area and go through 12 are of the 5 districts.

It is important to mention, in addition, that Rwanda has under gone a recutting up of its provinces and districts and this change has been launched since January 1, 2006 (Figure 6).

In the new southern province, the districts which are in the path of the line are: Nyaruguru (area of Ngoma), Gisagara, Huye, Nyanza, Ruhango (previous Province of Butare, Gikongoro and Gitarama).

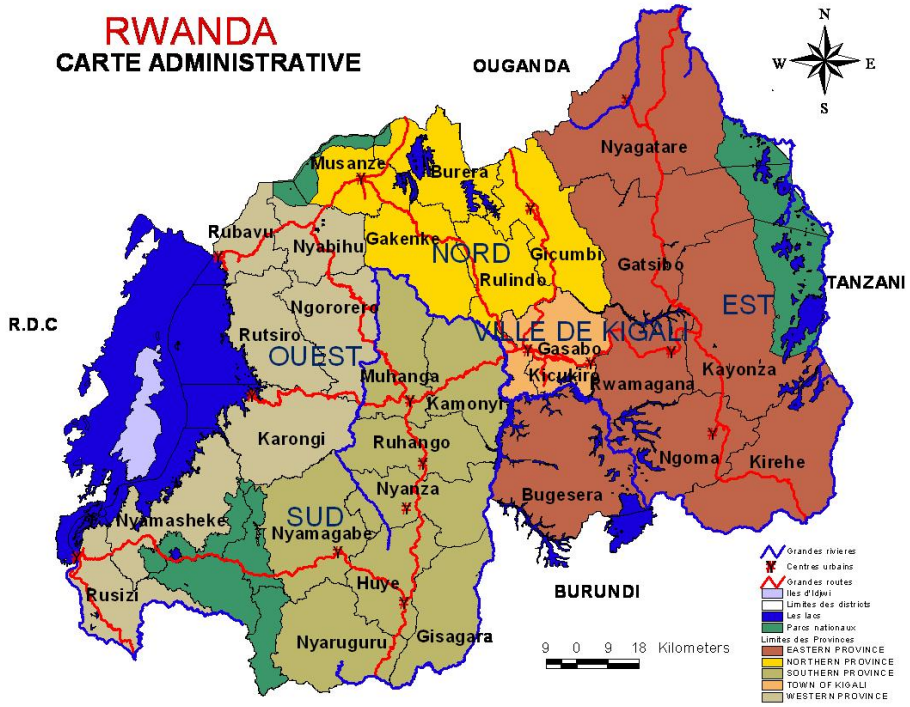

FIGURE 7. NEW ADMINISTRATIVE SUBDIVISION OF RWANDA

Concerning the land issue, the actual land policy is confronted to different constraints among which the excessive dowdong up of lands, the rural separated housing the duality between the written law and the traditional one. This thwarts the investment within the land's development and prevents the mortgage. In order to settle the problem, the Government has recently implemented a strategy of agro farming development having as objective contribute, to the food supplying (provision).

Indeed, the land's act dated September 15, 2005, at its article 3, stipulates that the land is included in the common in heritance of the Rwandan people, the ancestors, the actual generation. Not wit standing the rights guaranteed to people, only the Government (state) holds an eminent right of management of the whole lands located a long the national territory, it applies it within the general interest of all in order to ensure the national economic and social development in the way defined by the law.

Any form of discrimination, in particular that founded on the sex or the origin, as regards access to properties on land and buildings is prohibited. The man and the woman profit from equal rights on the land and buildings.

In this regard, the state (Government) is the sole holding power to grant the rights of occupation and use of the land. Is also has the right to order the expropriation due to a cause of public necessity, housing and development of the national territory in the way which is defined by the law and against a fair and previous compensation. There are also lands' commissions at the national level, at level of the province and at that of the city of Kigali and at the level of Districts.

The urban lands and those that are comprised within the limits of the urban districts as defined by the law. All the remaining are rural lands. The private land's concession of particulars is composed of lands acquired by the traditional law and the written law which are not comprised either within the public concession or within the state's concession or that of the District, the town or the city of Kigali, the lands allocated by the competent authorities and the lands acquired by purchase (gift) donation, exchange or share. The land's public concession of the state is constituted of all the lands, which are affected, to a use or a public service and also the public lands that are reserved to the environmental protection of the nation. It consists of:

- Cots' lakes, those of rivers and water ways classified by the decker of the Minister having water within his management;
- The shores of the lakes and rivers until a length determined by the Minister having environment management in his responsibilities, starting from the most isolated part reached by water during the successive floods, exception done to exceptional floods;
- The lands holding the sources of water and the natural water sources determined by the Minister having water within his responsibilities;;
- The national lands (destined) reserved to the protection of environment and constituted with natural forests, parks, protected swamps, gardens and tourist location.
- The national roads and their ascendinds as determined by the decree of the Minister having the infrastructures within his responsibilities.
- Lands and buildings constructed which are affected by the Administration to a use or public service or those accommodating the different services of the Public Administration.

The refugees returned to the country exercise an additional lobby concerning the availability and sustainability (durability) of the agricultural exploitations as rural subsistence means. According to the Arusha agreement of 1993, the people who come back to Rwanda within 10 years may claim (complain) about their former possessions (ownerships) of land even if they have been occupied by other persons, even if legally they have right to their former lands, the other refugees returned after these 10 years must rely on the Government to be awarded a new land. As result, the government has embarked on programmes of redistribution and share of lands within certain regions of the country, without compensation to the persons affected. This approach is well stopped within the new agricultural act.

5.3.2. POPULATION AND DEMOGRAPHIC FEATURES

Burundi

The area crossed by the line is the most populated of country. The following tables indicate some demographic characteristics of the three districts crossed by the line.

Tableau N° 11. POPULATION PER COMMUNE CROSSED BY THE PROJECT IN BURUNDI

District Commune	Population Population totale	Surface in Superficie en Km²	Density Densité (people(hab) /km²)
Kabarore	50 371	200,12	252
Muruta	51 239	147,08	348
Musigati	63 437	n.d.	n.d.

Sources: MININTER/UPP/Mars 2006 et République du Burundi, 2005

Tableau N° 12. SEX REPARTITION IN THE COMMUNES CROSSED BY THE PROJETC IN BURUNDI

District Commune	Sex		
	Man / Hommes	Woman / Femmes	Total
Kabarore	24 241	26 130	50 371
Kabarore	24 241	26 130	50 371
Muruta	25 036	26 203	51 239

Source: population department, interior and public security Ministry (2005).

Burundi has a young population whose 46% were under 15 years old in 2005. Adults of 18 to 59 years were 48% of the total and among those, the young adults under 40 years constituted the huge majority. Consequently to recent conflicts, women are nowadays more numerous than men. For each hundred of women, there are only 96 men (UNFPA, 2005). The number of women that became householders is important and assessed to be 20,000 or 22% of all households (PNUD/MPDR, 2003, Republic of Burundi, 2003).

Rwanda

Rwanda counted 8 162 715 inhabitants for a surface of 26 338 km2. It is a very populated country which counts the strongest densities in Africa, which is to say approximately 321 inhabitants with km2.

Some areas reach a density higher than 1 000 inhabitants per km2. The number of people by household is estimated at 4,5 (SNR, 2004). In the zone of study, we can observe remarkable disparities between the districts included in the zone of study.

According to the data of the census of 2002, the whole population of district that will be crossed by the new electric line is 1,230, 112 in habitants, for an area of 3,569.77 square kilometres (13.5% of the national territory) with a density of 344.6 inhabitants on a square kilometre, which exceeds the national average(see the following table).

Tableau N° 13. POPULATION DENSITY IN THE AFFECTED DISTRICTS RWANDA

District	Surface / Superficie	Population (2002)	Density / Densité
Ruhango	626,7	245 833	392,3
Nyanza	672,1	225 209	335,1
Gisagara	679,2	259 434	382,0
Nyaruguru	1 010,27	234 190	231,8
Huye	581,5	265 446	456,5
Total	3 569,771	230 112	344,6

5.3.3. SOCIAL ORGANIZATION AND ETHNIC GROUPS

Burundi

The area in which the line passes includes a population where all ethnic groups: Hutu, Tutsi and Batwa are found. This population is with Christian majority with a predominance of the catholic religion (90 %). The Protestant religion (10 %) is also present in particular Pentecotistes and Baptists.

Rwanda

Rwanda has registered, since the 1959, just at the previous day before the independence (1/7/1962) a lot of troubles that could be awarded to the ethnic bases (Hutu, Tutsi, Twa). These troubles to the resulted in 1994 to a terrible genocide. The actual government, within the programme of reconciliation of the whole Rwandan population, advocates the recognition of sale population composed Rwandans, possessing, the same culture, same language (the Kinyarwanda) and same territory since many centuries in order to eradicate the roots of the genocide's spirit and then thwart the history's malformation.

The actual ethnic diving up of the Rwandan population comprises around 85% Hutus, 14% and Tutsi, 1% of the Batwas. The Batwas compose the native group of the central region of Africa. It consists of a community which is very marginalized to the social and economic plans. Having in origin traditional activities oriented to the exportation forests, they are actually concentrated within the rural zone. Generally, they do not possess the agricultural lands and depend mainly from the artisan's making of pottery as sources of revenue.

Consequence of the conflicts, the zone of study hade and has always significant migrations of refugees as well as people moved inside the country. No data are easily available in order to specify these movements.

In addition, the society is organized in various social structures of which in particular no governmental often gathered in forum (NGOs) and at Community base (OBC) local an other nonofficial actors such as the religious confessions, the labor unions and the media.

The dominant religion is the Christianity (more than 90 %) of which Catholics and Protestants. The Moslems are slightly represented in the zone of study separately in certain urban centers.

Sometimes the state gets in touch with those organizations so to deliver services financed by public resources. NGOs are able of effectively intervening in domains in which the state has limited abilities, for example in order to supply solutions to problems of street-children. NGOs and OBCs have a crucial role as negotiators between the population and the state by taking part in campains, supplying assistance for specific priorities, particularly in decentralization context, and contributing to public debate through advocacy and researches on specific problems. The government has thoroughly undertaken to provide a favourable environment for the civil society. That includes efforts to insure adapted surroundings conforming to the regulations and find the happy medium between the civil society coordination and the need to ensure its independence. All those structures of social organizations even community-based organizations are the most representative and active in the study area.

5.3.4. HEALTH

Burundi

The sanitary situation in the area crossed by the line is characterized by insufficiency of the sanitary infrastructure, equipment, qualified personnel and capacity for accommodation. The sanitary situation is characterized by the persistence of some illnesses (table14).

Tableau N° 14. EPIDEMIOLOGICAL SITUATION IN THE COMMUNES CROSSED BY THE PROJECT IN BURUNDI

	Illness Maladies	Malaria Paludisme		IRA < 5 ans		diarrhoea Diarrhée < 5 ans		dysentery Dysenterie bacillaire	
Commune	Health center Centre de santé	C	D	C	D	C	D	C	D
Kabarore	Kabarore	832	1	1102	0	137	0	40	0
	Jene	2876	9	264	0	162	0	36	0
	Rubura	7431	22	434	0	390	0	165	0
	Rugazi	499	0	171	0	91	0	29	0
Muruta	Rwegura	2710	3	719	0	278	0	70	0

Source: Rapport BPS Kayanza 2005

Tableau N° 15. HEALTH SERVICES CAPACITY AND FREQUENTATION IN THE STUDY ZONE IN 2005

Commune	Health Center Centre de santé	Total Number of visits Total consultation	Number of beds Nombre de lits	Total number of Hospitalizations Total hospitalisation
Kabarore	Rubura	17237	15	1758
	Jene	8615	40	1015
	Kabarore	6204	8	117
	Rugazi	2586	0	0
Muruta	Rwegura	15597	17	527

Source : Rapport BPS Kayanza 2005

Only the health centers of Kabarore and Rwegura make the tracking of the AIDS. The Kabarore district has 7 seropositive people including 5 detected women while the Muruta has 15 hiv-positive individuals including 9 women (60 %) in 2005.

Tableau N° 16. BURUNDI : HEALTH DATA ON MOTHER AND CHILD HEALTH IN THE STUDY ZONE IN 2005

Commune	Health center Centre de santé	CPN3	Delivery Accoucheuses assistées
Kabarore	Rubura	273	449
	Jene	755	611
	Kabarore	322	85
	Rugazi	48	3
Muruta	Rwegura	474	165

Source: Report BPS Kayanza 2005

In 2005, the contraceptive cover for the Muruta district is estimated at 4,9 % and 3,6 % for the Kabarora district.

In the Musigati district, four health centers of are functional: Musigati, Kivyuka, Ntamba and Masare. There is no hospital in the Musigati district.

Rwanda

The medical characteristics of the zone of study are almost similar to those of the country in general. However, this zone is served by 4 hospitals, of which the Teaching hospital of Butare and hospitals of Gakoma, Nyanza and Kabgayi. One counts also several health centers whose serious cases are transferred to the hospitals.

There are 28 hospital and 521 health center in the country. The life expectation in Rwanda reaches 44 years for men and 47 years for women (WHO, 2006). The indicators of development connected to health indicate a deterioration of the health of children and adults since has few years. The misses of infantile mortality (death) misses reaches 118 for has thousand births. The yorothful mortality misses reaches 152 for has has thousand births and the maternal mortality misses reaches 750 for 1 000 000 births (UNDP, 2007). The adult mortality has for hand causes the malaria (6 510 boxes for 100 000 citizens) and the HIV/AIDS (13,7% among the population of 15-49 years). The AIDS prevailing reaches, moreover, 11, 2% At the national level and 10,8% in rural areas. The women aged from 15 to 24 years contaminated by the virus of AIDS represent 13,7% according to MINECOFIN/UN.

5.3.5. EDUCATION

Burundi

The zone crossed by the line contains primary and secondary schools; there is neither pre-school education nor high education. The school district of Kabarore has only one school of professional training established at Randa, only one room and two teachers with 18 pupils, all are girls.

Tableau N° 17. BURUNDI : PRIMARY SCHOOLS SITUATION IN THE ZONES AND HILLS OF THE KABARORE ET MURUTA COMMUNES (2005-2006)

Commune	Area (Zone)	School Name (Nom de l'école)	Colline	Nb of Class (Nb de salles)	Number of student (% of girls) Nombre d'élèves (% filles)	Number of teacher (Nombre enseignants)	Ratio : Student/ class (élèves/classe)	Ratio : Student/teachers (élèves/ens.)
Kabarore	Ruganzi	Ruganzi	Rugazi	8	1177 (41 %)	12	147	98
	Kabarore	Kabatwa	Kabatwa	12	1024 (48 %)	16	128	64
		Nyamisagara	Nyamisagara	7	612 (44%)	10	102	61
	Jene	Yandaro	Yandaro	8	673 (47 %)	12	84	56
		Randa	Randa	7	707 (48 %)	14	117	50
		Manga	Manga	8	709 (47 %)	10	118	70
		Mugoyi	Mugoyi	6	636 (46 %)	10	106	63
		Rubura	Rubura	12	1031 (48 %)	17	85	60
		Jene	Jene	25	1463 (52 %)	25	122	58
		Ryamukona	Ryamukona	7	833 (47 %)	10	138	83
Muruta	Rwegura	Munanira	Kavoga	6	804 (48 %)	17	134	47
		Rwegura	Rwegura	6	1169 (47 %)	18	194	64

Source : DPE Kayanza

Tableau N° 18. BURUNDI : SECONDARY SCHOOLS SITUATION IN THE ZONES AND HILLS OF THE KABARORE ET MURUTA COMMUNES (2005-2006)

Commune	Area (Zone)	Scholl name (Nom de l'école)	Colline	Nb of Class (Nb de salles)	Number of student (% of girls) Nombre d'élèves (% filles)	Number of teacher (Nombre enseignants)	Ratio : Student/ class (élèves/classe)	Ratio : Student/teachers (élèves/ens.)
Kabarore	Kabarore	COCO Kabarore	Kabatwa	4	148 (31 %)	5	37	29
	Jene	COCO Rubura	Rukere	6	210 (34 %)	8	35	26
	Rugazi	COCO Rugazi	Rugazi	4	188 (23 %)	5	47	37
Rwegura	Rwegura	COCO Rwegura	Rwegura	4	194 (30 %)	9	48	22

Source : DPE Kayanza

In the Musigati district, we find 19 schools. Boys represent 62,25 % of the pupils attending the primary schools (Republic of Burundi, 2005).

Rwanda

The development of education is in significant progress especially with the implication of the private sector. As facilities of education, we count 12 public and approved universities, 2 177 primary schools and 391 secondary schools in 2006.

In Rwanda, the most recent statistics indicate that the net enrolment rate at primary school has passed to 85,9% and to 10% at secondary school (UNDP, 2007).

The illiteracy among the adult women is highest 48,5% than among men 37,5%. The illiteracy is mainly accented (stressed) among the poorest (54,1%). The level of profession's learning is highest among the men (9,1%) than among the women (5,8%). In the rural area, the average distance to reach the primary school which is the nearest is 2,5 km in medium (average). Globally, 30% of the quarters have their own primary schools and 51% of quarters benefit from a literacy programme for adults (MINECOFIN, 2002).

5.3.6. GENDER EQUALITY

Rwanda

The concept gender is not yet well understood at the level of households at the same time by men and women. The discrimination towards the women originates from the culture and the tradition (customer) that have always considered the girl as inferior to the boy, physically, intellectually and socially and which should be submitted to the man. The women benefited from the masculine ^protection and that isolated them from the possession of immobilized properties a part from reducing their role in the society management. The frequency of the polygamy or cohabitation within certain regions constitutes also a constraint to the promotion of gender and to development

The legislative context dos exist or remains discriminatory concerning the protection of the women's right. As demonstrated by the statistics reported above, the actual situation together with the opportunities remains fundamentally different and worst for the women than for the men.

Practically, the crisis worsened by the traditional inequalities woman/man for the access to the necessary resources in order to enable the households to respond to their basis (staple) requirements. The rural women have no access to the are control of property, particular by that of agricultural lands; thy also confronted to a lack of education and necessary training to gain sufficient money in order to cover their family's requirements and/or acquire the means in order to improve the agricultural production.

Rwanda makes Endeavour's in order to progressively correct this situation but the culture constitutes again a barrier to the acceleration of the process. The new act on land's policy (the organic act n° 8/2005) elaborates the rights to equal properties for both women and men. Many feminine associations among which PRO-WOMEN TWESE HAMWE, HAGURUKA, DUTERIMBERE, WOMEN'S NETWORK, AVEGA AGAHOZO try to do their best to train women within the fields related to the promotion of the concept gender, to the promotion and protection of the women's rights and to the reduction of the poverty by the initiation of projects which generate the revenue to their target groups.

5.3.7. ECONOMIC ACTIVITIES

Burundi

The proportion of Burundi's population aged from 15 to 64 years and economically active reaches 89,9 %, with a masculine rate of 90% in rural area and a female rate of 87 % (UNDP/DRMP, 2003). Both agriculture and the informal sector employ up to 95 % of the active population. Agriculture provides over 50 % of the GDP; the industry, which provides nearly over 15 % of the GDP employs only 2 %, while services provide 30 % of the GDP and employ 4 % of the population (Republic of Burundi, 2003).

The GNP per capita has strongly decreased from 214 US$ in 1990 to 83 US$ 2004 (MPDR, 2005). Women's economic activities are badly paid, being a consequence of their limited access to high education and formation. In average, the annual income of women reaches 545 US$ (PPP) in comparison of 758 US$ for men (PPP) (UNDP, 2006).

In the study area, the agriculture and breeding are the principal economic activities. The crafts production is decreasing but some shops and workshops of carpentry and brick work remain.

The average size of family farm is estimated to 0,7 ha and to 0,4 ha in regions with a high density of population. An allowance agriculture focusing on rice and cotton in the study area is also noticed, as well as the breeding of cattle and other animals.

Rural women are responsible for most of the production and agricultural marketing activities, while dealing with housework (looking for water and firewood, preparing meals, children education and protection, sick person caretaking, etc.). Besides agriculture, a part of the masculine population also has other occupations in town. On the other hand, except for their agricultural activities, women are in majority unemployed.

Rwanda

The economic activity in Rwanda is marked by the predomination of the agricultural sector. The population living thanks to agriculture was 87% in 2002 (providing) creating jobs to 88% of the active population, contributing to 47% of the IDP and for 71% of the exportation revenues (coffee, tea, “pyreter”).

The secondary sector employs 2% of the active population of which 0,2% are women. The services’ sector occupies only 6,6% of the population of which 4,1% are men and 2,5% of women. The informal sector represents 79,8% of jobs and the public sector and parastatal represent only 2,4% only within the city of Kigali. The other activities sectors consist of commerce (trade), the public service, the manufacturing activities, the extractive industries, the construction etc, and this one very little proportions being less than 2%.

The agricultural average surface per family is estimated 0, 76 ha. The subsistence agriculture constitutes around 66% of the agricultural production. The exchange on the market, which consists only of around 34% of the production, is destined to feed the non agricultural households (estimated to 11,4%) but also the agricultural households which rely on the market in order to satisfy partly their food supplying requirements.

The economically active population accounts 62,5% of people aged of seven years and beyond comprising the families of unpaid cultivators. The proportion of women who work (64,4%) is higher than that of men (60,3%). It is noted that 14, 5% of children carry on a remunerated work within the rural communities.

5.3.8. AGRICULTURE AND LIVESTOCK FARMING

5.3.8.1. AGRICULTURE

Burundi

The majority of the zone concerned is used for agriculture. All the agricultural activities are practiced by the peasants according to the traditional methods, not improved and characterized by: sowing of small surfaces of an average of less than 50 Ares by household, the use of rudimentary tools (the hoe), the chronic deficiency of improved entrants and the use of a primarily family labour. It results from the generally weak outputs as well as a production which generates few incomes.

According to data's provided by the DPAE Kayanza, the principal food crops of the area crossed by the line are by order of importance: sweet potato, banana, cassava, potato, beans and corn (table 19).

Tableau N° 19. BURUNDI : AVERAGE ANNUAL PRODUCTION OF THE MOST IMPORTANT FOOD CROPS IN THE AFFECTED COMMUNES (2001-2005) IN TONS

Commune	Cultures						
	Sweet patotoes	banana	Manioc	Patotoes	Bean	Maize	Total per commune
Kabarore	12834	7125	6748	1 455	481	332	28 974
Muruta	674	5062	678	1 558	145	149	8 266

Source: DPAE Kayanza

The industrial crops practiced in the area of the line are coffee and tea which are the sources of income for the population. 17 coffee plantations and 5 tea plantations, among which the blocks of tea of the Rwegura tea Factory, were inventoried in the influence of the line.

The principal fruit farming met is the avocado trees, the citrus fruits, the papaw trees and maracoudja. The quantities of fruits produced and marketed are not known. The production is exclusively consumed inside the district.

Rwanda

The food-producing cultivations occupy 92% of the cultivated surfaces while the coffee and tea (occupy) cover respectively 6, 3 an 1, 6% of the cultivated lands. The typology of the exploitation policies enables to distinguish 3 types of producers with strategic specific characteristics: the small independent farmer, the autonomous producer, the production system referring to the capitalization that the production system referring to the capitalization that the production system referring to the capitalization that is encountered particularly among the agricultural cooperatives and associations. The average of cultivated surfaces on the period 1997-2003 reaches 1 423 033 ha4. These surfaces are decomposed in 18% for the cereals, 26% for the vegetables, 26% for banana trees, 28% for the cassava trees and the roots. In 2002, the cultivated surfaces represented 74% of lands, which were available whole the follows-pastures, wooded places and other uses represented respectively 14%, 7% and 5%. The typology of the agricultural exploitations indicate that 17% of the exploitations have less than 0, 25 ha; 26% between 0,25 and 0.5 ha, 29% between 0.5 Ha-1ha and only 28% have beyond 1 ha (MINAGRI, 2002).

Within the zone of study, the banana, the sweet potatoes, the manioc, the sorghum, the bean and the soja are the most producted. The seasoning cultivations are done on the hills and also on the « dry bottoms » among which are the sorghum, the sweet potatoes, the smallest peas the maize, the sunflower and the « colocases ». The lasting cultivations represented by the banana trees are among the most important ones then cultivated at altitudes that are inferior to 1 800 m.

The cultivations of the flooded marshes (cash crops) are mainly the flooded rice cultivations, the corn and the market gardenings (rivers Cyili, Agasasa, Migina, etc).

The strategy of the food guarantee consists of:

- the implementation of programmes related to the productivity's increase within the food-producing traditional sector,
- the intensification of the production for strategic products such as the paddy (rice), the maize, the potatoes,
- The targeting of the vulnerable zones and groups, taking into account the existing disparities among the social groups and at the level of regions and the possible chocks which would affect them. The zone of study is targeted for the intensification of the cultivation of rice (paddy) and maize in low altitude and the cultivation of fruits and the horticulture in high and middle altitude.

Photo 4. Rwanda- Subsistence agriculture

5.3.8.2. LIVESTOCK FARMING

Burundi

The strong density of population in the zone crossed by the line explains the insufficiency of the natural courses for the domestic animals. Non occupied spaces are covered by the Kibira forest.

The breeding practiced in the area is of traditional type, including bovines, caprine, ovine and poultry. The majority of the bovines found are local race "Ankolé". These animals seldom profit from basic health care and food supplements.

Rwanda

Concerning the farming, Rwanda possesses 991 697 bovinas (cattle) among which 86% belong to the local race with (weak) little milk and meat production, against 13% of the mixed races and 1% of pure races. It also accounts 1.270.903 «caprons», 371.766 ovines, 211918 porks, 498401 rabbits and 2482 124 poultry.

The bovine livestock is concentrated in the north eastern port of the country, mainly within the districts of Gatsibo and that of NYAGATARE which counts over 280 000 cattle. The subsector of forming is aimed to cover 10% of the protein's requirement of the population that 5 to say 6 grams per person and per day (according to the FAO/WHO standards calculated for Rwanda). However, this proportion has never been reached and the achievement which is the most signification has been obtained in 1989 during which the report of farming was estimated to be 4 be grans per person and per day.

The practice of bovina farming in Rwanda, is mostly of family type. The observed practiced are those consisted of the integrated intensive posture which tend to decrease, the semi-permanent "stabulation" and the permanent "stabulation". The little cattle farming is small in comparison to the needs, and have little genetic performances. It is mainly reserved to the peasants having small farm. The pork farming is mainly of semi-permanent "stabulation". For the poultry, the traditional extensive farming composed most of the national production, while the rabbits are farmed in small group up to 10 unit.

In the study area, the fish farming is mostly practiced in Gisagara (district of Kigembe) for local requirements.

As regards animal health, animals born of cross breeding between bettered breeds and pure breeds remain highly sensitive to various illnesses of viral, bacterial and parasitical origin. Nutritional constraints take a heavy toll among them. The developments of a breeding integrated into agriculture is the main option offered to overthrow the current process of damage of fertile soils and reduce the nutritional imbalance of population.

5.3.9. INFRASTRUCTURES AND SERVICES

5.3.9.1. TRANSPORT

Burundi

In the area crossed by the line, two types of transport are distinguished: the road transport by vehicles and bicycles and transport by porterage. The road transport in the most practiced, it is provided by tradesmen that carry merchandise to the city centre of Kanyanza or to trade centers of the region.

The region is served by the national tarred road RN10 that links Kayanza – provincial boundary OTB Rwegura – Cibitoke. It is also opened up by the following district roads: Mparamirundi- Jene-Kabarore- Rwegura, 31km long Rwegura- Rugazi- Buvumo (Rwanda) 28km long, both in literate soil and not compacted, and rural tracks in bad condition because of upkeep lack and erosion.

Rwanda

The road network is organized in four categories; the national roads, the asphalted roads, the non asphalted national roads, the secondary or community roads and the urban roads.

All the chief towns of province are connected to the capital by an asphalted road.

The average national distance to a road is unknown, however, a report from the imidugudu has enabled to calculate and ensure that the average distance to a main road was 4.1Km but it changed from o to 20 km. in Rwanda, the roads are classified within 1.101 km of rood of international importance, 2.086 km of roads of national importance and 2163 km secondary or of roads of local importance. There are also 110 km of other urban roads and 6650 km pf roads or rural track. On that network, 1069 km are asphalted.

The main ways of access to harbors are the straight road till Mombasa or the road up to Kampala and then by the railway until Mombasa, and the road till Issaka then by the railway or road until Dar-es Salaam. The improvement of these connections is a key factor in order to reinforce the integration to international markets. The aerial way is so far less developed. Rwanda holds an international airport, the Kanombe airport located within the city of Kigali. For internal connections, the country holds three civil aerodromes at Kamembe, Rubavu and Huye.

The zone of study, has a road network of all categories whose road of national importance which connects Rwanda and Burundi was recently rehabilitated. For the minor roads, because of place they have problems of stability of the bridges caused especially by strong precipitations.

5.3.9.2. WATER

Burundi

The Kabarore and Muruta districts possess arranged water points, that is to say: : 13 public drinking fountains and 35 not functional in the Kabarore district and 71 public drinking fountains including 36 not functional in the Muruta district. So, the zone crossed by the line does not reach the optimal standard for a supply drinking water.

This area holds a great number of rivers which come from Kibira forest, the principal ones being the Gitenge, Kayave and Mwogere rivers.

Tableau N° 20. BURUNDI : STATE OF THE WATER SYSTEMS NETWORK

Commune	Area	Colline	Network name	Commissioning date	Water delivery points			Number of "collines"		length (km)	Number of storage tank	Type of delivery
					Total	F	NF	D	ND			
Kabarore	Rugazi	Rugazi	Rugazi	1985	14	5	9	5	2	8	5	Gravity
	Kabarore	Kabarore	Kabarore	1990	7	3	4	2	1	2	2	Gravity
	Kabarore	Nyamisagara	Nyamisagara	2000	2	0	2	1	0	1,5	1	Gravity
	Jene	Kirehe	Rubura-Jene	1985	25	5	20	11	0	22	10	Gravity
Muruta	Rwegura	Kavoga	Kibira		38	28	10	11	1	110	25	Gravity
			Ext. Kibira	2003	8	3	5	4	1	16.5	23	Gravity
			Kibira	2003	6	0	6	3	0	1	3	Gravity

Source: Fontainiers communaux 2005

Rwanda

Water provision within rural areas in Rwanda is done through the means of three important systems that are: i) simple systems of water passage (788) with columns of water supplying (7421) and individual connection (2483), ii) sources of protected water (18241) and iii) systems of complex pumping which provide water through two or three districts (50) and though over one province.

The provision of water let arise two important questions for the reduction of poverty: the time wasted in searching for (seeking) water and the quality of the collected water which is used at home. The drinkable water is far from the household (residence) mainly within the Low Area of Amayaga in the study area, which constitutes a significant burden to the time management of women and girls in particular. This has implications on the life quality of women and girls, on their economic productivity and to the access to education and their personal safety.

The bad condition of access to the drinkable water should not constitute a major problem owing to a good level of water resources in Rwanda, with rains which are sufficient, a great number of sources within the valleys, many lakes, rivers and underground water tables. However , with the important number of hills and the populations, intention (tendency) to settle within the regions of high altitude, the distances to water source are often very long and have an impact on the time and the chose (drudgery) of women and girls for the collection of water.

According to a report from ELECTROGAZ (a public enterprise supplying water, the electricity and gas), for the year 2005, the total number of customers in 2005 for water reached 38529 and the quantity distributed was 15 843 726 m3 of which 11,8% for the rural area. It is probable that the individual connections are largely concentrated in the zones and households with high average incomes and that the poor groups in the rural and perish-urban zones and those of unauthorized residences do not have access to the limited services provided by this company.

The study area, practically all included in rural environment, is thus located in this underprivileged category.

5.3.9.3. ENERGY AND RURAL ELECTRIFICATION

Burundi

The line largely passes through rural zone not supplied with electrical power. Only the centre of Rwegura where the tea plant is situated and the county town of the Kabarore zone are supplied.

Wood is the main source of energy for the population of the region. This need of firewood is the main cause of biodiversity damage.

Rwanda

The main source of energy in Rwanda is mainly the wood and it is used by 90,2% of population while 8,4% use the charcoal. Only 2,4% of Rwanda households are customers of electrogaz (subscribers). Other sources of light such as the candle and the kerosene lamps are used in high proportion in rural areas. The use of electricity for domestic purpose is very limited.

The availability of the electricity in order to support the transformation of agricultural products and other related industries in rural areas remain the pertinent question in order to reduce the poverty.

Rwanda has 107 sites that are suitable for electric micro-station installation; 21 sites were operational in 1994 bust necessitate rehabilitation.

The availability of the electricity is targeted at the level of the community and not at the level of the households, in the way to support the economic activity rather than the sole consumption. It seems also that there is a certain insufficiency of trading and transformation infrastructure within the rural area in order to prompt the development of electric productive infrastructures. Only related to the same report from electricity for 2005 the number of subscriptions to electricity reached 70 187 and the whole electricity distributed reached 203 599 MW/h.

During the contacts made among the communities of the zone of study, the needs in energy have repeatedly been expressed. This supplying in electricity is particularly important in order to support the development efforts of infrastructures undertaken. These infrastructures are particularly connection to the development of industries of transformation of agricultural products (maize, potatoes), to the development of tourism, of information technologies of communication (ICT) within the schools at all levels and within the agglomerations as prompted infrastructure.

5.3.9.4. CULTURAL HERITAGE

Burundi

No known archaeological site or zone of archaeological potential is located in the Burundi part of the study area.

Rwanda

In Rwanda, the provinces of the project zone possess different cultural, historic or legendary sites recorded (registered) by the OTRPN (2005).There are over 83 natural and cultural sites within the country. Among these elements are mainly:

- elements of the natural environment having a significance symbolic system, history, legendary or cultural such as trees, caves, rocks, hills, sources, marsh, thickets, etc;
- elements of the built inheritance, like royal residences, wells, churches, etc
- the monuments like genocide memorials, tombs, etc.

5.4. ENVIRONMENT CROSSED BY THE WAY LEAVE: COMMUNITIES

5.4.1. METHODOLOGY

For community surveys, community representatives have been polled by means of socio-economic questionnaire aimed at communities. Recorded data have been afterwards captured with an access from conceived for that purpose. Moreover, a data base has been generated in order to allow to work out various costs related to the project.

5.4.2. POPULATION AND RELIGION

Burundi

The population of 19 crossed villages is mainly rural. It is formed by 52% of women and 48% of men. In great majority (84%), this one is of catholic denomination whereas a minority (16%) is protestant. The households average size is 6.2 persons. The number of refugees or displaced person is not known.

Rwanda

The population of 39 crossed communities is mainly rural and practice agriculture. It is 49% men and 51 women. The majority (52%) is catholic and there is a good proportion of Protestants (43%), of diverse appellations, and finally 2% Muslims. the number of refugees or displaced persons is not known.

5.4.3. ECONOMIC ACTIVITIES

Burundi

Besides agriculture and breeding, few crossed villages have other establishments or economic activities. So it is found only one built-up area where transport service is offered, another where a canteen or a restaurant is found and finally a village where commerce of materials is encountered.

Moreover, a small number of persons in the crossed communities can offer their abilities for more specialized works as the following table clarifies it.

Tableau N° 21. BURUNDI: NUMBER OF QUALIFIED WORKERS IN VILLAGES CROSSED BY THE WAYLEAVE

Métier - Profession	Number of persons	« Agglomérations » (n = 15)	
		N	%
Main-d'œuvre			
Monteur d'acier – Iron worker	1	1	7%
Menuisier – Carpenter	26	4	27%
Soudeur – Welder	10	2	13%
Électricien – Electrician	3	2	13%
Chauffeur de camion – Truck driver	8	2	13%
Opérateur de machinerie lourde – Heavy machinery operator	0	0	0%
Mécanicien – Mechanic	4	2	13%
Maçon – Mason	55	7	47%
Peintre – Painter	51	3	20%
Sculpteur – Scultor	0	0	0%
Tailleur - Tailor	42	5	33%

Rwanda

Villages covered by the project are mainly agricultural communities. There is no commercial establishment but commerce of materials (bit of gravel, stone, ect.) in villages covered.

A small number of persons can offer particular abilities as the following table clarifies it.

Tableau N° 22. RWANDA: NUMBER OF QUALIFIED WORKERS IN VILLAGES CROSSED BY THE WAYLEAVE

Métier	Number of persons	"Agglomérations" (n = 39) [a]	
		N	%
Main-d'œuvre			
Monteur d'acier – Iron worker	7	2	6%
Menuisier – Carpenter	19	12	31%
Soudeur – Welder	0	0	0%
Électricien – Electrician	2	2	6%
Chauffeur de camion – Truck driver	1	2	6%
Opérateur de machinerie lourde – Heavy machinery operator	1	2	6%
Mécanicien – Mechanic	4	2	6%
Maçon – Mason	44	29	75%
Peintre – Painter	42	22	56%
Sculpteur – Sculptor	0	0	0%
Tailleur - Tailor	0	0	0%
Autres - others	0	0	0%

5.4.4. PUBLIC BUILDINGS

Burundi

There was found only one community structure in the range, the Baptist church of Nyamisagara (Kabarore district). However, a detailed study of the situation allowed to elaborate an alternative layout that passes at the east of the church this allowing to avoid shifting.

Rwanda

In the Rwandese part of the line, there are no community facilities to move.

5.4.5. CURRENT ACCES TO ELECTRICITY AND INTEREST FOR THIS ENERGY

Burundi

None of crossed villages currently benefit from electricity. All asked persons have indicated that communities are interested in being connected to the electric network. The uses associated to this energy are (in accordance with mention frequency order). Lighting, to develop some businesses (hairdressing salons, studio etc.) and workshops and finally for entertainment (television), food preserving and air conditioning.

Rwanda

The villages crossed by the range of the line do not benefit from electricity. The most important needs mentioned by asked persons are lighting and functioning of various appliances (mills, varied machines, etc.) that can serve in businesses or small workshops.

5.5. AFFECTED HOUSEHOLDS

5.5.1. METHODOLOGY

The part of socio-economic surveys aimed at households chose to physically identify households that are exposed to side-effects of the project.

The systematic census of all households at Burundian side of the line Rwegura-Kigoma has been therefore carried out. So the all sub-villages concerned by the project have been visited. In total 196 households of which the land is touched by the range have been counted. It is estimated that there could be additional households in Musigati district but they haven't been counted since that part of the study area was not accessible for insecurity reasons

In Rwanda, information on households affected by the hold has been gathered thanks to exhaustive inquiry. In total, 271 households are affected by the impact of the electric line hold.

In Burundi and in Rwanda, information collected from households was relative to the households composition, the way of life, incomes and types of production, use and need of energy as impact of the electric line on their properties and activities. The socio-economic questionnaire aimed to households is presented in annex 8.

Tableau N° 23. BURUNDI-RWANDA : TOTAL NUMBER OF HOUSEHOLDS AFFECTED BY THE WAYLEAVE

District/Commune	Total number of households affected by the wayleave
Burundi	
Musigati	3 not confirmed
Muruta	19
Kabarore	177
Total Burundi	196
Rwanda	
Ruhango	29
Nyanza	97
Gisagara	116
Huye	8
Nyaruguru	21
Total Rwanda	271

5.5.2. POPULATION : MATRIMONIAL STATUT, SEX AND ETHNIC GROUP OF THE HOUSEHOLDER

Burundi

All house holders affected by the line hold are farmers. There is counted almost a third of households (27%) led by a woman, situation resulting probably from resent wars and the SIDA epidemic. The households count on average 5,1 people of which 65% have less than 25 years.

Tableau N° 24. BURUNDI : HOUSEHOLD HEADS CHARACTERISTICS SEXE AND AGE

Sex and average age of head of household	% or age
Men ratio	73 %
Woman ratio	27 %
Average age of men	47years
Average age of woman	43 years
Average age of head of household	46 years

Rwanda

The occupation of all interviewed householders is agricultural production. An important proportion of women are counted among householders. Probably this situation results from the recent disorders that knew Rwanda. Households count 5 persons on average, 64% of them are under 25 years old.

Tableau N° 25. RWANDA : HOUSEHOLD HEADS CHARACTERISTICS SEXE AND AGE

Sex and average age of head of household	% or age
Men ratio	61 %
Woman ratio	39 %
Average age of men	40years
Average age of woman	48 years
Average age of head of household	44 years

5.5.3. USE OF THE WAYLEAVE BY AFFECTED HOUSEHOLDS

Burundi

In Burundi 56 of 196 affected households, that is to say 29%, have their permanent residence within the hold. Moreover, 51%households use the hold to cultivation purposes (sweet potatoes, beans, cassava, coffee, tea, etc.), 31% area for planting trees(eucalyptus avocado trees etc.), and finally 8% as area for pasture.

Rwanda

In Rwanda, there are 271 residences within the hold, 41of them are permanent and 211 semi-permanent and finally 19 are temporary. Moreover, close to 85% of 271 affected households use land for annual crops (bananas, sorghum, and coffee) and 4% for tree planting.

5.5.4. ACTUAL USE AND INTEREST FOR ELECTRICITY

Burundi

None of the households affected by the line currently benefit from supply of electricity. Moreover, 67% of them have declared themselves interested in being connected to the network to have electric light, 38% to plug in domestic appliances (iron, sewing machine, etc.) and 19% to supply refrigerators for food preserving. Persons that have declared not to be interested have mainly justified their answer by the very high price of electricity (fixed to 113BIF or 0.11USD per Kw/h in the survey) or electric appliances that they would use.

The following table shows that energy expenses of the affected house holds is substantial notably in the case of wood and coal that are mainly used for cooking.

Tableau N° 26. BURUNDI: ACTUAL MONTHLY SPENDING FOR LIGHTING AND COOKING BY THE HOUSEHOLD AFFECTED BY THE WAYLEAVE

Type d'énergie Energy sources	N	%	Moyenne de la dépense mensuelle Average Monthly Spending (BIF)
Bois / Wood	179	91 %	13 902
Bougies / Candles	135	69 %	4 503
Pétrole / Kerosene	35	18 %	2 363
Bonbones de gaz / Bottled gas	0	0 %	0
Électricité/ Electricity	0	0 %	0
Charbon / Coal	9	4 %	9 000
Solaire / Solar	0	0 %	0
Biogaz / Biogas	0	0 %	0
Restes de récolte Sugarcane husk, maize stocks …	4	2 %	1 000
Autre / Others	13	7 %	1 267

Rwanda

No households affected by the line profits from electricity as in Burundi. The interest for this form of energy remains however mitigated, because mainly of its price (112 RWF or 0,21 USD the kw/h) considered to be too expensive or of the purchase price of the electrical appliances. Indeed, only 38 % of the households are interested to connect to light and 25% to feed from the domestic apparatuses (domestic iron, sewing machine, etc.)

However table 50 shows that the expenses in energy is substantial among the affected households. Most significant are for the wood and the coal in particular which are mainly used for cooking.

Tableau N° 27. BURUNDI: ACTUAL MONTHLY SPENDING FOR LIGHTING AND COOKING BY THE HOUSEHOLD AFFECTED BY THE WAYLEAVE

Type d'énergie Energy sources	N	%	Moyenne de la dépense mensuelle Average Monthly Spending (RWF)
Bois / Wood	263	97 %	6 427
Bougies / Candles	23	8 %	250
Pétrole / Kerozene	260	96 %	1 510
Bonbones de gaz / Bottled gas	0	0 %	0
Électricité/ Electricity	0	0 %	0
Charbon / Coal	0	0 %	0
Solaire / Solar	0	0 %	0
Biogaz / Biogas	0	0 %	0
Restes de récolte Sugarcane husk, maize stocks …	11	4 %	833
Autre / Others	0	0 %	0

6. ENVIRONMENTAL AND SOCIAL IMPACTS

The project will require extended construction works. Indeed, new pylons and a new line will be constructed to link Rwegura and Kigoma substations. Moreover the maintenance of ROW and line involve periodic access to the structures for maintenance activities.

The main impacts regarding the environment are the permanent loss of vegetation (trees, shrubs and plantations) in the ROW and the permanent loss of small portions of wetlands required for the construction of towers. Other impacts of temporary nature may also occur during construction works like dust emissions, noise, erosion, degradation of quality of water, soil contamination by poor waste management or accidental spill of hydrocarbons and displacement of wildlife.

For the household and communities affected the negative impacts are predominantly localised and short term and will occur during the construction period. The most important long term impacts are the permanent lost of arable land (access road, tower base and substation) and restriction to tree planting to species that do not grow higher than 4 to 5 m in the ROW). Beside these impacts on agricultural activities many houses and some public or private infrastructures (schools, mosques, churches, shops, etc.) will be relocated, in most cases, on another part of the same land or to an adjacent land plot.

If the household and communities have access to electricity many positive economic, educational and health related impacts will occur (see section 2.2 above for more details). Moreover temporary employment during the construction phase, and income generated by the sale of food and other consumables to migrant workers will help financially the communities crossed by the wayleave.

In brief, if sufficient time of preparation before the start of construction and adequate compensation are given to affected household and communities the new transmission line will have minimal negative impact on communities or persons, and on private or common property assets.

The main sources of the negative impacts are:

- Displacement of structures houses, school, etc. (lost of time, organization of daily live perturbed)
- Clearance of access roads (crop damage)
- Clearance of line corridor between towers (crop damage; removal of trees)
- Earth-moving and tower construction (crop damage; removal of tress)
- Arrival of skilled workers into rural areas (health concerns, esp. HIV/AIDs; overexploitation of local resources such as water, wood fuel and other natural resources)
- Construction of work camps (damage to crops and properties; potential affects from-inadequate waste management facilities etc.).

6.1. METHODOLOGY

This Section deals in detail with a description of the impacts of the Project. The potential environmental impacts of the installation of the power transmission line from Uganda to Kenya were assessed using data collected from field investigations (between May 2006 and May 2007), government offices, review of relevant documents and consultation with various stakeholders and Project Affected Persons.

The identification of the positive and negative impacts of the Project, their level of severity, whether they are long term or short term, direct or indirect, avoidable or unavoidable, reversible or irreversible and their classification into pre-construction, construction and operation has been based on the following:

The socio-economic and environmental studies undertaken at the prefeasibility stage in 2006 (SOGREAH, RSWI, Hydro-Québec, Hifab, 2006);

African Development Bank, October 2003. Integrated Environmental and Social Impact Assessment Guidelines;

World Bank Environmental Assessment Sourcebook and updates (World Bank 1994);

World Bank Operational Policies/Directives, namely: OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP 4.09 Pest Management, OP/BP 4.11 Cultural Property, OD 4.20 Indigenous Peoples, OP/BP 4.12 Involuntary Resettlement, (see Section 2.5);

International Agreements ratified by the Governments of Burundi and Rwanda (see Sections 3.1.1.2 and 3.2.2.1);

Consultation with people affected by the Project; officials from relevant ministries and government agencies (national, regional and local); village committees/elders; women and, NGOs/CBOs (see Appendices 2 to 7).

Extensive survey of communities and households directly affected by the wayleave to asses, in particular, activities and structures present in the future wayleave

Mitigation measures are presented in the Environmental and Social Management Plan (Section 7).

The nature and/or importance of the impacts described hereafter may change in the future if the Project is not implemented within the next two years. It is in fact probable that environmental and socioeconomic changes could occur in the Project area for different reasons (new projects, population displacement, changes in the economical situation or environmental conditions, etc.). It will later determine the nature and importance of the impacts described hereafter.

IMPORTANT NOTE: The description of impacts presented hereafter is not portrayed by country, like Section 5, but by impact categories. The categories of impacts are normally the same from one country to another but their importance and location could vary. It is for that reason, and to not weight down the text with numerous repetitions, that this organization was preferred.

6.2. NATURAL ENVIRONMENT

6.2.1. SOILS

The impacts of the project on soil are especially associated with the activities of preparation of the land and excavation for the implantation of the pylons, the preparation of the access paths and the stamping of the workers (transportation of the material and setting up of the wires).

Since construction of towers will require foundation covering an area of about 5.5m by 5.5 m and 2.5m deep depending on the soil conditions thus the areas affected will not be big. Excavators are likely to leave some areas bear, destabilized and vulnerable to soil erosion for hilly areas.

The oil and the fuel used by the machines during the construction of the line can also contaminate the soil and affect the cultures and human health.

Burundi

Soils of the area where the line passes in Burundi are mainly ferrisoils that are subjected to intense erosion. The relief in Musigati district is undulating with steep slops. This erosion situation of soils could be increased by the building of towers, that will require to dig deeper in order to strengthen the foundations. Along the whole line, thalwegs and river banks are fragile and the buildings could damage them.

Rwanda

The topography is characteristic of the central plateau with soils derived from granite and gneiss that alternate with soils derived from intrusive basic rocks and soils derived from the modification of schistose formations sandstone and quartzites.

On the whole, soils are in general deep, in places, with clay view and less sensitive to erosion. However easily damaged soils of alluvial deposits that are along water courser are made up of materials highly altered and leached by erosion. To do likewise, on areas with steep slop or abrupt, soils are liable, to present higher sensitivity to erosion.

The risks of falls of ground are also probable in zones with fragile schisto-quartzic material grounds or in the zones of abrupt slope.

6.2.2. WATER

Waterways in the form of streams and rivers are abundant throughout the proposed corridor. Construction and operation of the transmission line across these resources may have both short-term and long-term effects. Water quality of waterways can be indirectly impacted by soil erosion resulting from driving vehicles through streams, by building temporary bridges, or by clearing of brush along the wayleave.

Drainage disruption and pollution due to preparation of access road and tower foundation; siltation due to soil erosion and pollution due to oil and lubricant spillages are the major impacts on drainage and water resources.

Pollution and siltation impacts if properly mitigated will only be short term but if not, they can be long term and irreversible. Drainage disruption will be long term because the access roads and the foundations will be permanent. Roads could be eroded since they will be made of murram, but with proper mitigation measures in place, this impact could be minimized as well.

During construction, spoil material will be generated from the excavations for foundations of towers. Leaving loose heaps of spoil material will be susceptible to soil erosion and silting of watercourses leading to pollution. Equally affected wetlands especially those that will have several pylons and where wayleaves will be constructed. These deposits will disrupt the normal flow of water in the wetlands and flood plains leading to siltation and flooding, flood plains or drainage routes will contribute to silting problem.

During construction, towers will be brought as a complete set and fitting done at the site. However, conductors can be measured and cut at the site, leaving small pieces of waste. Children in the area may pick them to make toys and these will end up being spread in the whole community. The littering of refuse by the workforce in the nearby bushes may result in contamination of the water sources.

Construction is expected to be mainly mechanized and thus workforce will be expected to participate in the construction at any time will not be large. The impact of the project on waste generation is short term thus expected to be minimal.

Burundi

The line crosses a vast crowd of water courses and swamps that, as described above, would be affected by the building of towers.

The lake dam that supplies the hydropower station of Rwegura could more silt up because of the erosion phenomenon that could be the result of the building of the line which will have a knock-on effect on electricity production in the country.

Rwanda

The electric line will pass through an area of the central plateau constituted by plateaus of hills that have sides often of steep slop with soils vulnerable to erosion especially during heavy rains of April and November up to December. Those areas constitute moreover flowing basins upstream to various types of sheets of water: further downstream, there are sources fitted out or not, commonly used by the population as consumption water or to water livestock flow, reservoirs or fitted out waters of dams.

The direct consequence of erosion problems of leached soils is sedimentation of watercourses and water sources downstream in receiving valleys.

6.2.3. FLORA

Building a transmission line through woodlands and eucalyptus plantations found along the proposed corridor requires that trees and brush be cleared from the wayleave. This encroachment can have impacts on the number, health, and survival of interior forest species, many of which are rare. For example opening the Kibira forest could introduce undesired or harmful exotic plant species which may be inadvertently brought in by construction activities.

A transmission line wayleave is likely to fragment a larger forest block into smaller tracts. Fragmentation makes interior forest species more vulnerable to predators, parasites, competition from edge species, and catastrophic events.

It is important to note that this situation had occurred before in this area with encroachment for agricultural purpose.

The natural vegetation and crops will be damaged during clearance of access roads, ROW and construction equipment maneuvering and parking outside demarcated areas, and earthworks in construction phase. Vegetation damage leads to habitat destruction. Habitat destruction for instance shall be trees in the cultivated and not cultivated areas, wetland vegetation, shelter, ornamental and fruit trees around homestead.

Periodic maintenance along the ROW of the transmission line will require clearing of regrowth along and adjacent to the line. This means no vegetation will be allowed to grow above 4 to 5 m within the wayleave.

Burundi

The line passes through the Kibira natural forest from the hydropower station of Rwegura to the tea plantation of the tea factory of Rwegura. Kibira is a mountain forest rich in biodiversity and especially endangered species. In this forest, vegetable composition of Entandrophragma excelsum and parinari excelsa var. holstii, vegetable composition of syzygium parvifolium, Hagenia abyssinica, pure bambooes or mixed with Arundinaria alpine of the area could suffer from run over by machines or cutting to clear the line. The sector chosen to go through the part of Kibira is however located in a part of the park that suffers great modifications of its natural balance and already greatly deforested (see the following picture). The whole area of the hold in the woody zone is 800m long and 30m large for a total of 2.4 ha. §The expected impacts on the forest would be limited if strict measures of mitigation are implemented to weaken even more damages to the flora and wild life.

The natural forest of Kibira could undergo more fragmentation which will also have an impact on the present fauna. The development of tracks and roads while the building can favour encroachment by the local population in the Kibira park in order to install crops as it has been observed in that region these last years.

The line also crosses artificial afforestations of eucalyptus in Burundi, especially in the Kabarore district. Those afforestations are source of timber and firewood for the population, OTB and districts. The cleaning along the line and the building of the tracks will result in fragmentation of afforestations and especially in cutting trees down.

Even if the most of marshes spread along the line are cultivated, there are some of them that are still relatively intact, in particular the marshes of Gitenge that are in the park of Kibira. With those later, marshes of Nyabuturi contain a great biodiversity and in particular endangered species such as Bouscarle of Grauer (Bradypterus graueri). Drainage works could lead to modification of conditions that allow currently that kind of ecosystem to develop in those swamps.

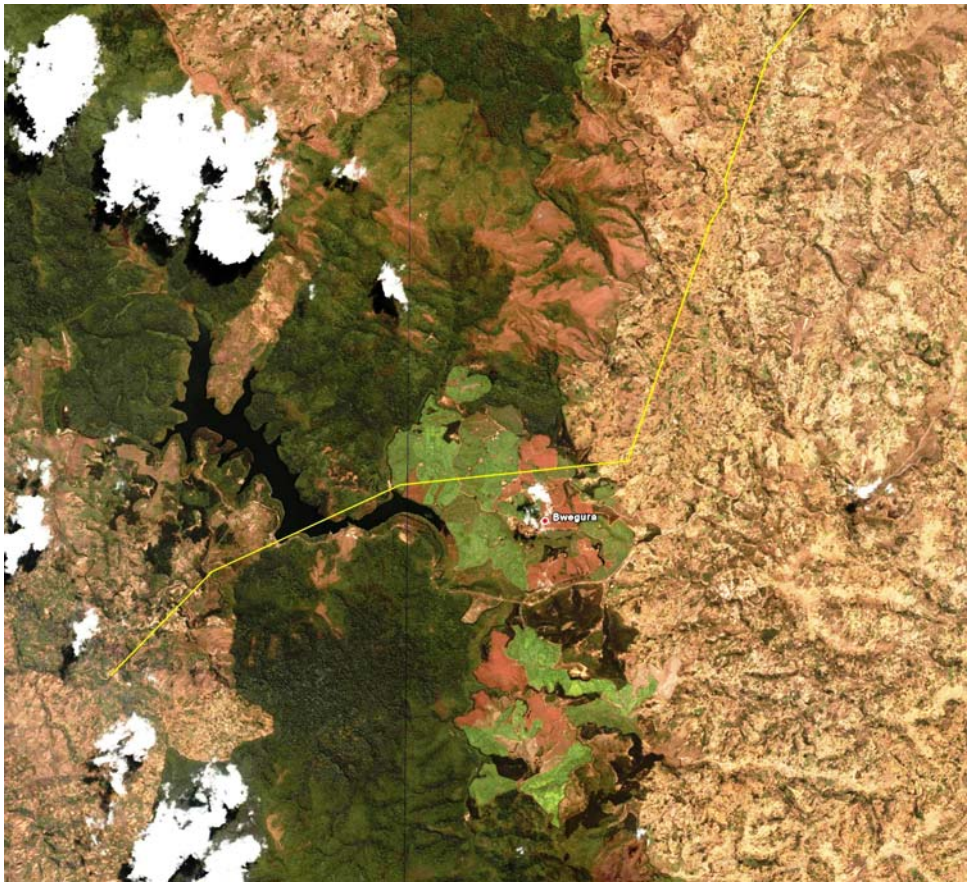

FIGURE 8. KIBIRA NATIONAL PARK CROSSING

Rwanda

The zone crossed by the powerline goes through agricultural zones and a few forest areas. The project will have an impact on the forest areas which mostly consist of eucalyptus. Since the country knows an increasing deficit of wood of 6.719 million m3 (MINAGRI, 2004), the project will contribute to accentuate this deficit on that natural resource and consequently the impact on the availability of this domestic energy resources for the population in this area. This impact concerns the surface of forest and also the variation of tree species

Photo : Forest on Mayaga Hills

6.2.4. FAUNA

The fauna is mainly affected by destruction of habitat and noise. Due to widespread settlement throughout the route section and accompanying human activities, mammals and birds have virtually disappeared from proposed line route corridor except in the Kibira forest and some cases wetland fauna and a few others that are adapted to settled-in areas. The birds will be affected by the noise related to construction activities like transport, vegetation clearing, etc. The birds and other wetland fauna are likely to migrate to other areas where they will be threatened by hunting activities. However this impact will be temporary and will end after construction.

Furthermore, the continued fragmentation of a forest can cause a permanent reduction in species diversity and suitable habitat.

Risk of bird collision

Transmission lines can be collision obstacles for birds such as sand hill cranes, waterfowl and other large water birds.

Once established, the transmission line is likely to cause collisions of birds in flight. Wetlands with higher populations of birds are spots of concern; these include Rwegura, Gitenge and Nyabuturi in Burindi, where the transmission line could potentially cause collisions of water bird species during migration and local movements, especially during the night. Thus, there is need for precautionary measures to be taken by making the transmission line more visible.

Vulnerable or endangered species

Burundi

In Burundi, the line passes through the part of the Kibira forest where are observed species endemic in the region of albertin Rift and endangered species. Those species especially species of birds that include especially Bradypterus graueri, Apalis argentea and cryptospiza shelleyi. Primates present in this region are also endangered, those are chimpanzees: pan troglodytes which had fled from the region but with the return of peace those animals are observed in Ruhondo in Musigati commune and in the sector of Mabayi, cercopitheques and colobes. Those works could stop the movement of those animals and would confine them in small zones, threatening them more with poaching and depriving them of part of their habitat.

The presence of the electric line can also cause risk of electrocution to chimpanzees which would manage to climb up in towers up to the level of conductive. It doesn't however seem to exist studies on that subject and impact of that situation on big primate populations is hardly measurable.

The cutting of the vegetation in order to clear the line could prevent animals to move freely in the forest and would expose later to poachers that would take advantage of that passage so to track them down. Increased fragmentation of the forest of Kibira represents as well an infringement upon habitat of many species of mammals.

Rwanda

The ecosystem crossed by the corridor is a typically agricultural ecosystem but which is characterized by important wetlands. These wetlands (river, ponds of water and marshes associated) constitute the principal habitat of the birds and fish associated with these habitats. All these rivers are tributaries of the Akanyaru

Certain species of these birds are vulnerable and benefit from the CITES convention. During the rainy season, after the floods, it is possible to observe important population of birds.

6.3. HUMAN ENVIRONMENT

6.3.1. HOUSES

The most alarming impacts for the affected populations are related to the acquisition of the grounds, the relocalization of the residences, the evaluation of the compensations and their payment and finally the behavior of the agents of evaluation (see report/ratio of consultation section 4 above)

Demolition of buildings is most sensitive and can often become political. If not well-handled demolition of houses can derail the project. That is why proper compensation (in kind or money) should be given before any houses have to be demolished. Adequate time to reconstruct them should also be given before the start of the project related construction activities. To this effect, a proper compensation schedule will have to be put in place.

Different measures are proposed to mitigate these fears and reaction in the Environmental and Social Management plan below (section 7 et 8).

The potential change in property values due to the proximity to a new transmission line has been studied since the 1950s by appraisers, utility consultants, and academic researchers. Data from these studies is often inconclusive and has not been able to provide a basis for specific predictions. It is thus difficult to predict any change in the price of property related to this factor. On the other hand, if the new project permits access to electricity for the communities and households near the wayleave the economic impact will certainly increase the value of these properties.

Burundi

In the range of the line, 56 permanent houses haves been inventoried and require shifting. A minority (14%) of owners has lands where they can build, the majority doesn't have it especially at Kiziba centre level.

Fences have been inventoried in the hold of the line. It must be noticed that among inventoried houses, some have also fences and toilets that will have to be compensated for with houses.

Photo 6. Typical Houses of Rwegura

Rwanda

Counted residences in the hold that will have to be shifted are 271. The distribution by kind of residence is the following.

Tableau N° 28. TYPE OF SETTELMENT INSIDE THE WAYLEAVE

Permanent	41
Semi-permanent	211
Temporary	19

In house of temporary type, walls are built of dried earth applied on trellis of (pisé) branches, the roof is thatched. Semi-permanent houses are built of dried bricks and have thatched or sheet metal roof. Permanent houses are built of concrete or baked bricks and have sheet metal roof.

6.3.2. AGRICULTURAL BUILDINGS

In the area crossed by the project, none agricultural buildings has been counted in Burundi, moreover, there are some 38 shelters for animals in Rwanda.

The project can have impact on the construction of agricultural buildings. Discussions mode with local authorities in Rwanda showed indeed that in their planning, they wish to intensify agricultural activities (maize, rice, fruit and market gardening, cassava) in the region and develop transformation units. The only constraint is permanent and sufficient access to electric power. The impact will then be positive on storage agricultural buildings in the region in the medium and long term.

6.3.3. ARABLE LANDS

In the construction period crops will have to be destroyed or delayed in the wayleave area. It is difficult to assess the exact impact on the annual harvest since the exact period and duration of construction in each locality are not known. For this reason compensation (cash equivalent) of a year of harvesting of the area under cultivation in the wayleave should be given to all the households. In addition, crops that may be removed from land to be temporarily used for construction purposes (camp, access road) will also have to be compensated on the same base (cash equivalent to a year of harvesting).

At long term or for the mechanized operations the high voltage lines can affect the agricultural operations and increase the cost. These impacts depend on the design of the line and the type of operations on the farm.

On the long term, transmission lines can affect farm operations and increase costs for the farm operator. Potential impacts depend on the transmission line design and the type of farming.

Transmission line and poles can:

- Create problems for turning field machinery and maintaining efficient fieldwork patterns;
- Create opportunities for weed encroachment;
- Compact soils and damage drain tiles;
- Result in safety hazards due to pole and guy wire placement;
- Hinder or prevent aerial activities by planes or helicopters;
- Interfere with moving irrigation equipment;
- Hinder future consolidation of farm fields or subdividing land for residential development.

On the other hand, the introduction of power in the area will result into improved storage and processing of agricultural products.

Burundi

In Burundi, the major part of the hold includes fields of annual, biannual and perennial cultivations. Main cultivations are banana plantations, coffee plantations, fruit trees and potatoes, sweet potatoes, corn fields (avocado tree, maracuja, papaw tree, etc.) During the construction of the line, these fields will be affected and that will be able to slow down the rural works activities.

The surfaces (m²) assigned to the various cultivations are as follows:

Tableau N° 29. BURUNDI : AREA AND CROPS AFFECTED IN THE WAYLEAVE

Cultures	Area (m²)
Aubergine	80
Banana	6 120 000
Wheat	1 100
Colocase	8
Bean	2 584
Manioc	4 176
Sweet Patatoes	9 464
Green peas	568
Patatoes	188
Sorghum	1 240
Tomato	8
Others	364

We also find tea, coffee and trees plantations. The number of seedlings or trees located in the influence is as follows. Only, the Rwegura industrial tea plantation is crossed by the line over a 2,8 km length. The surface affected during work is equivalent to 8,4 ha. For the lost surface in a permanent way, and which correspond to the place of the towers, it amounts to approximately 50 square meters.

Tableau N° 30. BURUNDI : TYPES OF CULTURES

Cultures	Plants
Coffee	1 168
tea (without the factory)	192
Avocado	20
Eucalyptus (m³)	3 292
Mango	4

Rwanda

The land's issue is a sensible issue in Rwanda due to (owning) the rarity (scarcity)of agricultural lands. The land's conflicts are located ahead among the issues of the legal authorities such as people with local authorities). The latest report on the human development from the UNDP (2007), states that 11,5% of the households is live without lands and 28,9% hold lands inferior to 0,2 ha.

In the zone crossed by the project of the ex-provinces of Butare and Gitarama, the people without land are in the respective proportions of 5,9 % and of 3,4 % while those which have family exploitations lower than 0,2 ha are 61,7 % and 25,2 %.

The most frequently practiced cultivations are those called food-producing cultivations, the fruit cultivations and the swamps' cultivations within the deepest bottoms, the cultivations generating income such as the coffee tree and the sugar canes and the tree planting and agro forestry.

The project will affect the vivace cultivations and afforestations (see table below). By order of importance we find banana plantations, sorghum and cassava. Among the trees we find eucalyptus and avocado trees. The disturbance of harvests during the construction and the loss of the plantations of trees must be compensated not to negatively disturb the socio-economic life of population.

Tableau N° 31. RWANDA - AREA AND CROPS AFFECTED IN THE WAYLEAVE

Crop.	Area (m²)
Banana	189 783
Bean	24 089
Manioc	87 111
Sweet patatoes	32 369
Sorgho	144 345

We also find tea, coffee and trees plantations. The number of seedlings or trees located in the hold is as follows:

Tableau N° 32. TREES IN THE WAYLEAVE

Culture	Plants
Fruit tree	245
Coffee	1 144
Cœur de bœuf	8
Guava	30
Papaya	41
Avocado	693
Cypre	23
Eucalyptus	2 488
Grévélia	369
Cedfrela	8
Others	222

6.3.4. FARMING ACTIVITIES

Burundi

In this mountainous area of Burundi the activities of breeding are very limited and the only raised livestock is represented by some goats.

Rwanda

Inside the project area, the farming relies on the permanent « stabulation » within the cowsheds. Within these zones, the impact of the project is that of short term and will focus on the damaging of the fodder cultivations practiced on the embankment of anti-erosive pits or the tough terraces. Yet, the inventory of environment element have noted 6.57 ha of reeds (penissetum sp) used as fodder

The project will have only a short term impact on farming as most of the animals are in loose housing or part time stalling.

6.3.5. OTHER ECONOMIC ACTIVITIES

It is expected that if there is distribution of power in the communities along the corridor there will be a boost in micro, small and medium enterprises which will in turn result into employment opportunities for the locals.

6.3.6. COMMUNITY BUILDINGS WITHIN WAYLEAVE

Burundi

The Nyamisagara Protestant church in the Kabarore district, Kabarore zone, will not need to be moved following the presentation of an alternative of layout which passes more to the east. No other Community infrastructure had been inventoried in the line hold.

Rwanda

No community building is present within the way leave.

6.3.7. INFRASTRUCTURES

Burundi

The inventory showed that in the line hold, 14 roads (among which the asphalt road is RN 10 which is from Rugombo to Kayanza) and 7 tracks will be crossed during the building work. These works could temporarily disturb transport and the exchanges/ trades which are done through these roads. However the setting up of measurements of attenuation will limit these disturbances considerably.

Rwanda

The infrastructures which will be affected by the project are effectively the roads. The national road (asphalted) from Kigali (Burundi) to the border at Akanyaru which will be crossed one time by the HV line. Additional secondary roads in compacted lands within the rural area will also be crossed by the electric lines conductors. The impact of the project on these infrastructures will be the temporary perturbation of the traffic along these roads

6.3.8. HEALTH AND WELL-BEING

Transmission of electrical energy through high voltage lines poses potential risks and hazards to the population living next to the lines due to the high current flowing through the conductors. However if the well known safety rules of erection for the pylons the line the distance in the way leave are taken into account and if the maintenance is regularly performed, the potentials risks are very low.

The extension of Rwegura and Kigoma sub-stations will pose no additional risk or hazard of fire or explosion. The sub-stations are equipped with fire equipments.

In Burundi, the line Rwegura-Kigoma will pass next to the line Rwegura-Kayanza, safety measures will ensure that the risk of short circuit or other troubles between the 2 lines will be minimized.

Pylons built at the edges of the roads, rivers or in other sensitive zones could, with time and especially erosion, collapse and cause accidents to the nearby inhabitants or overvoltage in the distribution. An efficient maintenance program will have to be in place.

Exposure to Electro-magnetic field (EMF)

Health concerns over exposure to Electro-magnetic field (EMF) are often raised when a new transmission line is proposed. Exposure to EMF caused by transmission lines has been studied since the late 1970s. These fields occur whenever electricity is used. The EMF is created when electric current flows through any device including the electric wiring in homes.

Diseases

Influx of workers from outside communities brings risk of spreading communicable diseases such as HIV/Aids. Also people not immunized against malaria could be at the risks to catch the disease, as quite all the area of the corridor is infected.

The labour infested by various parasitizes could contaminate the sources of water of the working area like conversely, it could be contaminated by contaminated water in the absence of drinking water.

The existing health facilities in the construction area are already not adequate for the local population, and they will not be able to provide a sufficient services for the new workers of the construction sites.

Influx of workers from outside communities brings risk of spreading communicable diseases such as HIV/Aids to local communities. Besides infectious diseases, accidents are likely to happen especially to the construction crew and members of the public should they come to the construction area. Although the magnitude of impact on health is expected to be low, it may be long term in case of HIV/AIDS.

Construction sites pose potential hazards to both workers and nearby communities because they would raise curiosity especially among children. Increased traffic in the villages could be a source of accidents as well.

Noise

Types of noise as sizzles, crackles, or hissing noises occur during periods of high humidity and are usually associated with high-voltage transmission lines. These noises are very weather dependent. They are caused by the ionization of electricity in the moist air near the conductors. Though this noise is audible to those very close to the transmission lines, it quickly dissipates with distance and is easily overshadowed by typical background noises.

In some area, construction works will be performed near housings farms and shops where traffic and machinery noises will be noticeable. Apart of the cities the noise is usually very low in rural area. This impact will be of temporary nature only, and can be minimized by adopting appropriate mitigation measures (refer to Section 7)

Aesthetic impacts

Loss of vegetation and landscape compounded by structures of transmission lines may lead to loss of esthetical value.

The overall aesthetic effect of a transmission line is likely to be negative to most people, and not compatible with agricultural or natural landscapes. That reaction to aesthetic of transmission lines vary. Some residents do not notice them or find them objectionable from an aesthetic perspective. To some, the lines or other utilities may be viewed as part of the infrastructure necessary to sustain our everyday lives and activities and therefore acceptable. To others, new transmission lines may be viewed in a positive light because it represents economic development. In the community or household consultation, the aesthetic impact of the project was not mentioned. This indicates that it is not a big concern for the impacted populations.

Air quality and dust

This will be an issue during the construction of access roads and clearing of vegetation along the ROW, especially dust emission since it is recommended that construction take place during the dry season. The fuel combustion from trucks and heavy machinery is a source of air pollution, as well as the burning of shrubs and trees coming from vegetation clearing in the wayleave may cause air pollution.

People at the risks are those of the households gathered in the agglomerations or the shopping centers along the roads which will be taken by the motorized machines of the project.

6.3.9. JOBS OPPORTUNITIES

It is expected that some jobs will be available during the construction of the transmission line for the local population. The masons, welders and other workers who are not specially qualified could be recruited to work on the construction site. Moreover, the inhabitants of the area could be engaged in the maintenance of the line for vegetation control within the wayleave or for the maintenance of other infrastructures.

However, most of the employment opportunities will be temporary and the jobs will also be limited because not more than 100 people will be expected to work on the line at any time. Nonetheless, REGIDESO and Electrogaz should encourage local leaders to form a project liaison group to assist them in distributing jobs to local communities.

The skilled workforce, professional and administrative personnel, will most likely be from outside the project area, and this may cause some resentment from the local people. Nevertheless these workers will bring within the project area the much needed additional money to spend.

After construction, the rural electrification would undoubtedly be accompanied by the creation of jobs following the development of small trades like welding, carpentry, mills and food transformation. This could contribute to reduce migration among the rural population. It can also reduce the walking distance to find commodities for local residents.

6.3.10. CONSTRUCTION PROCUREMET

Some materials used for construction needs could come from the local market in particular for food products, building material for pylons foundations (stones, gravel, sand, cement, etc), renting of storage spaces and guesthouses, hiring of transport vehicles, provisioning of office supplies and petroleum products. Other materials could also be provided by companies that operate in the field of electricity in the country. The machines to transport the material which will be used on the line could be rented from national companies.

REGIDESO and Electrogaz should encourage local business leaders to form a project liaison group to assist them in monitoring local procurement practices.

Well-being

The project will have a positive impact on the well-being of the population of the study area during the period of the setting up of the high voltage line. That well-being will be the result of additional incomes that will be associated with the creation of temporary or permanent job for local personnel or the purchase of various resources by non-resident personnel and entrepreneurs as well as compensations that will be distributed. In terms of concrete impacts, this money supply will contribute to the improvement of diet (reduction of malnutrition cases), increase of children schooling, improvement of accessibility to health care and increase in business. However, this impact will be of short time, that is to say during the building phase.

6.3.11. BENEFIT OF RURAL ELECTRIFICATION

Burundi

During the line exploitation, positive impacts will be numerous because of this agricultural region has a little rural electrification. If the area electrification is done, it will allow creation of business and improvement of services. As it is an interconnection with other countries of the region, this line will allow as well to compensate for the fall of the energy production of the power station of Rwegura because of the reduction of the river flow or technical problems.

10 km away from the hold of the line Rwegura-Kigoma, 3 centers in Kabarore district could benefit from connection to the network (Kiziba, and Yandaro) as well the Musigati district (district where the Rwegura hydropower station is situated). Masango zone could be electrified which could no doubt limit attempts of act of sabotage on electric lines by inhabitants that put forward the reason that electricity comes from their place but they do not benefit from it.

Photo 7. Village of Kiziba

The tourist centre of Rwegura and offices of the national park of Kibira could also benefit from rural electrification and thus attract more tourists that will come to visit that zone rich in biodiversity.

Coffee hulling and washing stations of Manga and Yandaro, community infrastructure (schools, churches, health centers, etc.could benefit from electrification.

The exploitation plant of Colombo-tantalite could increase its production if electric power were available.

Photo 7. Yandaro Coffee factory (washing and de-pulping)

Rwanda

The expectations of the local population for the rural electrification have been largely expressed. The impacts to possible development of the rural electrification development are particularly:

- The contribution to the development of information technologies and communications (TCI) within the primary and secondary schools trough the improvement of straight teaching and that at distance.
- The improvement of the health equipments among which are health centers and existing and planned hospitals. Already the hospital of Gakoma (which is a reference for numerous health centers in the districts of Gisagara and Nyanza) is no longer provides in electricity.
- The development of trading centers enabling the conservation for a long period of perishable products or in supplying clients with cool products such as drinks.
- The improvement of services provided by most the areas which are without electricity while they are considered actually as the basics of community development with the policy of decentralization.
- The development of the arts and crafts (such as sculpture, soldering (welding)…), and the development of the transformation of agricultural products (bananas, maize, tomatoes, rice, etc.)
- The development of tourism mostly at Nyanza (erection of hotels, production and commercial center for handicraft…), development of sports or recreational activities as a new stadium will be soon erected at Nyanza

- The motivation of the population to the joining up to the policy of gathered housing called "umudugudu". Within the area of study, the population has only a few concern about the policy of gathered housing. Most of authorities think that the supplying of existing villages in electricity should encourage the population to be gathered within the umudugudu.

The expectations of the local authorities and the population for the rural electrification have been largely expressed and these impacts will contribute to the long term development of the zones served and will decrease the poverty.

6.3.12. CONTRACTORS CAMP

Construction camps may have an impact on the environment through vegetation clearance, compaction of soils and source of water pollution due to inappropriate management pf solid and liquid wastes. These impacts can be ongoing if the camps are not adequately rehabilitated after their use and adequate sanitation facilities provided during operation.

Camps should be located away from residential areas and environmentally sensitive areas (forests, parks, wetlands, etc.). If mitigation measures proposed in the ESMP (chapter 7) are implemented, the impacts from temporary construction camps can be managed to acceptable levels.

6.3.13. CUMULATIVE IMPACTS

Burundi

The line Rwegura-kigoma creates a cumulative impact at the Kibira natural forest level concerning the cutting of the vegetation in order to clear the line. There is indeed another line Rwegura-Kayanza which has similar impacts on the forest and its biodiversity. The few inhabitants living near the station could be influenced by the station and the line.

This line intersects the line Mparamirundi –Kabarore not far from the centre of Kiziba. Inhabitations of this hill will be subjected to cumulative effects of those both infrastructures (moving and limitation of plantation on their land).

Rwanda

The projects which should create cumulative impacts with the present project among the population of zone of study are for most, the cases of projects planned by the authorities of the districts of the study.

There have been noticed for the district of Ruhango, projects of coffee and turnsole transformation and pineapple juice production. In the district of Nyanza, priorities have been given to fitting out marshes for the growing of rice and maize in the area of low altitude. In the area of economic development that is close to the headquarters of the district, it has been planned to set up an industry of silkworms, Olympic buildings of which a stadium and a tourist centre with setting up of high standard hotels.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Section addresses mitigation measures, monitoring and institutional arrangements for the environmental and social management of the Project.

The environment and social management plan (ESMP) is an action plan or system which addresses the how when, who, where and what of integrating environmental mitigation and monitoring measures throughout an existing or proposed operation or activity. The ESMP addresses only the environmental and social issues relevant to the particular application identified or should link findings of the impact assessment into the management system of environmental performance. ESMP also serves as the function of integrating environmental conditions under various legislations.

The purpose of the environmental monitoring program is to ensure that the envisaged outcome of the Project is achieved and results in the desired benefits to Burundi and Rwanda. To ensure the effective implementation of the ESMP it is essential that an effective monitoring program be designed and carried out. The environmental monitoring program provides such information on which management decisions may be taken during construction and operational phases. It provides the basis for evaluating the efficiency of mitigation and enhancement measures and suggests further actions that need to be taken to achieve the desired Project outcomes. An environmental monitoring program is outlined in Section 7.5.

7.1. PROPOSED ENVIRONMENTAL AND SOCIAL MANAGEMENT MEASURES

An outline of the environmental mitigation measures during the various stages of the Project is provided in the following Environmental and Social Management Plan. Appendix 9 also includes a selection of environmental prescriptions for construction activities which should also be included in all Construction Contracts.

Tableau N° 33. PROPOSED ENVIRONMENTAL AND SOCIAL MANAGEMENT MEASURES

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	PRECONSTRUCTION			
Social expectations and community consultation	Conduct information cessions for authorities and communities (at national and provincial and district level) including ONG or local community in all the areas affected by the project Inform all communities along transmission route of rights to compensation. Provision of sufficient project information.	All communities along the ROW	Burundi = 10 000 Rwanda = 20 000	PIU (Project Implementation Unit, see RAP in chapter 8)
Job opportunities **Construction procurement**	Development measures: It is recommended for the Contractor to develop and implement a plan to ensure that local residents are given first priority for job opportunities for which they are qualified, before workers from outside the region are hired. Details of specific job opportunities must be released and information provided on application procedures. Development measure: The Contractor should investigate local, regional and national capacity to supply construction materials, goods and services. Whenever goods or services are available on a competitive basis, the policy should be to purchase locally. Develop specific employment programs for women, young, poor and other vulnerable groups.	All communities along the ROW	As part of works to be executed by the contractor	PIU (Project Implementation Unit, see RAP in chapter 8) Contractor
Land and building acquisition	Final valuation of all affected assets to update the RAP cost estimates prior to payment of entitlements. Put in place a grievance resolution mechanism. This operation should start a year before the beginning of construction activities. Appropriate valuation of the property affected should be done both by property owners and the project implementing body. Based on the valuation reports, appropriate compensation should be done before construction starts within sufficient time for affected household to transfer or reconstruct structures Complete all necessary land and building acquisition in accordance with RAP (see chapter 8) prior to commencement of any construction works. Rwanda: Proceed with the payment of indemnities (cash or nature) prior to any moving within 120 days. Give at least 90 days to the expropriate to relocate.	ROW	Burundi = 50 000 Rwanda = 75 000	PIU (Project Implementation Unit, see RAP in chapter 8)

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
Implementation of environmental management requirements	Preparation of contractor's environmental management plans.	All work sites and activities	As part of works to be executed by the contractor	Contractor
Health and Safety issues	Preparation of health and safety plan for workers and impacted communities addressing issues including : Measures to prevent the spread of HIV/Aids such as public awareness and free condoms Education and sensitization of workers and the communities on STDs including HIV/Aids and the dangers of construction activities. Provision of safety equipment for workers Use of child labour be prohibited Provision of protective wear to the workers (60) by the Contractor Warning signs should be placed near construction sites. Contractor should avail First Aid Box at each work site. Provide equipment, electricity etc. and assistance to at least one Health Centre in each of the affected commune in form of equipment for the laboratory, medicine, connection to the grid, etc.	ROW, campsites, all communities along the ROW	Rwanda = 30 000 Burundi = 20 000	ELECTROGAZ, REGIDESO, Contractor, Health inspectors
Work site survey, pegging and approval	Survey the proposed alignment with a level and peg the centerline. Jointly inspect the surveyed alignment. Locate, peg out and seek approval from the Engineer for each ancillary site prior to the commencement of related activities. Inspect and approve if correct all pegged ancillary sites.	Through ROW, all ancillary sites	As part of works to be executed by the contractor	Contractor, Engineer, SEO
Clearance approvals and borrow pit permits	Only licensed quarries and sand suppliers shall be used. Obtain written permission for borrow pit operation from the landholders with prior approval of the rehabilitation proposal of the borrow areas from the Site Environmental Officer (SEO) and provide copies to the CES. Provide a copy of all necessary permits to the CES. Adhere to all permit terms and conditions.	ROW, surroundings	As part of works to be executed by the contractor	Contractor, SEO. CES

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
Temporary construction camps	If the need arises to construct a contractor's camp then the following measures will be taken: Full compensation for any crops, properties and rent for the land while the works are ongoing will be paid. The District authorities will provide values for crops and structures respectively. If persons will be required to temporarily shift, then a disturbance allowance will be paid. The disturbance allowance is 15% or 30 % of the total amount assessed depending on whether the notice is six months or three under the Ugandan law. The Contractor will need to pay rent to the landowner as agreed prior to construction. In setting up a workmen's camp, consideration will be given to water availability and fuel supplies. Contractor should prepare for approval by the CES plans for the base camps and other work sites, which make adequate provisions for safe disposal of all wastes, and prevention of spillages, leakage of polluting material, etc. Contractor should be responsible for payment of all costs associated with cleaning up any pollution caused by his activities and to pay full compensation to those affected. Provide and maintain proper drinking water, worker's health check-up and sewage and waste disposal facilities at the camps.	Construction camps sites	As part of works to be executed by the contractor	Contractor, SEO. CES
	CONSTRUCTION			
Vegetation clearance	Vegetation clearing should be minimized. Adjusting tower placements and span length to minimize the need for tree removal and trimming along forest edges. Reduce the width of the ROW when crossing woodlands and plantations. Clearly mark out the extent of clearing within the approved worksite areas with pegs at 50 m intervals or less. Identify and mark individual trees for retention along a section within the marked extent of clearing. Seek approval for clearing from the CES at least 1 week prior to any proposed clearing. Inspect and approve all correctly located and pegged clearing sites. Vegetation clearance shall only be undertaken once consent to clear strip plantation / individual trees along the alignment has been obtained from each owner. Compensate for all trees and useful plants in the areas affected by the ROW. Instruct all construction workers to restrict clearing to the marked areas and not to	Through ROW, all ancillary sites Kibira national Park	As part of works to be executed by the contractor Kibira national park = 20 000	Contractor, SEO, Engineer, REGIDESO, ELECTROGAZ, CES. INECN

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	harvest any forest products for personal consumption. Stockpile cleared shrub foliage where possible within the ROW for later use as a brush layer.			
	Allow tree and shrub species with limited heights of 4 to 5 m to grow within the ROW. Trees along the right of way should be protected from machinery. Within the limits of the Kibira national Park, reduce the width of the wayleave and vegetation clearance to the minimum required (5-10 m). A revegetation program should be developed to compensate the loss of 2.4 ha of vegetation in the Kibira national park. This program should be elaborated with the participation of the INECN.			
Drainage disruption	All necessary measures shall be undertaken to prevent earthworks from impending cross drainage at rivers/streams, irrigation canal, etc. In sections along watercourses, earth and construction wastes should be properly disposed of so as not to block rivers and streams. Where it occurred, remove backfill from the swamps/wetlands when tower erection is complete. Install culverts or bridges for temporary and permanent access roads. Survey and peg the designed drainage works prior to construction. Outlet drains into existing stable drainage lines, or where this is not possible, consult with adjoining downslope landowners on mutually acceptable locations for drain outlets. Construct all designed drainage works prior to, during or immediately following excavation work in order to minimize the erosion hazard. Inspect all works and ancillary sites for drainage and erosion problems after each major storm event during the period of construction. Repair all failed drains and take other appropriate action as directed by the Site Environmental Officer.	Through ROW	As part of works to be executed by the contractor	Contractor, SEO, CES
Sedimentation	Identify and map all areas where soil disturbance is susceptible to occur. For each of these areas, identify appropriate sediment control structures and install structures prior to commencement of works. When possible, schedule works requiring large areas of soil disturbance or river crossings to avoid rainy season. Avoid cutting vegetation along the lakes,	Through ROW	As part of works to be executed by the contractor	Contractor SEO, CES, INECN

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	rivers and ravines and revegetate after construction.			
Soil erosion and slope instability	Prior to construction, install necessary temporary/permanent erosion and sedimentation control structures. Access roads and constructions along steep slopes and rivers should be avoided; roads can be located perpendicularly or diagonally to the slope. For inaccessible areas and steep slopes or fragile soils (rocks, lava zones, etc), use labour to transport the material and use the existing tracks and paths preferably. After construction, soil should be leveled off, areas stabilized to facilitate vegetation regeneration. Activities should be carried out in the dry season especially for the wetland areas. Avoid vegetation clearing on steep slopes. Wherever possible avoid locating towers, construction areas, access tracks and construction camps on steep slopes. Construction vehicles should remain in identified access tracks and ROW to avoid damaging soil and vegetation. Ensure topsoil is left in a non-compacted condition following completion of works. Ensure re-vegetation at the earliest time. Where erosion occurs on steep slopes, river banks, etc. all exposed soils should be rehabilitated immediately following construction activities (grass shall be seeded or other measures implemented depending like silt fences). Use lower impact / tracked vehicles for pulling stringing ropes along ROW.	All project area, specially steep slopes and river crossings	As part of works to be executed by the contractor	Contractor, SEO, CES
Top soil removal and re-use	Strip and save all available topsoil from within the ROW and other borrow pit areas and re-use it for site rehabilitation. If topsoil is to be stockpiled, keep it separate from sub-soil material.	Through ROW and ancillary sites Cassiterite mine	As part of works to be executed by the contractor	Contractor, REGIDESO, SEO, CSE
	Burundi : Soil resulting from constructions must be used to rehabilitate degraded areas in particular the abandoned site cassiterite mine near Rwegura			
Impact on waterways and water pollution	Design the line to avoid waterways crossing. Avoid designing the transmission line route running along river beds. Erection of bridge on river should be minimized, also it should be temporary bridge Weight of erection vehicle using bridges should be kept at a minimum. Avoid the placement of pylons in or immediately adjacent to river banks to reduce		As part of works to be executed by the contractor	Engineer, REGIDESO, ELECTROGAZ, SEO, CES

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	the potential for soil erosion into the stream. Regular maintenance should be carried out on all vehicles and other machinery used for construction. Prohibit construction and maintenance vehicles from driving in waterways. Ensure that the Contractor submit Emergency Procedures prior to commencing activities on the site. Provide appropriate waste management strategy for soils and liquids to control soil pollution and degradation of the environment Prohibiting construction and maintenance vehicles from driving in waterways. Use approved erosion control methods as outlined above. Ensure that potential sources of petro-chemical pollution are handled in such way to reduce possibility of spills and leaks. Ensure that Contractor have a spill kit in his possession at any time. The Contractor shall submit a Waste Management Plan for approval by the CES before commencement of work. As part of this Plan to include: Provision of an appropriate number of toilets at worksites (1 for 15 persons); Septic tanks or an alternative sewage system will be designed to accommodate the sewage level at the substation sites; Urinating or defecating anywhere other than in the toilets shall not be permitted. The Contractor shall enforce the use of such sanitary facilities by all personnel on the site; Provision for on-site treatment of effluent at long-term work sites; Training of construction employees on project sanitation practices. Vehicles maintenance should be confined to designated areas or in construction camps designed to contain any spill of fuel or lubricant. Waste petroleum products and used oils must be collected, stored and taken to authorize disposal facilities according to NEMA regulations.			
Protected areas Kibira national Park	Reduce the width of the ROW to the minimum (5 m) when crossing the Kibira national Park. Follow the Rwegura-Kayanza transmission line. Protect the trees on the edge of the ROW. Avoid crossing bamboo stands. Prohibit workers from cutting plants and trees or picking fruits, nuts, or any other part of a	Kibira national Park	As part of works to be executed by the contractor Kibira Reforestation program:	Contractor, SEO, CES, INECN

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	plant. Minimize construction of new roads and paths in the park and use the existing access paths to the Rwegura-Kayanza transmission line. If there is a need for a construction camp in this area, install the camp at least at 1 km from the park. When construction works are finished, close all access roads and tracks and revegetate them including any other work sites using indigenous plants species. Inform and make an agreement with INECN before commencing any work including vegetation clearance. INECN should prepare a reforestation program which could be included in the existing management plan, for the area along the transmission line. This program should intend to restore the ecosystems.		20 000 (see above)	
Impact on wetlands	Activities should be carried out in the dry season especially for the wetland areas to minimize disturbance of sensitive soils and problems of in flood prone areas. Avoid construction of the transmission lines through wetlands and span wetlands wherever possible. Where it's not possible to completely avoid wetlands, the use of mats and wide-track vehicles when crossing wetlands is preferable. Burundi: Avoid Gitenge and Nyabuturi wetlands as they are water sources for the Rwegura lake and important habitats for the fauna. Fine tuning of tower locations in consultation with local communities and the Wetlands Inspection Division. If towers are to be erected in swamps not easily accessible from existing roads or causeways, specialized construction techniques should be used to access the sites in a way that does not require permanent access ways to be built. All temporary structures should be removed after works. Carefully clean construction equipment after working in areas infested by purple loosestrife or other known invasive, exotic species. Regular maintenance should be carried out on all vehicles and other machinery used for construction. Vehicle maintenance should be confined to designated areas or in construction camps designed to contain any spill of fuel or lubricant. Ensure that potential sources of petro-chemical pollution are handled in such way to reduce possibility of spills and leaks.	Burundi: Marais de la Gitenge et de Nyabuturi, Through the ROW	As part of works to be executed by the contractor	Contractor, SEO, CES,

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	Waste petroleum products and used oils must be collected, stored and taken to authorize disposal facilities according to NEMA regulations. Prohibit construction and maintenance vehicles from driving in waterways. Use approved erosion control methods as outlined above. Ensure that the Contractor submit Emergency Procedures prior to commencing activities on the site. Ensure that Contractor have a spill kit in his possession at any time. Provide appropriate waste management strategy for soils and liquids to control soil pollution and degradation of the environment The Contractor shall submit a Waste Management Plan for approval by the CES before commencement of work. As part of this Plan to include: Provision of an appropriate number of toilets at worksites (1 for 15 persons); Septic tanks or an alternative sewage system will be designed to accommodate the sewage level at the substation sites; Urinating or defecating anywhere other than in the toilets (latrines) shall not be permitted. The Contractor shall enforce the use of such sanitary facilities by all personnel on the site; Provision for on-site treatment of effluent at long-term work sites; Training of construction employees on project sanitation practices.			
Impact on eucalyptus plantation	Reduce the width of the ROW to the minimum (5 m) when crossing eucalyptus plantation. Protect the trees on the edge of the ROW. Make an agreement with the owners before commencing vegetation clearance.	Eucalyptus plantation along the ROW	As part of works to be executed by the contractor	Contractor, SEO, CES
Invasive species	Thoroughly clean engines and machinery before using them in the Kibira national Park to avoid contamination by invasive species.	Kibira national Park	As part of works to be executed by the contractor	Contractor, SEO, CES, INECN
Impact on wildlife including illegal hunting of bushmeat by workers during construction	Neighboring areas are not chased away and land in the hands of hunters. Prohibit workers from possessing firearms and other hunting devices. Prohibit wildlife disturbance and poaching. Paths created through wetlands during construction and are not intended to be permanent should be blocked as soon as construction is complete so that area	camp sites Kibira national Park		ELECTROGAZ, SEO, CES, INECN

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	rejuvenates and the habitat restored. It is recommended that a precautionary measure be taken near wetland areas to reduce the risk for bird collision/electrocution. Such a measure could include use of reflectors placed at intervals on the ground wire along the line to minimize potential impact of bird collision. Maintain shaded stream areas for aquatic fauna, where possible.			
Endangered/Threatened and Protected Species	Before construction a comprehensive survey of rare birds should be undertaken to specify their status and elaborate protective measures. As well a monkey survey should be undertaken in order of collecting data on habitat use and location. Where the line crosses the Kibira national Park, on each side of the Rwegura reservoir, insulate the conductors to prevent monkeys from being electrocuted. In some cases, ROW can be managed to provide habitat for endangered/threatened resources.	Kibira national Park	Fauna survey in Burundi: 10 000 Conductor insulation on a length of 1 500 m: ???	Engineer, REGIDESO, INECN
Construction traffic management	Contractor and sub-contractors should use appropriate vehicles and comply with legal gross vehicles and axle loads limits. Contractors should repair damages at own expenses. Contractors should minimize road safety hazard and inconvenience to other road users by taking all appropriate measures.	Through ROW	As part of works to be executed by the contractor	Contractor, SEO, CES
Access to the proposed corridor	Where access tracks are not present (i.e. in areas where the new transmission line does not follow the existing line), an access track of approximately 5 m width will be cut through all vegetation along the wayleave, where possible following the centerline of the wayleave. Clearance for housing and other buildings will be maintained by local adjustment of the route. Cut trees will be left for the use of (or sale by) local owners.	Through ROW	As part of works to be executed by the contractor	Contractor, CSE, SEO
Air and dust pollution	Spraying of water during the construction work will be done to suppress dust emission at construction sites adjacent villages/house. At least twice a day in problematical areas. Vehicles delivering materials shall be covered to reduce spills and dust blowing off the load. Control speed and operation of construction vehicles. The machines used on construction sites should be maintained in good condition to minimize gases emission resulting from the combustion of their engines. Prohibit burning of trees and vegetation debris resulting from vegetation clearing in the ROW.	Through ROW	As part of works to be executed by the contractor	Contractor, SEO, CES

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
Noise pollution	Noise pollution should be reduced to a minimum during construction phase. Workers in vicinity of strong noise will wear earplugs and their working time should be limited according to national guidelines. Construction would be stopped from 21:00 to 06:00 hrs at construction sites located within 300 m of residential areas. Machinery and vehicles will be well maintained to keep noise at a minimum level. The construction period should be made as short as possible.	Through ROW	As part of works to be executed by the contractor	Contractor, SEO, CES
Landscape and interference with aesthetics along the corridor route	Where possible, straight line runs are maximized so that the need for angle towers, which have a more negative visual impact due to their heavier construction, is minimized. Wayleave management can also mitigate aesthetic impacts by planting vegetative screens to block views of the line, leaving the wayleave in a natural state at road crossings, creating curved or wavy wayleave boundaries, pruning trees to create a feathered effect, and screening and piling brush from the cleared way-leave so that it provides wildlife habitat. Replant indigenous trees in areas where vegetation is unnecessarily removed. Short flora and trees will be retained. Landscaping of all disturbed areas will be undertaken.	Through ROW	As part of works to be executed by the contractor	REGIDESO, ELECTROGAZ, Engineer, Contractor, CES
Risks, hazards, security	Erect warning signs to avoid risks from moving vehicles. Erect an appropriate number of lightning arrestors. Sensitize the communities along the ROW about the risks and dangers of electricity. To sensitize the population along the line on the security measures.	Through ROW	As part of works to be executed by the contractor	Contractor, SEO, CSE, REGIDESO, ELECTROGAZ
Electric and Magnetic Fields (EMF) **Lighting strikes**	The transmission line will be designed and constructed to ensure that EMF levels are well below accepted guidelines for occupational and human health exposure limits. To minimize exposure of the general public to EMF, no business, schools or residential building structure will be allowed in the ROW. No building structure (residential or business) should be allowed to be constructed within 20 m of the center line of the existing and proposed high voltage transmission lines. Incorporate ground wire on top of the line during design. This protects the transmission line from lightning strikes by arresting the lightning ions and propagating them safely to	Through ROW	As part of works to be executed by the contractor	Engineer, Contractor

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	ground. Lightning is therefore not more likely to strike houses or vehicles close to the transmission line. Shorter objects under or very near a line may actually receive some protection from lightning.			
Working conditions	The Contractor should adopt policies and procedures that comply with national and international legislation. Sub-contractors should adhere to labour and health and safety legislation.	Through ROW and camp sites	As part of works to be executed by the contractor	REGIDESO, ELECTROGAZ, Contractor
Public health, occupational health and safety, fire preparedness and response	As a general precaution, no one should be on an object that is taller than 5 to 6 meters under an overhead high-voltage transmission line. Construction of residential and business building structures shall not be permitted within 20 m of the center line. Community and workforce sensitization on STDs including HIV/Aids and the dangers of construction activities, including free condoms for workers. Provide assistance to at least a Health Centre in each of the affected districts in form of equipment for the laboratory (microscope, refrigerator, etc.), medicine and connection to the grid. The main danger during construction will be the likelihood of accidents to the construction mainly to the workers. It is there fore recommended as follows: Protective wear should be provided by the Contractor to the construction crew; Members of the public should not be allowed in the construction area; First Aid facilities should be availed to the workforce; Warning signs will be placed at the pylons and substations to warn intruders of the potential for electrocution. Install and maintain firefighting equipment and machinery. Provide emergency fire assembly points at strategic locations, clearly marked. Provide billboards at site or entrance to notify motorists about the ongoing activity and turning of construction vehicles. Contractor should avail First Aid Kit at the site.	Communities along ROW	See Health & Safety budget in preconstruction activities	Contractor, Health and Safety Officers
Climbing and Electrocution Risk	All towers will be fitted with warning signs and anticlimbing devices. Sub-stations to be fenced.	All transmission towers and substation sites	As part of works to be executed by the contractor	Engineer, Contractor
Waste management	The Contractor should prepare a Waste Management Plan. This Plan should be	Through the ROW and all	As part of works to be	Contractor,

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	approved by the Site Environmental Officer before beginning of works. Ensure proper solid waste disposal and collection facilities. As part of the Waste Management Plan to be submitted by the Contractor, the following management measures shall be implemented: Waste management training for all workers; The Contractor shall identify a suitable site for the disposal of solid waste from construction activities in agreement with the local authorities and shall ensure that such a site is used properly; Wood etc. e.g., cable reels, may be sold for a nominal fee to local persons; Burning could be used as a last option and only when material cannot be disposed of at a licensed disposal location. Only dry, clean-burning material (wood, cardboard, paper, dry vegetal material) will be burned. Hazardous and dangerous wastes should be managed properly	camp sites and ancillary sites	executed by the contractor	SEO, CES
Increased population and workforce management	Liaise with local communities regarding proposed construction activities. Residents in the project area should be employed to provide unskilled labour to minimize this impact. Ensure workers act in a responsible and respectable manner to local people and do not harvest or take personal resources, forest products or wildlife. Ensure that no or minimal wood is burnt by any construction worker son or off construction sites. Provide kerosene or gas for all workforce cooking needs.	All communities along the ROW	As part of works to be executed by the contractor	Contractor, SEO, CES
Cultural Property	Should any archaeological or historic remnants be encountered, construction work should immediately stop along that section, and the CES should be informed forthwith. Any archaeological finds like broken pots, bones etc should be reported to the national authorities for follow up. If cultural or historical sites (e.g. shrines, graves etc) are found and affected by the Transmission Line they should be compensated and relocated in accordance with the customs and norms of the communities.	Through the ROW	As part of works to be executed by the contractor	Contractor, CES, Ministry of Culture
Roads obstruction	In order to minimize inconvenience to road users, the contractor should be required to put measures in place to keep all roads and accesses affected by the work open and not to obstruct traffic flows and existing accesses	Roads crossings	As part of works to be executed by the contractor	Contractor, SEO

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	at all times. Installation of electric cables over roads should be done during non-peak traffic times to reduce impacts on pedestrian, cycle and car traffic. Planning of construction activities should be done in collaboration with local authorities and well in advance of planned activities to ensure the shortest possible period for minimal traffic interference. To this end, REGIDESO and ELECTROGAZ will be responsible for strictly enforcing construction schedules.			
Disruption of services	Inventory of all services to be disrupted during construction. Liaise and reach agreement with affected landowners, local authorities, public undertakings and local people regarding services to be maintained, temporarily cut and reinstated, including the timing and location of cuts and reinstatements. Obtain written permission from affected landowners / local people regarding the temporary cessation of services. Maintain or provide temporary services during construction, including temporary water supplies. Progressively reinstate or repair all interrupted services to their previous capacity.	See above 6.3.7.	As part of works to be executed by the contractor	Contractor, SEO, Local Authorities
Displacement of people and loss of structures	A total of 56 houses in Burundi and 271 houses in Rwanda are affected and the families there in should be compensated. In general, affected people preferred cash payment except in some case were land acquisition by the electricity producer should be done in favour of the displaced households (see above section 4 on consultation) Some 595 other structures (latrines, kitchen, fences, etc.) in Rwanda and 52 in Burundi will have to be displaced also.	Through the ROW	Cost of resettlement of structures: Houses : 2 741 939 Other private structures : 294 082 Costs are detailed in Chapter 8	NELSAP, REGIDESO, ELECTROGAZ, MINATTE, Communes, local authorities, PIU (Project Implementation Unit, see RAP in chapter 8)
Community structures	Burundi: The Nyamisagara church could be avoided and do not need to be relocated.	Kabarore		NELSAP, REGIDESO, Project Implementation Unit, Local authorities
Loss of crops and trees	Compensation (cash equivalent) of a year of harvesting of the area under cultivation in the wayleave should be given to all the households. In addition, crops that may be removed from land to be temporarily used for construction purposes (camp, access road) will also have to be compensated on the	Through the ROW	Cost estimate for loss of crops for one year is estimate to: Rwanda: 47	PIU (Project Implementation Unit, see RAP in chapter 8) REGIDESO, ELECTROGAZ, local

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	same base (cash equivalent to a year of harvesting). According to projection from the survey 92 hectare in Burundi and 218 in Rwanda it is based on the type of crop and stage of maturity. There are fixed rates that apply.		451 USD Burundi: 22 180 USD Costs are detailed in Chapter 8. Compensations for loss of trees are estimate to: Rwanda: 26 473 USD Burundi: 10 174 USD	authorities, MINATTE,
Farming activities	Ensure that utilities to repair much of the damage that can occur during construction and provide fair monetary compensation for damages that cannot be easily repaired. The contractor should work with agricultural landowners to determine optimal pole heights, pole locations, and other significant land use issues to minimize interference with agricultural practices. If a field must be crossed, larger structures with longer spans can be used to span them. The potential for soil compaction and erosion by transmission construction and maintenance activities should be lessened. If compaction has occurred, affected soils can be chisel ploughed over successive seasons as needed to break up compacted layers. A cleaning of all construction debris and leftover should be done at the end of construction of each portion of the line. In order to reduce the impact of the project on land and agricultural production, permanent acquisition of land for the way leaves should not be done (except an area of 6.25 m2 for each pylon) and instead leased with restrictions on cultivations practices (trees over 4-5 m height forbidden).	Through the ROW	As part of works to be executed by the contractor	REGIDESO, ELECTROGAZ, Contractor, SEO
Ancillary sites rehabilitation and re-vegetation	Rehabilitate ancillary sites as soon as they are not requested anymore such as borrow pits, temporary access roads, camps sites, material storage piles, etc. Restore sites to their previous state. Progressively sow all disturbed construction and ancillary site surfaces with a cover crop mix immediately following final use of each ancillary site. Regularly monitor the effectiveness of re-vegetation measures.	All ancillary sites and other disturbed areas.	As part of works to be executed by the contractor	Contractor, SEO, CES

Environmental Concerns	Mitigation measures	Location	Budget (USD)	Responsible
	MAINTENANCE AND OPERATION			
Vegetation control in the ROW	The ROW will require periodic maintenance to control vegetation growth under conductors and in substations Maintenance activities should be limited to the wayleave and not damaging vegetation outside. Manual or mechanical control of vegetation growth should be encouraged and the use of herbicides should be minimized.	Through ROW	Operation and maintenance costs	REGIDESO, ELECTROGAZ
Environmental protection training	Prepare a training program for maintenance personnel		Operation and maintenance costs	REGIDESO, ELECTROGAZ
Bird collision/ electrocution	Place reflectors on the top (shield) wire along the line, near sensitive areas, to make the wires more visible to birds if the collision potential is high.	Where the TL crosses wetlands and other important birds areas, e.g. Kibira forest	Operation and maintenance costs	REGIDESO, ELECTROGAZ
Public safety	Instigate educational programs in schools and communities to educate people of hazards and safe practices when playing and working near high voltage power lines. Install devices and signs to prevent people, and specially children, from climbing the towers and be electrocuted	Communities along ROW	Operation and maintenance costs	REGIDESO, ELECTROGAZ

7.1.1. ENVIRONMENTAL PRESCRIPTIONS TO BE INCLUDED IN THE PROJECT EXECUTION PLAN

Much of the work during the construction stage can form part of the contractor's routine activities as indicated in the Environment and Social Management Plan. The planned mitigation measures whose responsibility is the contractor as indicated in the ESMG should be included on the list of contractual items. Construction contracts may require all qualified bidders to include environmental management plan as part of the submitted bids. The Contractor shall be obliged to appoint a Site Environmental Officer to enforce both environmental mitigation and Occupational Health & Safety Policy (OH & Safety Policy).The additional costs of their plan cannot be predicted at this time, but they are considered an integral part the total project costs.

This ESMP shall be carried out as part and parcel of project planning and execution. It will interact dynamically as implementation proceeds, dealing flexibly with environmental impacts both expected and unexpected as they come up.

Appendix 9 also includes a selection of environmental prescriptions for construction activities which should also be included in all Construction Contracts. Section IV of this appendix presents specific attenuation measures for agricultural land.

7.2. ROLES AND RESPONSABILITIES IN ESMP IMPLEMENTATION

The Developer/Client is responsible for ensuring that environmental issues are taken care of through out the project cycle. The Consultant and the Contractor work on behalf of the developer. For this matter, environmental matters of the project could be retained by Contractor's Site Environmental Officer (SEO) and the Consultant's Environment Specialist (CES) to ensure that action is taken on impact mitigation and benefit enhancement.

Staff from government agencies should be involved in the implementation of ESMP. These may include: Department of Environment (Department de l'environnement), Department of Land Planning (Département de l'aménagement du territoire), MINATTE, INECN, MININFRA, MINITERE, ORGE, ORTPN.. Monitors (with exception of Contractor and Consultant) will need facilitation from the Client since the responsibility of environmental mitigation and monitoring lies in his hands.

During the construction period, the project managers will be given some responsibilities to prepare them for the eventual handover of the project. Some of the responsibilities might include but are not limited to:

- Supervision of the safety and health aspects;
- Restoration work such as decommissioning of access roads and quarries, placing soil over re-contoured land, and seeding/planting vegetation; and Maintenance of environmental data, records and files, plus preparation of regular status reports.

During the operational period, these managers will continue to monitor environmental baseline conditions and other related environmental impacts.

The Contractor will designate an appropriately qualified Site Environmental Officer (SEO) acceptable to REGIDESO and ELECTROGAZ, who will be responsible for implementation of the measures set out in the EMP.

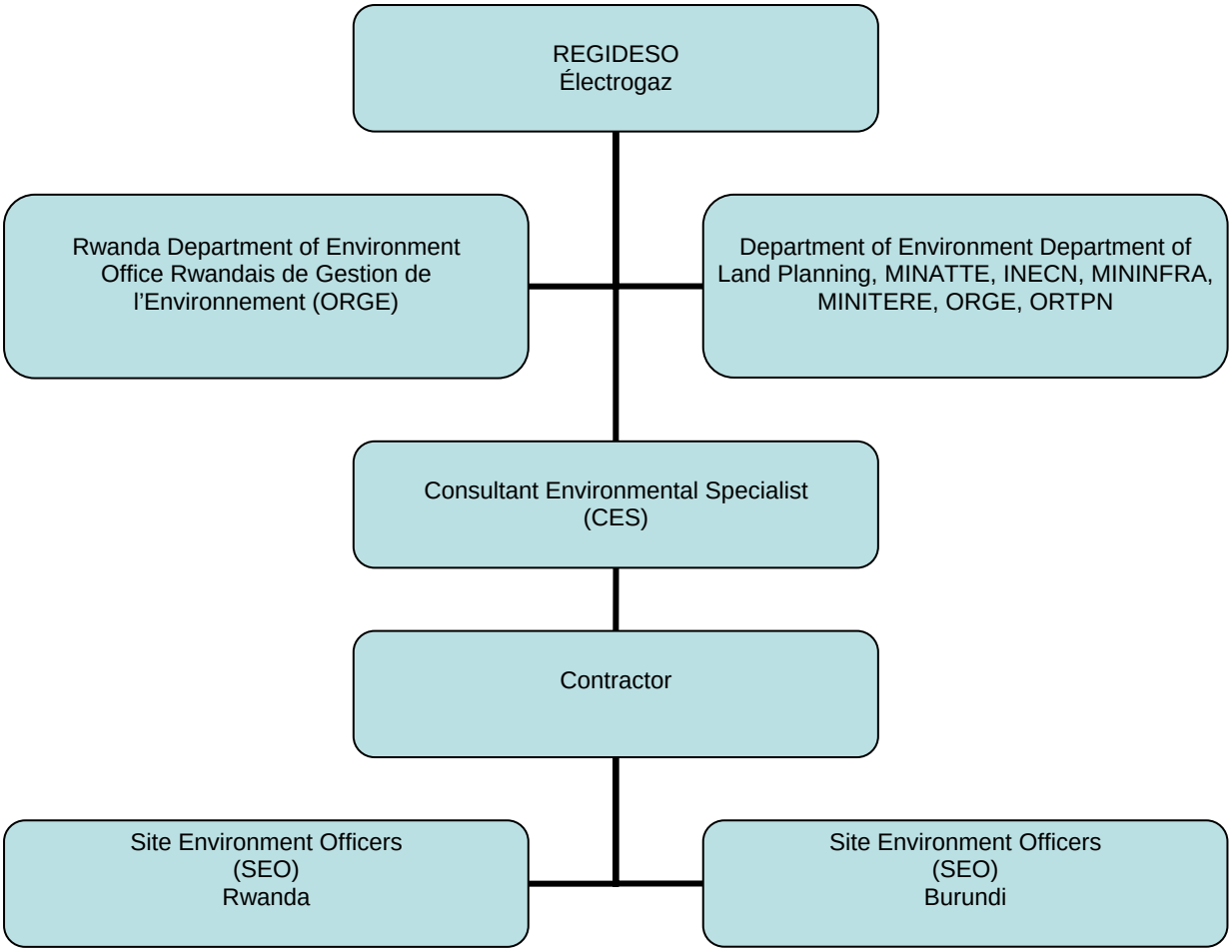

FIGURE 9. ESMP ROLES AND RESPONSABILITIES

Burundi

Governmental institutions and commune public service will be involved in the PEGS implementation. The environment department, the territory development department, tourism and environment ministry (MINATTE) are departments that are in charge of approving attenuations measures according to governmental guidelines. That is the environment department which controls the quality of water, air and soil. The territory development department is responsible for the management of lands. The head provincial inspectorate will be involved in evaluation of attenuation measures linked to health and sanitary security; the national Institute for environment and nature conservation (INECN) will follow the implementation of attenuation measures accepted relating to the national park of Kibira.

The public service of the communes of Musigati, Muruta and Kabarore will be involved in programmes set up in order to mitigate various impacts of the building of the line.

Rwanda

Governmental institutions that have environment, housing and infrastructure in their duties are: MININFRA, MINITERE, ORGE, ORTPN. They will intervene in the process of expropriation and compensation of the population and in the approval of PGES and the PRC (see below section 8) and other documents relating to the implementation of that project. They will also to intervene in the raising of required funds.

Decentralized governmental institutions-districts and sectors- will facilitate the communication and contacts between the entrepreneur and control companies with the population.

Laboratories that have abilities to ensure the control of the quality of waters and soil are the laboratory of hygiene and foodstuffs of Butare University (LHDA) as well as the water analysis laboratory of national university of Rwanda and soil laboratory of MININFRA and national university of Butare (Faculty of agronomy)

REPORTING PROCEDURE

Internally, all staff will be required to report environmental incidents to their direct supervisor. Construction Team Supervisors (CTS) will be responsible for reporting to the SEO who in turn, will be responsible for implementing initial mitigation measures whilst notifying the CES.

The CES will be responsible for both reporting internally to the Project Manager. Externally reporting to the relevant Government Agencies (eg ORGE, MINATTE, etc.) is the responsibility of the Project Manager.

The following records are required to be kept by the SEO and approved by CES in the event of an incident or complaint:

- Time, date and nature of the incident/complaint;
- Type of communication (for complaints only, eg telephone, letter, in person, etc.);
- Name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then "Not Identified" is to be recorded);
- Response and investigation undertaken as a result of the incident/complaint;
- Name of person responsible for investigating the incident/complaint; and Corrective action taken as a result of the incident/complaint investigation and signature of responsible person.

7.3. INSTITUTIONAL STRENGTHENING

There is need for strengthening of the institutions involved in environmental management to ensure that the proposed ESMP has been implemented and the potential environmental and social impacts are minimized or entirely avoided. The institutions involved during construction, operation and maintenance need to have their capacities strengthened to ensure the proposed line operates without compromising the environmental and social quality. Close consultation with the environmental officers in the districts through which the line will traverse will be necessary but the environmental officers themselves may need some training on the qualities and hazards of electricity so that they may develop a broader perspective of the project.

All participating stakeholders will be provided with the necessary information (implementation activity schedules, mitigation and monitoring plan) and encouraged to adhere to the guidelines designed to safeguard and improve environment.

Arrangements will be made to facilitate (logistics) all stakeholders to take on their roles and responsibilities.

Transmission line projects are not common in Rwanda and Burundi and only come up after many years. In this respect ORGE and MINATTE may not have adequately trained personnel, lead agencies and lead experts to effectively oversee such projects especially at local level. Therefore, capacity will need to be strengthened in this area. This also applies to other agencies and ministries involved in this project.

In Burundi, the INECN is responsible for the management of the Kibira national Park and should beneficiate from institutional strengthening.

Regarding the “communes” and “cellules” they do not have an official in charge of environmental matters. They should also beneficiate from an institutional strengthening program with a budget to hire environmental officers responsible for monitoring the project at their level.

7.4. TRAINING

Related to the above issue, training is important on the current environmental legislation, issues related to compensation and regulations governing the wayleaves. Experience gained from the already existing line shows that people are still erecting structures and buildings along the wayleaves. Continuing education and awareness program is necessary to avoid accidents and enhance safety.

All employees should receive environmental induction training prior to commencement of work on this project. The induction training will focus on training staff on environmental and social issues, Health, Safety and Quality Standards, this Environmental and Social Management Plan and the general environmental duty.

Staff directly engaged in the assessment and monitoring of environmental conditions will be given additional specialized training.

The Consultant Environmental Specialist will be responsible for delivering induction and on-going training during the Construction phase.

Training must be centered mainly on laws and environmental regulation as well as regulation on compensations and relocation. The civil servants in charge of the environmental issues at the communal level should receive training to reinforce their capacities and to enable them to fulfill their role.

Training to sensitize about the risks related to construction and exploitation of the transmission line will have to be given especially during the construction phase. Those which will be in charge of monitoring and evaluation of mitigation measures will have to receive training in these fields.

7.5. MONITORING

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

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

Monitoring in the ESIA process happens at many levels to verify environmental impact prediction and adequacy of mitigation measures. Essentially, monitoring finds out if any major mistakes or omissions had been made in the project assessment and implementation. Monitoring will depend on the type of environment the project is located and the degree to which it is likely to be affected. Monitoring should include regular measurement of parameters such as water flow, levels and quality, sedimentation, air quality, observations of wildlife, fauna, flora, health monitoring, employment monitoring, control of resources, resettlement, compensation, etc.

Monitoring should be undertaken at a number of levels. Firstly, it should be undertaken by the Contractor at work sites during construction, under the direction and guidance of the SEO who is responsible for reporting the monitoring to the implementing agencies, ELECTROGAZ and REGIDESO. It is not the Contractor's responsibility to monitor land acquisition and compensation issues, which will be monitored by the project implementation unit (see chapter 8). It is recommended that the Contractor employ two local full time qualified Site Environmental Officers for the duration of the Contract (one in Burundi and the other in Rwanda) capable of undertaking the required monitoring or to supervise an external monitoring group (such as a consulting group or a university) to undertake the monitoring on behalf of the Contractor.

The Consultant Environmental Specialist should include the services of an international environmental and monitoring specialist on a part time basis as part of their team.

ELECTROGAZ and REGIDESO will have overall responsibility to oversee that all environmental measures are put in place and that regulations are enforced. The CES should assist ELECTROGAZ and REGIDESO in this process in order to make sure that contractors fulfill the environmental requirements.

ELECTROGAZ and REGIDESO should in turn undertake independent monitoring of selected parameters to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project. ELECTROGAZ and REGIDESO also have the direct responsibility to implement and monitor land acquisition and compensation issues as outlined in the resettlement and compensation issues with assistance of the Project Implementation Unit (PIU) (see below RAP chapter 8). The Consultant Environmental Specialist should include the services of an international environmental and monitoring specialist on a part time basis as part of their team as well as a sociologist experienced in social impacts of infrastructures. Six person months per year should be allocated by each organization to the Project during the pre-construction and construction stages. Periodic ongoing monitoring will be required during the life of the Project and the level can be determined once the Project is operational.

Rwanda has a Rwandese Environmental Management Office (ORGE) and Burundi the MINATTE and INECN that have the overall responsibility for issuing approval for the Project and ensuring that their environmental guidelines are followed during Project implementation. Their role therefore is to review environmental monitoring and environmental compliance documentation submitted by the implementing authorities and they would not normally be directly involved in monitoring the Project unless some specific major environmental issue arose.

Environmental monitoring of the following parameters is recommended as a minimum for the Project.

7.5.1. WATER QUALITY MONITORING

Construction camps are often a source of significant surface and groundwater pollution if not managed and sited properly. It is recommended therefore that the Contractor undertake monitoring of any effluent, waste water, or rainfall runoff discharged from campsites. This would encourage the Contractor to implement proper wastewater treatment facilities on site through the use of settling and treatment ponds.

The parameters to be analyzed should include those in the following table.

Tableau N° 34. LIMITS FOR PROCESSED WASTEWATER, DOMESTIC SEWAGE AND CONTAMINATED STORMWATER DISCHARGED TO SURFACE WATERS (FOR GENERAL APPLICATION)

Pollutant or parameter	Limit (Milligrams per liter, except for pH, bacteria, and temperature) World Bank standards
pH	6.0 – 9.0
Chemical Oxygen Demand	250
Oil and grease	10
Total Suspended Solids	50
Heavy metals, total	10
Arsenic	0.1
Cadmium	0.1
Hexavalent chromium	0.1
Total chromium	0.5
Iron	3.5
Lead	0.1
Mercury	0.01
Nickel	0.5
Selenium	0.1
Silver	0.5
Zinc	2.0
Free cyanide	0.1
Total cyanide	1.0
Ammonia	10
Fluoride	20
Chlorine, total residual	0.2
Phenols	0.5
Phosphorus	2.0
Sulphide	1.0
Coliform bacteria	< 400 MPN/100 ml
Temperature	Maximum 3°C above ambient temperature of receiving
increase	waterway

Notes:

MPN = Most Probable Number

a. The effluent should result in a temperature increase of no more than 3O C at the edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 meters from the point of discharge.

Source: World Bank Group, 1999.

If the discharged effluent does not meet the WB standards then the Contractor must take further treatment measures or refrain from discharging effluent directly into nearby watercourses.

7.5.2. NOISE LEVELS MONITORING

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

Tableau N° 35. MAXIMUM NOISE LEVELS DURING OPERATION PHASE

Zoning	Maximum Noise Limits	
	Night (7.00 pm – 7.00 am)	Day (7.00 am – 7.00 pm)
Habitation, hospital, school	40 dB (A)	45 dB (A)
Campground, institution, high-density habitation	45 dB (A)	50 dB (A)
Commerce, parks	50 dB (A)	55 dB (A)
Industry, agriculture	70 dB (A)	70 dB (A)

Source: Government of Quebec (2006)

7.5.3. SOIL EROSION MONITORING

The excavation of earth for the establishment of towers, temporary and permanent access roads, work camps and storage facilities will exacerbate soil erosion. It will, therefore, be the responsibility of the Contractor's Site Environmental Officer to ensure the implementation and effectiveness of erosion control measures. Focus should be given to work sites where soil is disturbed and its immediate environ as well as along the ROW during and after vegetation clearing.

7.5.4. MONITORING OF VEGETATION CLEARING

Removing of vegetation for the establishment if the wayleave will be monitored by the Contractor's SEO to verify the respect of areas marked for clearing and that clearing is undertaken with minimal disturbance to the surrounding environment and after compensation has been paid to the owner.

7.5.5. MONITORING REHABILITATION OF WORK SITES

The Contractor's SEO should ensure that areas used as temporary campsites for workers, as well as any other ancillary sites (borrow pits, temporary access, etc.), are progressively rehabilitated as they are no longer required. Once a site is rehabilitated it should be "signed off" by either REGIDESO or ELECTROGAZ environmental staff.

7.5.6. MONITORING OF ACCIDENTS/HEALTH

The Contractor's SEO must make sure that appropriate signs are posted at appropriate locations/positions to minimize/eliminate risk of electrocutions.

In addition the environmental inspectors should make sure that:

- Measures to create awareness regarding sexually transmitted diseases, primarily HIV/AIDS, and other diseases such as malaria, schistosomiasis, leishmaniasis, and onchocerciasis are taken;
- Preventive measures to reduce/eliminate malarial, schistosomal, leishmanial, onchocercal infections where/when ever appropriate are put in place;
- Periodic health surveys are carried out along the transmission route;
- REGIDESO and ELECTROGAZ will have overall responsibility to oversee that all environmental measures are put in place and that regulations are enforced. The Consultant Environmental Specialist should assist REGIDESO and ELECTROGAZ in this process in order to make sure that contractors fulfill the environmental requirements.

The following parameters could be used as indicators:

- Presence of posted visible signs on towers, etc.;
- Presence of sanitary facilities at campsites;
- Level of awareness of communities pertaining to dangers/risks associated with power lines;
- Accident reports. Records on actual accidents associated with the establishment of the transmission line could be compiled with the help of local peasant association officials, teachers/students of local schools.

Tableau N° 36. MONITORING PLAN

Environment Component	Project Stage	Parameter	Standard	Location	Frequency	Implementation	Supervision
Land Acquisition and Compensation	Pre-construction	Ensure compensation paid as per RAP	RAP	Along ROW for all PAPs	Monthly until complete	REGIDESO and ELECTROGAZ	NELSAP
Water Quality	Construction	pH, EC, SS, turbidity, colour, NH4+, NO3-, total P, Fe, Al, DO, BOD, grease & oil, total coliform	World Bank and national standards	Construction Camps	Monthly during operation of camp	Contractor	Site Environmental Officer
Noise Levels	Construction	Noise levels on dB (A) scale	Quebec Guidleines	At equipment yards	Monthly as required by Site Environmental Officer	Contractor	Site Environmental Officer
		Noise levels on dB (A) scale	Quebec Guidelines	Noise level meter kept at a distance of 15m from edge of ROW	As directed by the Site Environmental Officer	Contractor	Site Environmental Officer
Soil Erosion	Construction	Turbidity in storm water	EPA guidelines	As identified by REGIDESO and ELECTROGAZ	Pre-monsoon and post monsoon seasons	Contractor	Site Environmental Officer
Vegetation Clearing	Construction	Monitor clearing to ensure consistent with EMP	EMP	Along ROW and works areas	As required	Contractor	Site Environmental Officer
Rehabilitation of Work Sites	Construction	Monitoring to ensure all work sites are progressively rehabilitated	EMP	Work camps, material storage sites, along ROW		Contractor	Site Environmental Officer
Health	Construction	Signs, posters displayed, health awareness lectures, mosquitoes nets in malarial areas for each worker, health checks for workers	EMP	Along ROW, work camps and surrounding areas	Monthly	Contractor	REGIDESO and ELECTROGAZ
Accidents	Construction	Safety training for workers, accident reports, community consultation	EMP	Along ROW	Monthly	Contractor	REGIDESO and ELECTROGAZ

7.6. ESMP IMPLEMENTATION SCHEDULE

As observed from the proposed Environmental and Social Management plan, there exist some mitigation measures that will be undertaken during the pre-construction, construction and operation and maintenance stages. It is recommended that pertinent safety regulations and proven standard designs including protection and monitoring systems be employed to minimize potential risks and hazards, and make transmission lines reliable and safe.

7.7. ESMP COSTS

A special budget for environmental protection, in addition to the funds already allocated for construction activities should be considered. The budgets for environmental management and monitoring during the construction period should be estimated according to the Standards on Designing, Planning and Computing Construction Costs for a transmission line, while taking into consideration the actual situations at similar projects already in operation and the scope and planned environmental protection measures adopted for this project.

Tableau N° 37. ESMP COSTS

Item	Burundi Cost USD	Rwanda Costs USD	Total USD
Sensitization of communities and consultations	10 000	20 000	30 000
Final valuation of assets	50 000	75 000	125 000
Health and safety sensitization, equipment for health centers	20 000	30 000	50 000
Survey of endangered species	10 000	0	10 000
Kibira national Park reforestation program	20 000		20 000
Total	110 000	125 000	235 000

8. RELOCALIZATION AND COMPENSATION PLAN

8.1. INTRODUCTION :

The Relocalization and Compensation Plan is in conformity with the directive OP 4.12 of the World Bank. It is particularly precised in it the objectives and principles guiding the actions to be undertaken, the compensation plan organization and the agenda of the operations to be respected in cash country, as well as the mechanisms for complaints and appeal to be set up. Following the surveys that been carried out in each country and described above (chapter 4) us (chapter 4), the number of affected households and the projected budget have been worked out.

8.2. JUSTIFICATION

The construction of a power transport line implies the way leave clearance for security reasons. All the permanent or temporary structures such as houses, huts, barns, farm houses, latrines, etc. must then be rebuilt outside the way leave. Any kinds of trees whose height is more than 4 to 5 m must also be taken away from the way leave since they present electrocution risks. On the other hand, gardening, market gardening, banana trees, animal husbandry, pasture or any other activity that is not harmful to the line operation and maintenance are tolerated. Therefore the use of the way leave is possible, but it is submitted to limitations and particularly to a right-of-way.

The Rwegura (Burundi)-Kigoma (Rwanda) interconnections line route bas been set up in collaboration with REGIDESO and ELECTROGAZ at the prefeasibility stage in 2006. The length of the High Voltage Line is 103 km. The way leave width is 30 m. so, the total area of the way leave is 309 ha. A total number of 271 pylons will have to be erected

8.3. OBJECTIVES AND PRINCIPLES OF THE PRC

The PRC aims at providing compensation for persons, households and communities affected by the line construction, and helping then restore heir way of living and producing.

If necessary, the planning is expected to provide assistance for the relocalization of private structures (houses and outbuildings, etc.) or community structures (school, church, dispensaries, etc.). The affected persons, households and communities must regain so good an economic and social situation if not situation that is better than the one prevailing before the project.

The operational directive OP.12 of the World Bank puts forward the following principles for the setting up of the PRC:

- Minimizing as for as possible, the needs for relocalization and compensation trough the examining of alternatives and the project design.
- The persons affected by the project (PAP) comprise all the persons who are going to hose their possessions or benefits because of the project implementation whatever the extent of the losses is like. The loss of possessions may include the loss of lands, structures, houses and other buildings, cultural possessions (graves, altars, etc.) as well as the disruption of activities (for example, losses due to the closing or the relocation of a business activity).
- All the PAP are eligible whatever their social or economic status, their sex, etc. may be.
- Information and participation measures for the PAP and the concerned parties to know, among others, the principles on which the PRC is based, the rights of the PAP, the scales of the compensation evaluation, the appeal mechanisms.

The relocalization and compensation measures to be planned are:

- Compensation in cash or in kind for houses and any other structures at the replacement cost without taking into consideration the depreciation of the replaced structures or the possibility of recovering the material from the displaced structures.
- Replacement of any affected cultivation, business, residence land by another on of the same value and/or product that is acceptable for the PAP, or, by an explained consent from the PAP, an equivalent amount according to the market value.
- A compensation in cash for affected crops and tree plantations or destroyed woods.
- A displacement allowance and some assistance for the restoration of activities.

The estimation and the payment of compensations and the relocalization of the affected structures before the beginning of the high voltage line building works is approved by the ruling authorities.

Mechanisms of follow-up, assessment and diffusion of results to the concerned authorities must be planned in advance.

The eligibility to the relocalization and to the compensation will be based on a detailed inventory of possessions owned by every household, firm or organization (church, school) and on the negotiation to be carried out by the Project Implantation Unit (PIU) at least six months before the beginning of the construction. Every household, firm or organization that is identified as being affected by the project will have right to a compensation and/or to a relocalization according to the principles established above and in conformity with the regulations of each country.

8.4. ALTERNATIVES FOR REDUCING RELOCALIZATION NEEDS

At the time of the prefeasibility study, different options have been considered so as to reduce the impacts on the human and biophysical environment. The corridor of lowest impact has been selected.

In addition, from the phase of the prefeasibility study, it has been agreed to limit the way leave to 25 m so as to reduce the new line impacts to a minimum. While limiting the effects on the environment, this measure allows to meet short of the 110 KV high voltage line security.

8.5. CONSULTATION OF THE PERSONS AFFECTED BY THE PROJECT (PAP)

From the phase of prefeasibility and at the phase of the feasibility study, consultations have been done with the persons affected by the project. These consultations have been done at different levels:

- With the local and regional authorities ;
- With the households settled inside the way leave, trough socioeconomic surveys;
- With host communities, trough information meetings.

As the reports of the consultations and the number of persons having participated in the different information and consultation activities are deemed authentic, the people have been able to express their opinions, their expectations and their wishes towards this project.

The PAP have generally welcomed the project as for as it permits to effectively improve the electrification of their environment. Nevertheless, some worries related to the evaluation procedures of possessions, the payment of compensations and the relocalization of households have been expressed. When the project implementation date will be known, the PIU will have to plan the opening of local offices that are accessible to the PAP. There, it will be possible to provide assistance and listen to complaints.

Since no realization date has been fixed yet for the project, it is agreed that other consultations will be done by the PIU at the realization stage. These ones are described further.

The section 4 of the report presents the account of the consultations. Detailed reports are included in the annexes 2 and 3.

8.6. SUMMARY OF IMPACTS

8.6.1. GÉNÉRALITY

The choice of the site, the linear nature of the project and the limited with of the way leave arrange things so that the impacts on households and communities as well as on private and public possessions of the project will be limited. Nevertheless, compensations and relocalizations are planned where the way leave of the electric line affects houses, public services, farming, trade and other structures or activities.

The characteristics of affected communities and households are described in chapter 5 of this report whereas the detailed presentation of impacts is done in chapter 6. In general, the affected communities and households are situated in the rural area. So, farming and animal husbandry are the most widespread occupations.

8.6.2. NEGATIVES IMPACTS

The project will generate impacts, mainly during the construction stage. They are those ones related to:

- The relocalization of private and public structures;
- The clearing of the way leave (destruction of woods and tree plantations);
- The excavation and tower construction works (damages done to crops, noise and dust for the bordering populations);
- The influx of specialized workers in the rural area (health problem, particularly HIV-ADS, increased demand and other natural resources such as water, firewood and other natural resources);
- The construction of the worker's camps (damages done to crops and to properties, problems related to the management of rubbish and liquid waste, etc.).

The population and territory occupation density is very important. The number of households whose land has the way leave passing through it is then 196 in Burundi and 271 in Rwanda. Among these ones, it is estimated that the number of residences to be relocated is 56 in Burundi and 271 in Rwanda. The proportion of households which may rebuild their residence close by varies according to districts and countries. The impacts on relocated households should be mitigated by appropriate measures of relocation and compensation.

Since the project study area is linear and the line way leave is relatively narrow, no group relocalization is planned. In Burundi, as community building there was only one church in the wayleave, however after review and modification of the line route it has been possible to avoid to dismantled and rebuilt the church

8.6.3. POSITIVES IMPACTS

The persons living in the project area will have the possibility to be provided with job and business opportunities, mainly during the period of building works. In fact, surveys within communities have shown in all the regions which the electric line passes through, there is a basin of a considerable contingent of manpower. These people are capable of being employed on the building site as manual workers, specialized workers, unskilled workers, car drivers, etc.

Those business opportunities, for both the goods suppliers and the services providers, will also be an occasion to make local communities benefit from positive project effects. Needs for feeding, clothing, tools, etc. from migrant workers and building companies will get some possibility to be satisfied, partly by local enterprises and private individuals, particularly women (feeding, laundry, etc.).

Nevertheless, the most important positive impact of the project, if connections are established, will consist in providing many communities which the line passes through with access to electricity. It has been shown in this study that the 110 KV new line will permit to realize rural electrification projects in the areas that do not have them get (section 2,5). The socioeconomic surveys that lave been carried out (chapter 5) show that most of the communities situated in the project area are seriously affected by the lack of supply in terms of services and infrastructure.

Rural electrification projects after stand at the centre of poverty reduction strategies, as it is the case for many African sub-Saharan countries. The availability of this form of energy particularly encourages the settings up of development projects such as drinking water supply by means of pumps, the setting up of wills and other small scale industries, the extension or the improvement of existing installations, etc. the community consultations carried out within this survey have allowed to identify a lot of projects or even existing installations, particularly in the farm-produce sector that may benefit from that electrification. Women will be able to benefit from it, particularly an easier access to water, which will lighten water transport time and effort.

The availability will favor investment in education, and in this way the capacity reinforcement. The access to electricity for the health installations will permit cooling equipment installation for the storage of vaccines and other vital medicines.

8.7. LEGAL MEASURES

Laws and legal measures being applied for the project are described in chapter 3 of this report.

After the final decision on the expropriation for public reason is published, the competent Land commission makes an exhaustive list of Land owners or parties entitled to Land and to works to be carried out by the fund. That list is posted up in a place that is accessible to the public at the office of the District, of the sector and of the Unit (cellule) in which the land is situated so as the concerned may get aware of it.

The expropriation procedure can not exceed 4 months' period, dated from the taking of the decision about expropriation. The works concerning the measurement and the calculation of expropriation compensations are carried out in presence of the owner or the concerned parties or their representatives the concerned parties or their representatives and the representatives of the local authorities.

The right compensation determined by the Land commission is paid within a period not exceeding one hundred and twenty days (120) dated from its determination, otherwise the expropriation becomes invalid.

In Burundi the institutional responsibilities for the relocalization plan implementation are: the Ministry of Infrastructures and Equipment, the Ministry of Finance, the Ministry of Regional Planning, Tourism and Environment, the authorities of Kirundo Province through the cadastral Service, the district authorities of the province, the company having charges to carry out works.

8.8. ORGANIZATION RESPONSIBILITY

The PRC setting up and good operation responsibility belongs to the electricity companies that are responsible for infrastructure implantation, that is to say Electrogaz (Rwanda) and REGIDESO (Rwanda).

These companies must ensure that the Project Implantation Unit (PIU). This structure will make sure the PRC is implanted.

As it has been shown by the consultations carried out within the context of this study (chapter 4), households and chiefs of villages are worrying about not being compensated or not being compensated enough. Their worries come particularly from their past experiences.

In order to alleviate these worries and ensure that the compensation and relocalization process is done in transparency and in good working order, it is proposed here that an independent organization from electricity companies, the Project Implantation Unit (PIU), should be set up. Observers from government authorities, particularly the district officials and persons in charge of land and electricity companies will participate in that PIU works.

At the time of the project approval, and at least one year before the beginning of works related to the way leave and the construction, a PIU will have to be set up in each concerned country (Rwanda and Burundi).

Under the responsibility of a coordinator authorized by the different parties that PIU will be responsible for:

- the PAP information and consultation activities;
- the inventory of possessions and the detailed estimation of compensations;
- the payment of these compensations;
- the good working order of relocalization works;
- the PRC follow-up reports to appropriate authorities, to the network promoter in each country, to the financing organizations (AfDB, WB, or others) as well as to the person in charge of the line construction works.

The coordinator of each PIU must be a person who knows the legal agreement and payment procedures. The coordinator must also ensure that the organization and the implantation of the PAP information and participation measures are started and hire the required person from an NGO, or a private consultant to prevent the population from worrying.

Furthermore, a team of authorized assessment staff that is able to estimate the value of lands, crops, woods and plantations as well as buildings must carry out the evaluation of possessions and compensations in conformity with the legal measures that are planned in each country

In any case, the women's and children's interests must be protected.

The planned total amounts of compensation and relocalization will have to be approved and endosed by the PAP, the competent government authorities and by Electrogaz and REGIDESO.

The population and households worries about the non-payment of indemnities are important and general. Those worries are connected to unhappy experiences that undermined their confidence (see section 4). Out of respect for consulted population and in order to alleviate their worries, it is

strongly recommended that the approval of the first payment for the building works be condition to the handing over the UIP report. This later must clearly state, with evidence to prove it, that indemnities have been paid and rebuilding have been carried out and that the project can therefore go ahead.

8.9. PROGRESS OF THE PIU WORKS

A general schedule of works is presented in the document (section 2.12). All the relocalization compensations and works must be completed before the beginning of the construction works.

After its setting-up, the PIU must:

- Spread out information to the PAP and the communities settled where the line passes about the procedures, methods and calculation criteria of compensations, and about relocalization measures, complaining mechanisms and the settlement of disputes;
- Carry out, in collaboration with public officials, the evaluation of possessions and required relocalizations and get the agreement from households and communities or organizations for what is relating to relocalization measures and agreed total amounts.
- Secure the payment of the agreed amounts or the acquisition or the transfer of equivalent lands, as the case may be.
- See to it that there is a good working order in reconstructions and demolitions of structures and buildings.
- Present a detailed report about paid compensations and realized works to the appropriate local and national ruling authorities as well as to Electrogaz and REGIDESO.

The realization of all these tasks by the PIU will take about 1 year.

8.10. COMMUNITY PARTICIPATION

It is very important that the persons affected by the project (PAP), the chiefs of villages and the heads of community structures (schools, churches) who will have to be relocated take an active part in the planning, the rebuilding and the restoring of their way of living.

Therefore, they must get involved into:

- The definitive inventory and the final evaluation of the relocalization costs;
- The selection of the relocalization site;
- The demolition activities;
- The rebuilding activities;
- The moving of possessions and people.

The required workers should first be chosen from the PAP. They should be hived and trained to rebuild their houses on their new parcel. This new approach is highly encouraged by the donors and it contributes to ensure the success of relocalization programs which come up to the PAP'S expectations

Considering the linear aspect of the line there are possibilities of relocalization on adjoining sites. However, some difficulties are to be envisaged, in particular in Rwanda because of the population density. The households which do not have lands to carry out the rebuilding of their residence must be subject to an exceptional attention.

In fact, in most cases, and according to the wish expressed at the time of consultations, the affected persons should be relocated in the immediate vicinity of the occupied original site. This solution will highly reduce drawbacks for the PAP.

Two options are possible:

- The first option consists then in an immediate relocalization by the way leave side.
- The second solution consists in finding in collaboration with the community authorities and the PAP concerned, a site for the relocalization.

Whatever may be the chosen solution, the costs related to relocalization will be entirely compensated.

The relocalization site selection will result from a mutual agreement between the PAP and the Project Implantation Unit (PIU).

Since, the payment in kind for compensations is a priority for the project, the PIU will take into consideration each PAP'S particular demands to get lands on which they will take either a long-term renewable lease or a title deed in due form.

The principles to be applied for identifying, buying and distributing lands will be:

- A similar plot of land or the one which presents a better potential will be proposed to the PAP on basis of an equivalent area.
- The land will be selected in consultation with the PAP and the host communities.

8.11. ELIGIBILITY

The PAP comprises all the persons who will lose possessions or benefits because of the project, whatever may be the extent of losses. The possessions to be compensated include lands, crops and structures (houses and other constructions) or a combination of both. All the PAP will not be obliged to be relocated since in most cases only a small part of their possessions will be affected. In this case, they should be given a financial compensation for losses suffered.

Eligibility to relocalization and compensation will be based on a detailed inventory of possessions belonging to cash household a company which will be carried out by the PIU at least six months before the beginning of the construction. Every household, company or organization identified as being affected by the project will have right to a compensation and/or to the relocalization proportionally to the suffered impact.

The PAP also includes persons without title deeds or without any lease (squatter) according legal measures of the country (see previous section 3).

Vulnerable persons such women and children who are heads of families as well as old people or the displaced (refugees or others) will have to be given special attention. Their particular needs must be taken into account and the required resources for the restoring of their living conditions must be set up during the compensation and relocalization process. Consultations with the members of their community and local NGOs should allow to find means for helping them and improving their living conditions.

8.12. EVALUATION AND COMPENSATION OF LOSSES

8.12.1. COMPENSATIONS FOR HOUSES

Within the context of the interconnection project, some 196 households in Burundi and 271 in Rwanda will be affected by this new infrastructure. Among these households, some 56 houses are considered permanent in Burundi and 271 in Rwanda (permanent, half permanent and temporary), which will have to be relocated.

In the temporary type houses, the walls are built in dry soil applied to a branch trellis (pisé) with a thatched roof. The semi-permanent houses are built in dry bricks with a thatched or iron sheet roof. The permanent houses are built in concrete or in bricks done to a turn, and they have an iron sheet roof.

The affected houses are scattered on the whole of the line corridor, and not concentrated. The impact will consist, most of time, in rebuilding them at a few meters from the way leave, habitually on the same plot of land. In some cases, nevertheless, the residual portion, outside the way leave, is not enough to permit the rebuilding. The residence will have to be relocated to on and her parcel belonging to the same household or another parcel that will have to be bought.

Tableau N° 38. NUMBER OF HOUSES TO RELOCATE BY TYPE

Line section Section de ligne	Houses/Maison		
	Temporary/Temporaire	Semi-permanent/Semi-Permanente	Permanent/Permanente
Burundi	0	0	56
Rwanda	19	211	41
Total	19	211	97

The total replacement cost of buildings is 2 751 939 US$ from which 1 059 968 US$ is for Burundi and 1 681 971 USD for Rwanda. The replacement cost of related infrastructure (cowsheds, latrines, fences, etc.) is 294 082 USD from which 3 805 is for Burundi and 290 277 US$ for Rwanda.

8.12.2. COMPENSATION FOR PUBLIC INFRASTRUCTURES

No public infrastructure will have to be relocated.

8.12.3. COMPENSATION FOR AGRICULTURAL PRODUCTS

The total of the areas required for the project is estimated at 309 ha (103 km x 30 m). From that total, 0.16 ha (271 x 6.25 m2) will be lost permanently for the tower footing construction. This area is minimal in relation to the size of forms. Also a road of 5l large may be necessary in some places to allow the maintenance operation. In addition, crops whose height will be compatible with the line security and pasture will be authorized inside the way leave once when works are completed.

The cost associated with the compensation for the permanent losses of cultivated areas are estimated at 27 757 USD, that is to say:

Burundi : 0,05 ha X 7887 USD = 394 USD

Rwanda : 0,12 ha X 9380 USD = 1126 USD

The costs associated with the compensation for lost crops during the construction works may vary according to the fact that the peasant has had time to harvest or not. The compensation for implementation on basis of the market value including the cost for the restoration of crops

For the project requirement, the crop losses are considered for the whole construction year, that is to say 22 180 USD in Burundi and 47 451 USD in Rwanda, thus a total of 69 631 USD.

Tableau N° 39. BURUNDI – COMPENSATION COST FOR LOSS OF ANNUAL CROPS

Type of culture	Area	Compensation cost m2 BIF	Cost BIF
Coffee (plant)	1 168	16 360	19 108 480
Tea (plant)	192	251	48 192
Sorgho	1 240	39	48 235
Froment	1 100	47	52 061
Manioc	4 176	507	2117 232
Potatoe	188	324	60 927
Sweet potatoe	9 464	169	1 599 037
Colocasse	8	324	2 594
Beans	2 584	112	289 640
Sweet peas	568	132	75 193
Tomatoes	8	691	5 526
Eggplant	80	367	29 389
Total BIF			23 436 505
Total USD			22 180

Tableau N° 40. RWANDA – COMPENSATION COST FOR LOSS OF ANNUAL CROPS

Type of culture	Area	Compensation cost m2 RWF	Cost RWF
Coffee (m²)	1 144	240	274 560
Banana (are)	189 783	81	15 319 284
Manioc	87 111	65	5 644 793
Sweet potatoe	32 369	36	1 165 284
Sorgho	144 345	13	1 905 354
Beans	24 089	11	252 935
Other vegetables	2 258	324	731 592
Total RWF			25 293 801
Total USD			47 451

8.12.4. COMPENSATIONS FOR TREE PLANTATIONS

A lot of families have plots of land on which they grow trees, generally eucalyptus that are used either as timber or as firewood, and whose part may also be sold.

A lot of households also grow fruit trees in the way leave. Those trees will have to be cut and may not be planted again; so, it is a permanent loss. From the results of the surveys that have been carried out, it has been possible to estimate the total number of trees by household.

The loss of these trees owing to the complete deforestation of the way leave may have a significant impact for the families. The corresponding compensation is a complex procedure because it depends of the size of the tree.

The estimated cost is 36 647 USD, i.e. 10 174 USD in Burundi and 26 473 USD in Rwanda.

Tableau N° 41. RWANDA - COMPENSATION COSTS FOR TREES

Type of tree	Number of trees	Compensation cost (RWF)	Cost
Fruit trees	222	2 665	591 630
Goyava	30	2 670	80 100
Papayer	41	345	14 145
Eucalyptus	2 488	3 000	7 464 000
Cyprus	23	1 000	23 000
Cedrela	8	1 000	8 000
Gravella	369	1 000	369 000
Avocado	693	8 020	5 557 860
Coeur-de-boeuf	8	435	3 480
Sub-total Rwanda (RWF)			14 111 215
Total (USD)			26 473

Tableau N° 42. BURUNDI - COMPENSATION COSTS FOR TREES

Type of tree	Number of trees	Compensation cost (BFI)	Cost
Banana trees (hectares)	612	6 750	4 131 000
Goyava		4 340	0
Papaya		7 880	0
Palm tree		34 340	0
Citrus		28 080	0
Coeur-de-boeuf		8 840	0
Mango	4	8 667	34 668
Avocado	20	32 952	659 040
Firewood (m^3)	3 292	1 800	5 925 600
Sub-total Burundi (BFI)			10 750 308
Total (USD)			10 174

8.12.5. COMPENSATIONS FOR INDUSTRY AND COMMERCE

Same business or companies are going to be affected by the line construction. Taking account the linear aspect of the project, the relocalization of business will generally be possible in the immediate vicinity of the interruption of activities during the period of works. Whatever may be the company and business income losses shall be evaluated case by case.

The compensation basis that will be established will be an amount equivalent to six months of turnover after deduction of taxes and fees as declared to the authorities.

8.12.6. COMPENSATIONS FOR MOVING COSTS

Every household and company that shall more will be granted a fixed amount to cover for moving expenses. That amount will be established taking into account the particularities of each case and the number of persons to get moved. So, it is more expensive to get a family of 12 persons moved than 2 persons, with or without goats, cows, chickens, etc. In the same way, according to the quantity of furniture and other possessions to carry, the compensation costs vary. The same principles are applied to companies including their equipment, their stock as indicated in the stocklist, etc.

8.12.7. UNEXPECTED EVENTS AND CONTIGENCIES

Unexpected damages, perturbations and nuisances may happen during the relocalization process. They may be quite variable such as the loss of needed furniture that cannot be moved to another place, the obligation to move at a fixed date, the need to pack up house and business things and others.

The compensation relating to contingencies and drawbacks is found by adding a percentage at the end of the compensation calculations. It is suggested that 10% of the calculated compensation value should be given for drawbacks.

8.12.8. SETTLEMENT OF DISPUTES

In order to avoid misunderstandings during the process of evaluating the possessions, community representatives should be present in addition to the PIU members. All the documents should be signed by those present parties. A witness from a local NGO may also participate in this procedure.

Furthermore, a unit for settling conflicts shall be set up before the beginning of acquisitions by the PIU. That unit will comprise a local community representative (district) and a local NGO representative.

The PIU shall do everything possible to find common ground of agreement within that unit, including the nomination of a mediation accepted by the parties, or by a second evaluation of compensations independent of that one carried out by the PIU.

In case of misunderstanding, the PAP keeps his/her right to take a case in court.

In Rwanda a mediator of the Republic can be called to seek a compromise between the parts. If it is not possible to obtain a friendly agreement on the amount of the allowances, the expropriated must seize the Court of first authority of the place of situation of the expropriated good. The Court names three experts, in agreement with the parts or of office, then statue on the amount of the allowances and the starting time.

In the case of Burundi the Public Ministry of Labor and Equipment makes an evaluation of the goods, in dialogue with the communes and the population concerned. In the case of dispute, the plaintiff can make recourse to the competent courts.

8.13. COSTS

The estimated budget for the compensation and the relocalization of the PAP is presented in the following table. It presents the overall costs required for compensating and relocalizing the PAP in addition to the needs for a realization of a detailed inventory, the surveillance and the assistance to vulnerable persons. To this sun it may be added an amount equivalent to 10% for contingencies.

Tableau N° 43. COMPENSATION AND RELOCATION COSTS

ITEM	Rwegura-Kigoma	
	Burundi	Rwanda
Houses replacement cost	1 059 968	1 681 971
Private structures replacement cost	3 805	290 277
Public buildings replacement cost	0	0
Cost of trees	10 174	26 473
Permanent loss of cultivation	394	1 126
Temporary loss of cultivation (1 year)	22 180	47 451
Sub-Total by country	1 096 521	2 047 298
6 months or more quit notice 15%	0	0
Administrative cost (2%)	21 930	40 946
Contingencies (10%)	109 652	204 730
Sub-Total by country	1 228 104	2 292 974
TOTAL (USD)	3 521 077	

8.14. FOLLOW-UP AND EVALUATION

The follow-up and evaluation program of the relocalization implementation plan shall be set up by REGIDESO and Electrogaz.

It is recommended that this follow-up program should be under the responsibility of the Independent Follow-up Unit (IFU). This unit must be highly independent of the local influential authorities. To this end it is recommended that it should comprise the representatives of Regideso and Electrogaz, of an organization financing the project (the World Bank or other) and of a NGO representing the PAP, and finally an expert in relocalization and compensation from a University or an international organization.

The committee will have to examine the PAP'S situation and report to KPLC and Electrogaz and to competent government authorities.

More specifically, the IFU will have to:

- examine the PIU reports and related documents that have to do with compensations and relocalisations;
- evaluate how the PRC objectives have been attained, particularly the restoration of household crops and income;
- access the PAP'S satisfaction regarding given compensations and solutions given to complaints;
- determine the efficiency of taken measures and draw lessons

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APPENDIX 1: SOCIO-ECONOMIC QUESTIONNAIRE FOR THE COMMUNITIES

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

Questionnaire socioéconomique à l'intention des communautés

Province :	Questionnaire No. :
District :	Commune/village :
Fonction du répondant :	
Nom de famille du répondant :	Prénom du répondant :
Nom de l'interviewer :	Date :

SECTION A : DONNÉES SOCIOÉCONOMIQUES

Population du village

Tous les ménages									
Nombre de ménages		Population						Taille des ménages	
		Hommes		Femmes		Total			
1		2		3		4		5	

Ménages ruraux									
Nombre de ménages		Population						Taille des ménages	
		Hommes		Femmes		Total			
6		7		8		9		10	

Ethnie et religion

1	Ethnie majoritaire :	2	Pourcentage % :
3	Ethnie minoritaire :	4	Pourcentage % :
5	Autre ethnie :	6	Pourcentage % :
7	Principale religion :	8	Pourcentage % :
9	Seconde religion :	10	Pourcentage % :
11	Autre religion :	12	Pourcentage % :
13	Fête religieuse principale :	14	Date :
15	Autre fête religieuse :	16	Date :

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

Personnes réfugiées, femmes et enfants chefs de ménage

1	Est-ce que le village compte des personnes réfugiées, si oui combien ?	
2	D'où proviennent ces personnes réfugiées ?	
3	Combien de ménages ont à leur tête des femmes ?	
4	Combien de ménages ont à leur tête des enfants ?	

Infrastructures socioéducatives

	Principales infrastructures socioéducatives	Nombre
1	École primaire	
2	École secondaire/lycée	
3	Centre de santé/dispensaire	
4	Hôpital	
5	Église	
6	Mosquée	
7	Centre communautaire	
8	Poste de radio	
9	Associations :	
9	Autre :	
10	Nombre d'enseignants	
11	Nombre d'infirmières	
12	Nombre de médecins	

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

Activités socio-économiques

	Principales activités	Oui	Non	%
1	Agriculture			
2	Élevage			
3	Industrie de transformation			
4	Tourisme			
5	Secteur tertiaire			
6	Artisanat (spécifiez) :			
7	Autre (spécifiez) :			

	Commerces et industries	Nombre
8	Marché	
9	Moulin/atelier de conditionnement	
10	Boucherie	
11	Station d'essence	
12	Bar	
13	Boutiques/magasins/épiceries	
14	Atelier	
15	Café Internet	
16	Autre :	
17	Autre :	

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

Accès à l'eau potable

		Oui	Non	Ménages desservis %
1	Robinet dans la maison			
2	Robinet à l'extérieur de la maison			
3	Puits à la maison			
4	Puits communautaire			
5	Rivière ou source			
6	Autre (spécifiez) :			

SECTION B : ÉLECTRIFICATION RURALE

Accès à l'électricité

		O/N	Utilisation(s)
1	Y a-t-il l'électricité au village ?		
2	Si OUI, à quel usage(s) est-elle employée ?		

			OUI	NON
D'où provient cette électricité ?	3	Réseau électrique :		
	4	Génératrice :		
	5	Solaire :		
	6	Éolien :		

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

Demande pour l'électricité - village non relié au réseau de distribution

		O/N	Utilisation(s)
1	Est-ce que le village pourrait bénéficier de l'accès à l'électricité ?		
2	Si OUI, à quel usage(s) serait-elle employée ?		

Sources d'énergie utilisées par les ménages

	Source d'énergie	Éclairage	Cuisine	Chauffage
1	Bois			
2	Chandelles			
3	Kérosène			
4	Gaz de pétrole liquéfiés (butane, propane, etc.)			
5	Électricité			
6	Autre (spécifiez):			

SECTION C : MAIN-D'OEUVRE ET SERVICES

Main-d'œuvre

Est-ce qu'il y a dans le village des ouvriers qualifiés ? Si OUI, quels métiers sont représentés ?

	Métiers représentés	OUI/NON	Nombre de personnes
1	Monteur d'acier		
2	Menuisier		
3	Soudeur		
4	Électricien		
5	Chauffeur de camion		
6	Opérateur de machinerie lourde		
7	Mécanicien		
8	Maçon		
9	Peintre		
10	Autre :		

Services

Est-ce qu'il y a dans le village des entreprises en mesure de fournir des services durant la construction de la ligne ? Si OUI, quels services peuvent être fournis ?

	Services représentés	OUI/NON	Nombre de personnes
1	Transport		
2	Mécanique		
3	Essence/produits pétroliers		
4	Machinerie lourde		
5	Matériaux (bois, pierre, sable, etc.)		
6	Cantine		
7	Autre :		

Initiative du bassin du Nil

Programme Auxiliaire d'Action des Pays des Lacs Équatoriaux du Nil (PAALEN)

(NELSAP)

SECTION D : IMPACTS LIÉS À L'EMPRISE DE LA LIGNE ÉLECTRIQUE

Structures et bâtiments principaux

Quels bâtiments municipaux sont situés à l'intérieur de l'emprise et qui seront entièrement ou partiellement affectés? Fournissez le meilleur estimé possible des superficies affectées à l'intérieur de l'emprise.

Bâtiment	**Utilisation** (École, centre de santé, autre (spécifiez))	**Type de construction** (Indiquez les matériaux principalement utilisés pour les murs et le toit)	Superficie (m^2)	
			Totale	À l'intérieur de l'emprise
1				
2				
3				

4	Avez-vous un terrain à l'extérieur de l'emprise sur lequel reconstruire le bâtiment ? (O/N)	
5	À quelle distance du bâtiment actuel ce terrain est-il situé? (km)	

Préoccupations sur les impacts de l'établissement de l'emprise

Avez-vous des préoccupations à formuler entourant l'établissement de l'emprise de la ligne électrique et comment cela pourrait affecter le village ? Si OUI, quelles sont-elles?

		O/N
1	Avez-vous des préoccupations?	
	Si OUI, quelles sont-elles?	
2		
3		
4		
5		
6		

Signature de l'interviewé…… No de carte d'identité……..……

Signature de l'enquêteur... …… Date.....

APPENDIX 2: REPORT OF BURUNDI CONSULTATIONS

L'ETUDE SOCIO-ECONOMIQUE POUR L'INTERCONNEXION DES RÉSEAUX ÉLECTRIQUES DES PAYS DES LACS ÉQUATORIAUX DU NIL (partie burundaise)

ÉVALUATION SOCIO-ECONOMIQUE

RAPPORT SUR LES CONSULTATIONS (MENAGES ET COMMUNAUTES)

Juin, 2007

1.1 INTRODUCTION

Dans le cadre de l'interconnexion des réseaux électriques des pays des lacs équatoriaux du Nil, un programme a été établi pour réaliser des études de faisabilité de ce projet. Ainsi, deux enquêtes socio-économiques ont été initiées. L'une a été conduite auprès des ménages et l'autre auprès des communautés. Ces enquêtes sont réalisées après une étude de préfaisabilité qui a identifié le tracé jugé le plus efficient pour le tronçon Rwegura (Burundi) – Kigoma (Rwanda).

L'étude devrait permettre de quantifier les conditions socio-économiques des communautés et des ménages vivant ou ayant des biens (infrastructures) dans la zone du projet. Les données doivent aider à identifier les impacts et à proposer des mesures d'atténuation incluant un programme de recasement et de compensation des personnes affectées.

Méthodologie

Enquête auprès des ménages

Les études de ce genre sont généralement réalisées à l'aide d'une enquête directe auprès des ménages qui risquent de subir des pertes liées à la mise en œuvre du projet, c'est-à-dire la construction des pylônes. Dans le rapport de l'étude de préfaisabilité, la mission n'a malheureusement pas fait une identification des tracés en fonction de l'organisation administrative des zones concernées.

Par rapport à cette insuffisance, le volet « enquêtes socio-économiques et communautaires » de l'étude de faisabilité a choisi d'identifier physiquement les ménages qui sont potentiellement exposés aux effets induits du projet.

Au niveau des ménages, nous avons d'abord fait un dénombrement systématique de tous les ménages sur la ligne Rwegura-Kigoma. Le choix de cette technique est de pouvoir réaliser un échantillonnage ayant des bases scientifiques solides. Une opération de dénombrement a été réalisée en même temps que le pointage de l'arpenteur.

Dans le but d'avoir un échantillon représentatif, un taux de sondage a été fixé à 25% et les ménages choisis ont été fait sur toute la ligne avec un « pas » de 5 ménages. Toutes les sous-collines concernées par le projet ont été visitées à l'aide de la méthode énoncée ci-dessus. Ainsi, il sera facile de faire l'inférence des résultats obtenus sur l'échantillon sur l'ensemble de tous les ménages de la ligne Rwegura-Kigoma. Les résultats obtenus sont synthétisés dans le tableau ci-après :

Lignes (partie burundaise)	effectif dénombré	échantillon (25%)
Ligne Rwegura-Kigoma	196	49

Enquêtes communautaires

Pour les enquêtes communautaires, nous avons ciblé, les représentants des communautés à la base. Pour le Burundi, il s'agit des chefs des sous-collines. Tous les responsables à la base ont été interrogés conformément aux directives préétablies. Le tableau ci-après donne les détails sur le nombre de responsables à la base.

Lignes (partie burundaise)	nombre de responsables
Ligne Rwegura-Kigoma	15

L'ETUDE SOCIO-ECONOMIQUE POUR L'INTERCONNEXION DES RÉSEAUX ÉLECTRIQUES DES PAYS DES LACS ÉQUATORIAUX DU NIL (partie burundaise)

Synthèse des résultats des consultations

Les discussions avec les ménages et les représentants des communautés ont été réalisées à l'aide des questionnaires appropriés. Les données ont été ensuite saisies à l'aide d'un formulaire Access qui a été conçu à cette fin. Ainsi une base de données a été générée et elle permet de calculer les différents coûts liés au projet.

Dans le but d'avoir une idée précise sur la façon dont les personnes interrogées ont perçu le projet, nous avons procédé à l'analyse de deux éléments du questionnaire. D'une part nous avons synthétisé les préoccupations pour l'ensemble des ménages visités et d'autre part, nous avons dépouillé la question sur les raisons de la demande d'électricité fournies par les représentant des communautés à la base. Nous en avons fait une analyse quantitative dont les tableaux et graphiques ci-après fournissent le résumé.

NB. Les détails sur les noms des Communes et sous-collines qui ont été visitées par nos enquêteurs, sont bien détaillés dans la base de données Access qui a été générée.

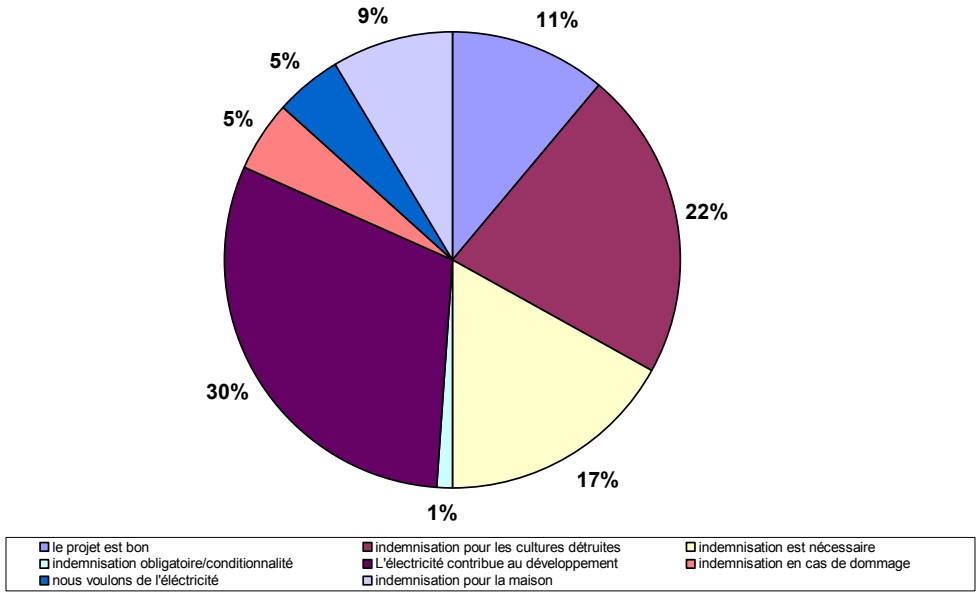
Préoccupations des ménages sur le projet Rwegura Kigoma

Les résultats qui sont dans le tableau ci-après ont été obtenu à partir de la question XV du questionnaire ménage. Le dépouillement des réponses fournies a montré que les ménages visités apprécient positivement le projet mais aussi ils ont insisté sur l'indemnisation.

Préoccupations	n° Ménage[1] (Rwegura Kigoma)	fréquence
le projet est bon	1, 3, 10, 14, 22, 30, 37, 43, 44	9
indemnisation pour les cultures détruites	1, 3, 16, 17, 20, 21, 28, 30, 32, 33, 35, 37, 38, 39, 40, 41, 43, 44	18
indemnisation est nécessaire	4, 5, 7, 8, 9, 10, 11, 14, 15, 19, 31, 34, 47, 48	14
indemnisation obligatoire/conditionnalité	6	1
L'électricité contribue au développement	7, 8, 9, 15, 16, 18, 19, 21, 23, 24, 25, 26, 27, 28, 31, 32, 33, 35, 36, 37, 38, 40, 41, 45, 46, 49	25
indemnisation en cas de dommage	12, 13, 18, 23	4
nous voulons de l'électricité	13,'20, 32, 39	4
indemnisation pour la maison	26, 27, 28, 33, 34, 38, 49	7
peur d'être exproprié		0
parcelles destinée à la construction		0
montant de l'indemnisation		0
risque d'accident avec les fils électriques		0
Total		82

[1] [1] Ici nous avons repris les numéros les ménages telle qu'ils sont ordonnés dans la base de données

Préoccupations des ménages sur la ligne Rwegura Kigoma



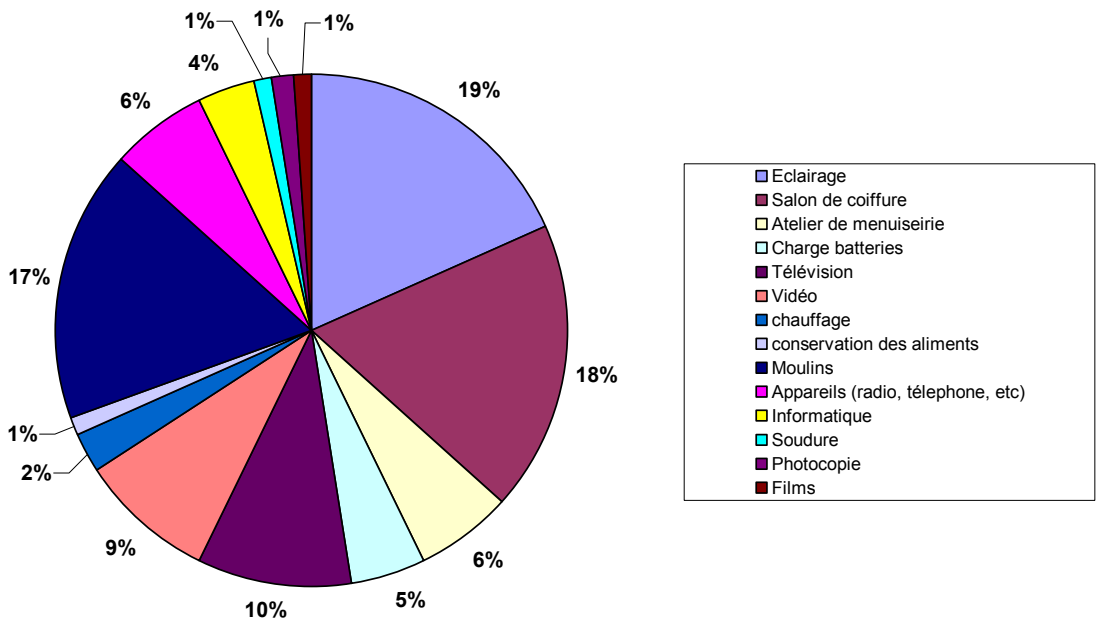
L'ETUDE SOCIO-ECONOMIQUE POUR L'INTERCONNEXION DES RÉSEAUX ÉLECTRIQUES DES PAYS DES LACS ÉQUATORIAUX DU NIL (partie burundaise)

Raison de la demande d'électricité fournie par les représentants des communautés sur le projet Rwegura Kigoma

Pour avoir les résultats présentés ci-après, nous avons dépouillé le questionnaire auprès des communautés. Les réponses fournies à la question VIII, relative à la demande pour l'électricité du village, nous ont permis d'avoir les raisons de ce tableau. Il apparaît que, pour le projet de Rwegura-Kigoma, l'éclairage, l'installation des salons de coiffure et des moulins sont les raisons principales pour lesquelles l'électricité serait utilisée.

Raisons de la demande d'électricité	n° sous colline (Rwegura Kigoma)	fréquence (Rwegura-Kigoma)
Eclairage	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	15
Salon de coiffure	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	15
Atelier de menuiserie	1, 5, 9, 11, 15	5
Charge batteries	1, 12, 13, 14	4
Télévision	1, 4, 5, 8, 12, 13, 14, 15	8
Vidéo	1, 5, 8, 10, 12, 13, 15	7
chauffage	2,3	2
conservation des aliments	2	1
Moulins	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	14
Appareils (radio, téléphone, etc.)	2, 3, 12, 13, 14	5
Informatique	2, 3, 6	3
Soudure	3	1
Photocopie	3	1
Films	7	1
Décortiqueuse de riz		0
Total		82

Raisons de la demande d'éléctricité pour la ligne Rwegura-Kigoma



APPENDIX 3: REPORT OF RWANDA CONSULTATIONS

MESURES DES CONSULTATIONS EFFECTUEES

Introduction :

Les consultations du public ont été faites à trois niveaux respectifs :

Au niveau central, auprès des personnes ressources ayant une expertise dans l'un ou l'autre domaine concerné par l'étude (système foncier, domaine forestier, environnement, énergie, etc.) ;

Au niveau des structures décentralisées, les autorités administratives locales ont été consultées depuis le niveau de la province, du district jusqu'aux secteurs des zones qui seront affectées par l'emprise de la ligne électrique ;

Les consultations avec les communautés ont été faites à travers différentes réunions avec la population dans leurs villages « *Imidugudu* ». La plupart des réunions ont été tenues dans les centres commerciaux ou dans les écoles primaires selon les recommandations du Chef du Village.

La méthode d'entretien a été utilisée lors de la consultation des experts des différentes institutions au niveau central ainsi qu'avec les autorités locales des provinces, des districts et des secteurs. A cette occasion, une lettre d'introduction préparée par le Ministre ayant l'énergie dans ses attributions avait été préalablement transmise à toutes les autorités administratives nationales et locales (provinces et districts). Au moment de la consultation, un rendez-vous était d'abord acquis auprès de chaque autorité et au moment de l'entretien on présentait la copie de la lettre d'introduction ainsi qu'une fiche de présentation du résumé du projet.

La méthode des Assemblées Publiques a été utilisée pour les séances de consultation avec la population au niveau des villages. Une rencontre était organisée préalablement avec le chef du village « *Imidugudu* ». Lors de l'entretien avec le Chef du village, un consensus était obtenu sur le lieu et le temps de la réunion. L'invitation par affichage était adressée à la population par le Chef du village et annonçait l'objet et le lieu ou se tiendrait la réunion.

Objectifs des consultations :

Informer le public sur le projet et particulièrement les personnes qui seraient potentiellement affectées par le projet;

Recueillir les besoins, les priorités de la population riveraine au site d'implantation du projet et leurs réactions sur le projet ;

Identifier les préoccupations de la population et leur acceptabilité du projet ;

Promouvoir la coopération du public et des communautés riveraines aux différentes phases de réalisation du projet.

Consultation des communautés :

Lors des consultations avec les communautés, la réunion débutait par un mot de bienvenue du Chef du village et une brève introduction des enquêteurs. Ensuite, on présentait aux participants l'ordre du jour ainsi que les objectifs de la réunion, et enfin un bref résumé du projet d'interconnexion du réseau électrique des pays des lacs équatoriaux. Après cette présentation, la parole était donnée à la population pour demander des questions sur le projet ou exprimer leurs préoccupations. A la fin de chaque réunion, on complétait un formulaire de collecte d'informations sur la présence et les préoccupations exprimées par la population.

Au total, une audience de 552 personnes a répondu aux consultations des communautés, dont 30,9 % de femmes. L'importance de l'audience par district dépendait du nombre de villages traversés par l'emprise de la ligne électrique dans chaque district. La majorité de l'audience était composée des agriculteurs et des éleveurs. D'autres métiers étaient aussi représentés : maçons, menuisiers, enseignants, etc. Les détails de l'audience par district se trouvent dans le tableau ci-dessous. La liste des personnes consultées se trouve en annexe 1.

Tableau 1. Répartition des personnes consultées par village et district

District	Villages “Imidugudu”	Audience	% femmes
Ruhango	Kigimbu, Gasharu	26	50
Nyanza	Kigufi, Butara, Kirambo, Marongi, Gitare, Kibaza, Bayi, Kibaza, Nyarutovu, Kigufi, Butara, Kirambo, Gasharu, Buhaza, Migina, Rwimpudu	190	34,2
Huye	Kigali	13	15,4
Gisagara	Nyarubare,Kaduha, Rusenyi, Kibarama, Agahehe, Janja, Gitozo, Murama, Kabahizi, Kabagagi, Nyesonga, Umubezi, Ruhangaye, Umugobe, Karambo, Nyaburondwe, Kigarama	265	24,9
Nyaruguru	Karambo, Umugobe, Ururambo	58	39,7
Total		552	30,9

Les consultations des leaders locaux :

A la suite d’une lettre adressée à tous les districts concernés, des consultations sous forme d’entretien ou en *focus group* ont été conduites dans tous les districts et les secteurs. Ces consultations ont précédées des enquêtes proprement dites effectuées dans les ménages et les communautés. D’autres consultations complémentaires ont été conduites auprès des différents experts des départements ministériels et des établissements paraétatiques selon les domaines d’expertise et relatifs au projet.

Les autorités et les experts consultés occupent des services diverses notamment : les Maires (districts), les Secrétaires Exécutifs (provinces, districts, secteurs), planification, affaires sociales, agricultures et élevage, développement des infrastructures, conservation des titres fonciers, bonne gouvernance, énergie, ressources humaines, affaires économiques et développement). Les détails sur les consultations des leaders communautaires sont en annexe 2.

Les enquêtes dans les ménages :

Des enquêtes dans les ménages se trouvant à l’intérieur de l’emprise de la ligne de transport électrique ont été conduites sur un échantillon de ménages pour les trois corridors. Les informations collectées étaient relatives à l’identification administratives, spatiales et les membres de chaque ménage. D’autres informations collectées étaient relatives au mode de vie, les revenues et les types de production, l’utilisation et la demande en énergie ainsi que l’impact de la ligne électrique sur leur mode de vie.

Pour chaque ménage, un questionnaire était complété par les enquêteurs après une introduction de l’interviewé. Les méthodes d’échantillonnages et le questionnaire sont repris en annexe. Le total des ménages et les ménages échantillonnés sont représentés dans le tableau suivant.

Tableau 2. Nombre de ménages de l'emprise et ménages échantillonnés

Districts	Ménages	Echantillons
Ruhango	29	7
Nyanza	97	34
Gisagara	116	22
Nyaruguru	21	5
Total	263	68

Les préoccupations du public :

Les consultations faites au niveau des autorités locales et auprès des communautés ont montré des similitudes. Le grand problème est lié à l'insuffisance des terres dans presque toutes les entités administratives visitées. Les litiges liés aux questions foncières sont les plus dominants parmi les litiges reçus par l'administration locale. Les préoccupations notées lors de cette consultation sont décrites en détail dans le tableau suivant.

Tableau 3. Préoccupations et questions soulevées lors des consultations du public.

Composantes environnementales	Questions majeures et préoccupations exprimées
Le cadre légal pour l'expropriation et indemnisation.	Cette préoccupation de référence légale a été exprimée par les autorités du Ministère ayant les terres dans ses attributions, les autorités des provinces et des districts. Le récent document juridique date de 1996. I s'agit d'un arrêté ministériel **nº 1808/1185 du 22/04/1996** qui fixait le tarif du taux d'indemnisation à l'expropriation pour cause d'utilité publique. Il était prévu que cet arrêté devait être mis à jour tous les 18 mois et au cours de la consultation, il était caduc. Comme alternative, on se réfère à cet arrêté en appliquant le double du tarif pour la location et 10 fois pour la vente. En outre spécifiquement pour le milieu rural et e en attendant qu'une loi sur l'expropriation soit promulguée, une lettre du 27 octobre 2005 nº2494/16.03/01.03 adressée au district, villes et Ville de Kigali propose de procéder à l'entente entre l'exproprié et l'expropriant selon les prix actuels du marché. La plupart des autorités consultées ne sont pas au courant de cette lettre.
Expropriation et indemnisation	**Les communautés** ont beaucoup de préoccupations sur cette question. Elles ont exprimé que les terres sont petites, rares et chères. Elles se demandent où elles vont trouver encore des terres. Elles ont émis le souhait d'être indemnisés le plutôt possible et à des taux satisfaisants afin de leur permettre d'acheter les terres et de reconstruire. Si les indemnisations vont prendre du temps, on dénombrera encore leurs biens car la valeur des terres et des biens changent d'une année à une autre. La population se demande aussi, si on va indemniser les bananiers et les arbres coupés par les arpenteurs lors du marquage du tracé. Souvent il peut se poser des problèmes lors du versement des indemnisations, la population a souhaité que les indemnités soient versées aux ayants droits directs.
Déplacement de la population	**Les autorités locales et les Leaders des communautés**. Ce groupe a exprimé que la politique du Gouvernement est de la promotion de l'habitat regroupé dit « Imidugudu ». Les autorités devraient être impliquées pour trouver un endroit de relocalisation de la population affectée. En concertation avec cette population, il serait préférable de leur verser la différence des indemnités d'expropriation après avoir construit leurs nouvelles maisons ou leurs trouver des parcelles. Les principales préoccupations des **communautés** relatives à la relocalisation sont notamment : - Etre déplacer vers un autre endroit auquel ils ne sont pas habitués, probablement avec des risques d'être installée dans une zone impaludée près des marais ou zones inondées. - Les terres ne sont pas encore fertiles et on doit apporter régulièrement du fumier. En cas de réinstallation loin de leurs terres, il sera difficile de fumer leurs champs restants et risques de vol des cultures dans les champs. - Ils sont fatigués de construire à nouveau particulièrement les anciens réfugiés nouvellement réinstallés. Ils ont besoins de beaucoup d'explication et des facilités. - Certaines personnes ont exprimé qu'elles ne supporteront pas voir physiquement la démolition de leurs maisons si le cas arrive. - Si on leur construit des maisons, il faudra les construire non loin de la route et de la nouvelle ligne électrique afin de bénéficier au nouveau développement qui arrive dans leur région.

	- D'autres personnes se disent que les câbles électriques sont aériens et se demandent pourquoi on va les exproprier et les déplacer pour un autre endroit. - Le déplacement pourra occasionner la perturbation de leurs activités agricoles et d'élevage et enfin de la faim s'il n'y a pas de mesures d'accompagnement.
Acceptabilité du projet	**Les autorités locales.** Les autorités locales consultées trouvent une issue dans ce projet pour résoudre les problèmes de délestage fréquente suite à l'insuffisance du courant électrique. C'est également un espoir pour rendre opérationnelle les projets planifiés relatifs à la transformation agricole et d'honorer leurs promesses données à la population des habitats regroupés. Les communautés. La population consultée a manifestée leur soutien entier au projet dans le cas où il y aura des raccordements ruraux. A ce moment, le projet leur permettra de sortir de l'enclavement et de l'obscurité.
Opportunités pour l'emploi	**- Les autorités locales.** Dans le cadre de la réduction de la pauvreté, le Gouvernement soutient les initiatives et projet à haute intensité de main d'oeuvre. Toutes les autorités avaient souhaité que ce projet puisse contribuer à créer des emplois en milieu rural et ce augmenter le pouvoir d'achat de la population et alléger les effets de la pauvreté. - Les communautés. Toute la population rencontrée a manifesté une attente d'emplois à partir de ce projet. Les hommes de métiers qui ont plus manifesté une attente d'emplois sont particulièrement les maçons, les soudeurs, les menuisiers. Ils ont manifesté une hostilité à d'autres projets qui ne recrutent pas la main d'oeuvre localement et par conséquent la population affectée ne bénéficie en rien de ce projet.
Désintégration sociale	La désintégration sociale a été évoquée par les communautés. Certaines personnes rencontrées ont manifesté leur regret au déplacement de certains ménages voisins qui se sont retrouvés dans l'emprise alors qu'ils cohabiter bien depuis de longues années. Elles ont noté en outre, la désintégration des membres de certaines familles qui seront obligés à être déplacées loin de leur famille élargie.
Accès à l'électricité	**Les autorités locales**. L'accès à l'énergie suffisante et aux nouveaux raccordements a été largement évoqué par toutes les autorités rencontrées. - Des projets de transformations agricoles et des produits d'élevage sont en projet et le grand risque noté était la disponibilité de l'énergie : Unité de décorticage du riz (Nyanza et Gisagara), développement de l'hôtellerie et de l'habitat (Nyanza), Stade Olympique de Nyanza (Nyanza). - Les autres infrastructures qui vont bénéficier du projet sont les bureaux des secteurs et de certains districts, les marchés, les habitats agglomérés, les prisons, les casernes militaires. La politique de l'habitat en milieu rural est de passer de l'habitat dispersé à un habitat aggloméré. La disponibilité de l'électricité est l'un des facteurs d'attrait de la population à rejoindre les agglomérations qui seront les pôles de développement en milieu rural. - **Les communautés**. La population a exprimé un vif besoin en électricité en vue de facilité la conservation des produits agricoles périssables et les produits laitiers. Un accent particulier à été mis aux marchés et d'autres centres de négoces surtout pour refroidir les boissons de vente. Cependant, les prix d'électricité sont élevés et ils ont demandé une réduction des prix de consommation d'électricité adaptés à leur pouvoir d'achat. L'accès à l'électricité leur permettra à se développer comme les citadins, sortir de l'enclavement et de l'obscurité. Cependant, la population se demande si tout le monde pourra accéder à l'électricité

Intégration à d'autres projets planifiés	**Les autorités locales**. Les autorités des provinces et des districts ont fortement exprimé l'intégration du projet avec d'autres projets de développement des infrastructures planifiés. Les infrastructures d'attraction de la population à habiter les villages sont particulièrement l'électricité, les routes, les adductions d'eau, les écoles et les facilités sanitaires. L'axe de basse altitude à partir de Ruhango-Ntyazo – Gikongo-Ndora et Gisagara constitue une axe déjà enclavée et qui sera dans un proche avenir un pole de transformation des produits agricoles (riz, mais, tomates, manioc). Le raccordement en électricité va s'intégrer à d'autres projets de développement des infrastructures de transport, d'abduction d'eau et de regroupement de la population en villages, dit-il le Secrétaire Exécutif du District de Nyanza.
La santé et la sécurité	**Les autorités locales.** Les autorités ont exprimé leurs préoccupations sur les risques d'accidents d'électrocution une fois que la population n'est pas éduquée sur les risques et les dangers que représente le courant électrique. **Les communautés.** La population consultée a manifesté un besoin d'être protégée contre les courts circuits et les surtensions. Elle a demandé une éducation et une large sensibilisation à se protéger contre les accidents éventuels liés à l'électricité. Elle se demande que si en cas d'accidents éventuels tant pour les bien que pour les personnes, qui assumera la responsabilité ? Il y aura t-il une assurance ? Un exemple peut être lié à une forte pluie qui peut faire tomber les pylônes et les câbles et en conséquence entraîner les dégâts.
Morcellement des terres	**Les communautés** qui n'ont pas de terres suffisantes sont préoccupées par le morcellement de leurs terres. Les terres morcelées perdent leur valeur et à ce moment, ils souhaiteraient tenir en considération toutes les terres d'un ménage dont la superficie des terres qui tombent dans l'emprise et supérieur aux terres résiduelles.
Sensibilisation de la population	Les autorités consultées ont montré leur satisfaction du projet au niveau de la sensibilisation. Ce projet sera un grand atout pour sensibiliser la population aux programmes d'habitat regroupé. Ils sont rassurés que le taux d'habitat regroupé va augmenter au niveau des axes de raccordement en électricité. Les autres programmes qui seront facilités pour la sensibilisation sont les objectifs du développement durable, la vision 2020 et la stratégie de réduction de la pauvreté, les programmes de décentralisation en raccordant tous les secteurs et d'autres programmes de développement d'organisations à base communautaire.
Amélioration de l'éducation	Le Rwanda a lancé un programme dit « un ordinateur laptop pour un écolier » et un autre programme d'enseignement à distance. L'approvisionnement en électricité pour les écoles secondaires et primaires va contribuer à l'application effective de ces programmes surtout dans les zones qui étaient enclavés en électricité. En conséquence, la qualité de l'enseignement, le développement de l'ICT (*Information Communication and Technology*), l'enseignement à distance et l'éducation pour tous seront améliorés.

APPENDIX 4: LIST PEOPLE MET DURING THE COMMUNITY CONSULTATIONS IN BURUNDI

Ligne Rwegura-Kigoma

Survey number / Questionnaire :	Village	Family name / Nom de famille	First name / Prénom
1	KIBAYA	NGERAGEZE	Antoine
2	CAGUKA	HARERIMANA	Claver
3	NYAMISAGARA		Thaddée
4	RUSEBEYI	NAHUMUREMYI	Claver
5	KABATWA	KAMANZI	Daniel
6	KIREHE	SINZOBAKWIRA	Simon
7	MUNEGE	NDUWIMANA	Pascal
8	MUGERA	NIYONZIMA	Arthémon
9	WANTEKO	NYABENDA	Pascal
10	SHORERO	BUCUMI	Lucien
11	SAKARIRO	NZOYAMAZE	Ernest
12	RUTEGA	NZEYIMANA	Jonathan
13	WABICOBOGO	NZEYIMANA	Jonathan
14	RUGERERO	NTAHIMPERA	Antoine
15	RYAMUKONA	GASHAGAZA	Charles

APPENDIX 5: LIST PEOPLE MET DURING THE COMMUNITY CONSULTATIONS IN RWANDA

Date	District	Village	Nom	Prénom	Fonction
2007-04-19	Nyanza	RWIMPUNDU	MUKARUSINE	FEBRONIE	Agriculteur
			NGIRUWONSANGA	ALPHONSE	Agriculteur
			SIBOMANA		Agriculteur
			NYANDWI	CHARLES	Agriculteur
			BIMENYIMANA	ONESPHORE	Agriculteur
			NTIBISASIRWA	APPOLINAIRE	Agriculteur
			MUKARURANGWA	MADELEINE	Agriculteur
			MUKAKARISA	FRANCINE	Agriculteur
			MUKANYANDWI	OLIVE	Agriculteur
			SENDEGEYA	VIATEUR	Agriculteur
			MUKESHIMANA	ANESIE	Agriculteur
			UWITONZE	SERAPHINE	Agriculteur
2007-04-17	Nyanza	MIGINA	GAKURU	J.CLAUDE	Agriculteur
			MBITUYIMANA	EMMANUEL	Agriculteur
			MUSHIMIYIMANA	VINCENT	Agriculteur
			NKURANGA	CLAVER	Agriculteur
			NTAGUNDA	JEAN	Agriculteur
			NEMEYE	FIDELE	Agriculteur
			NDIMURWANGO	DANIEL	Agriculteur
			MWUNVANEZA	AFREID	Agriculteur
			HAKORIMANA	PIERRE	Agriculteur
			NDINZI	EMMANUEL	Agriculteur
			NDOKORE	VIANNEY	Agriculteur
			MUTUYIMANA	EMMANUEL	Agriculteur
			RUHANGARE	SYLVESTRE	Agriculteur
			MUKAMANA	CLEMENTINE	Agriculteur
			NIYONSHUTI	TABEYA	Agriculteur
			NIYONKURU	MARTHE	Agriculteur
			NIBAKAREKE	JUNISSER	Agriculteur

			MUKABAKINA		Agriculteur
2007-04-16	Nyanza	BUHAZA	NYIRAMUHANDA	VALERIE	Agriculteur
			NKORABIKINO	ALPHONSE	Agriculteur
			NIYOYITA	VINCENT	Agriculteur
			NIMUGIRE	VESTINE	Agriculteur
			NIYONSAQBA	VINCENT	Agriculteur
			HAKIZIMANA	CALLIXTE	Agriculteur
			KAMANZI	FAUSTIN	Agriculteur
			SIBOMANA	EMMANUEL	Agriculteur
			MUTUNGIREHE	THEOGENE	Agriculteur
			NIYOMUGABO	EUGENE	Agriculteur
			NIYOMUFASHA	BEATRICE	Agriculteur
			NSABIMANA	LEONARD	Agriculteur
			NYIRANSENGIMANA	JEANNETTE	Agriculteur
			MUKANYANDWI	BEATRICE	Agriculteur
			MUTUYIMANA	M.GORETTE	Agriculteur
			REKERAHO	ISSA	Maçon
			MUKEZANGANGO	DANIEL	Maçon
			MUKAYIRANGA	JEANNE	Couturier
			NAHIMANA	OMAR	Maçon
			NIYODUSABA	ADELINE	Menuisier
2007-04-16	Nyanza	KIGUFI	KARAMBIZI	ASSIEL	Maçon
			NDAYAMBAJE	JOTHAM	Agriculteur
			MUNYANGABE	BENJAMIN	Agriculteur
			RWANDAMA	VINCENT	Agriculteur
			SIBOMANA	AIMABLE	Agriculteur
			NZAGIBWAMI	LEVERIEN	Maçon
			HABIMANA	NATHAN	Maçon
			URIHO	HODAL	Maçon
			MUKARUBUGA	ASSINATHA	Agriculteur

			NYIRABAHUTU	GENESTA	Agriculteur
			HABAKURAMA	FAUSTIN	Agriculteur
2007-04-06	Nyanza	GASHARU	SINDAYIGAYA	SOSTHENE	Agriculteur
			NSENGIMANA	J.PIERRE	Maçon
			NSANZIMANA	EMMANUEL	Agriculteur
			NYIRAMINANI	VESTINE	Agriculteur
			NZARAMBA	CELESTIN	Agriculteur
			KANYAMUHANDA	LAMAZANI	Agriculteur
			SIKUBWABO	EZILA	Agriculteur
			GASASIRA	HUSSENI	Agriculteur
			UWIMANA	ESTHER	Agriculteur
			MBONABUCYA	THERESE	Agriculteur
			MUKARUGWIZA	JEANNETTE	Agriculteur
			NZABARINDA	JEAN DAMASCENE	Agriculteur
			MAZIMPAKA	THEOGENE	Agriculteur
			MUKANSONERA	ESPERENCE	Agriculteur
			SIBOMANA	ANGELIQUE	Agriculteur
			NIYOYITA	VINCENT	Maçon
			NYIRABAGEBERA	ASSIYA	Agriculteur
2007-04-06	Nyanza	KIBAZA	MUKANTAGARA	EPIPHANIE	Agriculteur
			NYIRAJYAMBERE	ROSALIE	Agriculteur
			MUKAGASANA	BEATHE	Agriculteur
			SEBANANI	EPHREM	Sculpteur
			NYABYENDA	CLAVER	Agriculteur
			KARERA	SAMUEL	Agriculteur
			MUSHIMIMANA	EVELYNE	Agriculteur
			MUSABENDE	HELENE	Agriculteur
			NIYONSABA	VINCENT	Agriculteur
			MUKANKUNDIYE	FELICITE	Agriculteur
			HAJABIKIZA	EMMANUEL	Agriculteur

			NKANZAYIRE	JOEL	Agriculteur
			KABEGA	HELENE	Agriculteur
			KANKUNDIYE	IMELDE	Agriculteur
2007-04-06	Nyanza	BUTARA	MUKANURIKIYINTWARI	BONIFRIDE	Agriculteur
			RUTAGENGWA	EUGENE	Agriculteur
			NSENGIMANA	EVARISTE	Agriculteur
			HAKIZIMANA	LEONIDAS	Agriculteur
			MUKAMURANGWA	JOSEE	Agriculteur
			MUKAMANA	PASCASIE	Agriculteur
			MUSHIMIYIMANA	EPIPHANIE	Agriculteur
			MUHIGIWA	ALEXIS	Agriculteur
			NTAGANDA	THEOGENE	Agriculteur
			NGIRUWONSANGA	APHRODIS	Agriculteur
			BIMENYIMANA	DAVID	Agriculteur
			RUSANGA	DAMIEN	Agriculteur
			UWERA	CLARISSE	Agriculteur
2007-04-06	Nyanza	MARONGI	KAMANZI	DESIRE	Agriculteur
			HABIMANA	MARC	Agriculteur
			MUTARAMBIRWA	ALEX	Agriculteur
			KANYABUGOYI	GASPARD	Agriculteur
			MURENZI	SYLVESTRE	Agriculteur
			NTAKIRUTIMANA	PROTOGENE	Agriculteur
			SIBOMANA	MANACEE	Agriculteur
			BYUKUSENGE	BEATRICE	Agriculteur
			MUKLABYENDA	SAVORONIE	Agriculteur
			NYIRAMANA	BEATRICE	Agriculteur
			HABYARRIMANA	VINCENT	Agriculteur
			KAKUZE	ELINE	Agriculteur
			NGIRABERA	DOMINIQUE	Agriculteur
			NZABAWITA	THEONESTE	Agriculteur

			UTEGEREJE	BERINE	Agriculteur
			FUNDI	SYLVESTRE	Agriculteur
			GATARE	DENIS	Agriculteur
2007-04-05	Nyanza	NYESONGA	NTIHABOSE	ISAC	Agriculteur
			MUGIRWANAKE	EDOUARD	Maçon
			NDINDABAHIZI	ELIE	Agriculteur
			NDABARORA	ANATOLE	Agriculteur
			NYIRAHABIMANA	RACHELLE	Agriculteur
			MUKARUKUNDO	ATHANASIE	Agriculteur
			SINDAMBIWE	ELISA	Agriculteur
			MUSHIMIYIMANA	EUGENIE	Agriculteur
			MBONIGABA	SALATIER	Agriculteur
			DUSABUMUREMYI	PIERRE	Agriculteur
			NSABIMANA	ELIERRE	Agriculteur
			AYINKAMIYE	ROSEMERE	Agriculteur
			NTIHIGWA	EMMANUEL	Agriculteur
			SHUMBUSHO	SETH	Agriculteur
			GATORANO		Maçon
2007-04-05	Nyanza	GITARE	MUKAGAKWAYA	ANNONCIATE	Agriculteur
			NTIVUGURUZWA	MICHEL	Agriculteur
			SEKANABO	CHARLES	Agriculteur
			MUKAMANA	CHEZIA	Agriculteur
			UKOBIZABA	CLAUDIEN	Agriculteur
			HITIMANA	EMMANUEL	Agriculteur
			MUNYANDAMUTSA	AIMABLE	Maçon
			SEBUKIRIRO	EMMANUEL	Agriculteur
			HARINDINTWARI	PASCAL	Agriculteur
			MUKASHYAKA	LEONCIE	Agriculteur
			KAMPIRE	EUGENIE	Agriculteur
			BANGAMWABO	VEDASTE	Agriculteur

2007-04-19	Nyanza	BAYI	MUTABAZI	XAVIER	Agriculteur
			KABAHIRE	PRISCA	Agriculteur
			YANKURIJE	CHANTAL	Etudiant
			TANGISHAKA	ANCILLE	Agriculteur
			MUNYANEZA	ERIC	Agriculteur
			HATEKIMANA	PHILIPPE	Agriculteur
			MINANI	ANDRE	Agriculteur
			NIYONSABA	FLORANCE	Agriculteur
			MBUZIBUZI	AUGUSTE	Agriculteur
			NYIRABARERA	PAULINE	Agriculteur
			BIGIRABAGABO	VALENS	Agriculteur
			MUJAWINGERI	ALEX	Agriculteur
			UZABAKIRIHO	FLANCOIS	Maçon
			NTABARESHYA	SYLIVESTRE	Agriculteur
			DUSABIREMA	J.BAPTISTE	Maçon
2007-04-18	Nyanza	NYARUTOVU	MUKANDEKEZI	FLORIDE	Agriculteur
			KUBWIMANA	ELISSA	Agriculteur
			UWAMARIYA	FRANCINE	Agriculteur
			AHISHAKIYE	ANDRE	Agriculteur
			NGENDAHIMANA	EVARISTE	Agriculteur
			SEKIMONYO	CLAUDE	Agriculteur
			NTAGARA	DESIRE	Agriculteur
			TWIZEYIMANA	ABERI	Agriculteur
			NIYONTEZE	SILVANIE	Agriculteur
			MUHIRE	DOMINIQUE	Agriculteur
			MUNYAMPETA		Agriculteur
			SINDAYIGAYA	SETH	Agriculteur
			NYIRANTEZIMANA	THERESIE	Agriculteur
2007-04-05	Nyanza	KARAMBO	BAZIKI	NASONI	Agriculteur
			UGIRINKANDA	ALOYS	Agriculteur

			NYIRANDIKUMANA	MARIANE	Agriculteur
			NZAYINAMBAHO	SAMUEL	Agriculteur
			SUBUKINO	ILDEBRANDE	Agriculteur
			GENDANEZA	JEAN	Agriculteur
			NEMEYIMANA	FIDELE	Agriculteur
			MFIZI	JEAN	Agriculteur
			SIBOMANA	FAUSTIN	Agriculteur
			NYANDWI	EFURON	Agriculteur
			GAFARANGA	ADVIENNE	Agriculteur
			MURAGO	FRANCOIS	Agriculteur
			NTAKIRUTIMANA	SAMUEL	Agriculteur
2007-04-24	Gisagara	KAREHE	NYIRAMINANI	JOSEE	Agriculteur
			RUGANINTWARI	APPOLINAIRE	Agriculteur
			MUKESHIMANA	LIBEREE	Agriculteur
			NYIRANDIKUBWIMANA	JEANNETTE	Agriculteur
			MBONIGABA	BASILE	Agriculteur
			MBONIMPAYE	GRACIEN	Agriculteur
			MUNYAKAZI	ETIENNE	Agriculteur
			HAGENIMANA	FIDELE	Agriculteur
			MUNYANKIKO	SAMUEL	Agriculteur
			VUMIRIYA	PROTAIS	Agriculteur
			AYABAGABO	DAMASCENE	Agriculteur
			RUBAYIZA	PHILLIPE	Agriculteur
2007-05-02	Gisagara	KABAHIZI	HAKIZIMANA	ANANIAS	Agriculteur
			KABAGWIRA	ANASTASIE	Agriculteur
			MUHAYIMANA	J.M.V	Agriculteur
			BUSUMBINGABO	FAUSTIN	Agriculteur
			NGERAGEZE	EMMANUEL	Agriculteur
			MUKANTAGANZWA	DOMITILLE	Agriculteur
			NSENGIMANA	PIERRE	Agriculteur

			NSHUTIYUBAKEYE	NARCISSE	Agriculteur
			NSABUKUNZE	MOISE	Agriculteur
			MURENGERANTWARI	ERNESTE	Agriculteur
			MPOZAYO	ERNESTE	Agriculteur
			MAZIMPAKA	ALEXIS	Agriculteur
			NDAGIJIMANA	ANANIAS	Agriculteur
			NYECUMI	DAMASCENE	Agriculteur
2007-04-28	Gisagara	KIGARAMA	BIRINDABAGABO	JOSEPH	Agriculteur
			UWIRINGIYIMANA	CALLIXTE	Agriculteur
			HABYARIMANA	ELISA	Agriculteur
			NZASABINFURA	AUGUTIN	Agriculteur
			HARERIMANA	J.PERRE	Agriculteur
			NYIRAMISAGO	ATHANASIE	Agriculteur
			NAHIMANA		Agriculteur
			NYIRAKAGURIRA	MERCURE	Agriculteur
			KAMEGERI	CHARLES	Agriculteur
			NSHIMIYIMANA	VINCENT	Agriculteur
			MAZIMPAKA	FRANCOIS XAVIER	Agriculteur
			HARERIMANA	MARIANNE	Agriculteur
			UHAGAZE	J.BOSCO	Maçon
			NZEYIMANA	EMMANUEL	Maçon
			NKURUNZIZA	CHARLES	Maçon
			NYIRANZA	MARIANNE	Agriculteur
			BIZIYAREMYE	PASCAL	Agriculteur
			NIZEYIMANA	J.DAMASCENE	Agriculteur
			CYUBAHIRO	J.DE DIEU	Agriculteur
			AYINGENEYE	ESPERENCE	Agriculteur
			HAKORIMANA	IGNACE	Agriculteur
			NYANDWI	VIATEUR	Agriculteur

2007-04-26	Gisagara	NYARUBARE	KANKINDI	CHANTAL	Agriculteur
			MUKAYIRANGA	FRANCINE	Agriculteur
			MUKANDUTIYE	ANTOINETTE	Agriculteur
			NDAYISHIMIYE	AUGUSTIN	Agriculteur
			MUSABYIMANA		Agriculteur
			MUSABYEMARIYA	BERTHILDE	Agriculteur
			MUKAMAZIMPAKA	EPIPHANIE	Agriculteur
			NGARUKIYE	JEAN	Agriculteur
			MINANI	BONIFACE	Agriculteur
			IYAMUREMYE	JOSEPH	Agriculteur
			MUTESA	J.DE DIEU	Agriculteur
			NDIMUBANDI	EMMANUEL	Agriculteur
			RUHATIJWI	VITAL	Agriculteur
2007-04-30	Gisagara	KADUHA	NDINDA	ONESPHORE	Agriculteur
			RUTAZIHANA	FRANCOIS	Agriculteur
			UWIMANA	FRANCINE	Agriculteur
			NGANGO	J.BAPTISTE	Agriculteur
			NIYONAGIRA	TATIENNE	Agriculteur
			NYIRAMANYWA	VESTINE	Agriculteur
			NTAGUNGIRA	VINCENT	Agriculteur
			NKEJUWIMYE	JANVIER	Agriculteur
			BIZIMANA	FIDELE	Agriculteur
			MUKAMANA	CLAUDINE	Agriculteur
			GIHANA		Agriculteur
			TWAGIRUMUKIZA	ALPHONSE	Agriculteur
			MUKANDINDA	VENANTIE	Agriculteur
			NDAYISABA	GASPARD	Agriculteur
2007-04-25	Gisagara	RYARUBAYI	NTAKIRUTIMANA	FRANCOIS	Agriculteur
			MUREKEZI	BONIFACE	Agriculteur
			SIBOMANA	ALIXIS	Agriculteur

			NAHIMANA	VENERANDE	Agriculteur
			NIYOYITA	GENEVIEUVE	Agriculteur
			HITIMANA	DAVID	Agriculteur
			NIYONSABA	JOSEPHAT	Agriculteur
			NIRAGIRE	CECILE	Agriculteur
			NSABIMANA	INNOCENT	Agriculteur
			HABIMANA	VINCENT	Agriculteur
			MUKAMAZINA	BEATHE	Agriculteur
			ANGAMIHARI	ALEXIS	Agriculteur
			NSABIMANA	ARON	Agriculteur
			GASANA	JOSEPH	Maçon
2007-04-26	Gisagara	RUSENYI	NTEZIYAMBERE	EMMANUEL	Agriculteur
			MURWANASHYAKA	THARCISSE	Agriculteur
			MAJYAMBERE	ALBERT	Agriculteur
			RUTAYISIRE	EMMANUEL	Agriculteur
			MUKAKABERA	THERESE	Agriculteur
			UWIMANA	HYSENTHA	Agriculteur
			NYIRACUMI	GERARDINE	Agriculteur
			KAMURASE	PIERRE	Agriculteur
			KARASIRA	J.CLAUDE	Agriculteur
			KAMBUGUJE	IMMACULEE	Agriculteur
			NIYOYITA	APHRODISE	Agriculteur
			RWANYANGE	J.AIME	Agriculteur
			KAMANZI	RAMBERT	Agriculteur
			RUGERINYANGE	J.BAPTISTE	Agriculteur
			MUHIRE	ERIC	Agriculteur
			NYIRIMANA	EMMANUEL	Agriculteur
			NIRAGIRE	CHANTAL	Agriculteur
2007-05-02	Gisagara	AGAHEHE	TWAGIRUMUKIZA	STANSLAS	Agriculteur
			BIRINDABAGABO	DONAT	Agriculteur

			RUKIRIZA	ELIAB	Agriculteur
			MINANI		Agriculteur
			IYAMUREMYE	JOSEPH	Agriculteur
			NDABISHIMIYE	PASCAL	Agriculteur
			SENDEGEYA	NARCISSE	Agriculteur
			NYIRANZABANDORA	SERAPHINE	Agriculteur
			BIRAKABIRA	JOSEPH	Agriculteur
			NIYOTWAGIRA	ISAIE	Agriculteur
			TUBISAMANA	J.NEPOMUSCENE	Agriculteur
			NYIRANDEGEYA	PASCASIE	Agriculteur
			MASENGESHO	MODESTE	Agriculteur
			MUKAMANA	SERAPHINE	Agriculteur
			HAKIZIMANA	ALEXIS	Agriculteur
			NTIBISASIRWA	EMMANUEL	Agriculteur
			BASANINEZA	VINCENT	Agriculteur
2007-05-01	Gisagara	JANJA	HABIMANA	JEAN	Agriculteur
			NTIHINYUKA	J.FRANCOIS	Eleveur
			NDAGIJIMANA	DAMASCENE	Agriculteur
			BAVUGAMASHI	AUGUSTIN	Etudiant
			BUCUMI	J.M.V	Agriculteur
			MWAMBARI	CORNELLE	Agriculteur
			HAKIZIMANA	AUGISTIN	Agriculteur
			HARERIMANA	NOEL	Agriculteur
			NYABYENDA	EMMANUEL	Agriculteur
			HAKIZIMANA	VINCENT	Maçon
			UWIRINGIYIMANA	JASEPHINE	Agriculteur
			SIBOMANA	AIMABLE	Agriculteur
			HARERIMANA	DAMIEN	Agriculteur
			NIBAKURE	VESTINE	Agriculteur

			MURWANASHYAKA	VIANEY	Agriculteur
			NYIRANSAGUYE	MARIE GORETTE	Agriculteur
			NIKUZE	THERESE	Agriculteur
			BARABESHYA	EMMANUEL	Agriculteur
			UWAMBAJIMANA	ALEXANDRE	Agriculteur
			UWIMANA	GLORIOSE	Agriculteur
			NYINAWUMUNTU	JACQUELINE	Agriculteur
			NGENDABANGA	INNOCENT	Agriculteur
			NIRAGIRE	FRANCINE	Etudiant
2007-05-01	Gisagara	GITOZO	MANIRAGABA	J.BOSCO	Maçon
			NTEZIRYAYO	PASCAL	Maçon
			NSABIMANA	BARTHAZAR	Maçon
			HABUMUGISHA	VINCENT	Maçon
			KAMANAYO	ILDEPHONSE	Maçon
			MISAGO	ANDRE	Agriculteur
			NZAMUKOSHA	AGNES	Agriculteur
			BINYEMIMANA	VENUSTE	Agriculteur
			NIYONTEZE	CHRISTINE	Agriculteur
			NTACYONAYIGIZE	VENUSTE	Agriculteur
			MUKARUKUNDO	M.ALICE	Etudiant
			UWAMAHORO	J.D'AMOUR	Agriculteur
			NIKUZE	ANTOINETTE	Agriculteur
			MUKANGOGA	STEPHANIE	Agriculteur
			NSHIMIYIMANA	LEONIDAS	Agriculteur
			SIMBAYOBEWE	IMMACULEE	Agriculteur
			NYANDWI	EPIPHANIE	Agriculteur
			MARERE	ELIE	Agriculteur
			DUSABEMUNGU	AGNES	Couturière
2007-04-25	Gisagara	MURAMA	MPORWIKI	SILAS	Agriculteur
			SIBOMANA	SELINE	Agriculteur

			NDERERIMANA	PAUL	Agriculteur
			MUKANDIDA	JOSEPHINE	Agriculteur
			UWIMANA	NICODEME	Agriculteur
			UWIMANA	GLORIOSE	Agriculteur
			NDABASANZE	THEOGENE	Agriculteur
			HABYARIMANA	LAURIEN	Agriculteur
			NIYONGABO	FIDELE	Agriculteur
			NDAGIJIMANA	J.PIERRE	Agriculteur
2007-04-21	Gisagara	UMUBEZI	KABAYIZA	WELLARS	Agriculteur
			WUBAHE	DELPHINE	Etudiant
			MISAGO	VALENS	Agriculteur
			MURWANASHYAKA	ALPHONSE	Agriculteur
			HABIYAREMYE	FELICIEN	Agriculteur
			MUGENZI	EUGENE	Agriculteur
			NDAGIJIMANA	CELESTIN	Agriculteur
			KARANGWA	FREDERIC	Agriculteur
			MUSIRIKARE	JEAN	Agriculteur
			MUNYENGANGO	EVARISTE	Agriculteur
			URIMWIJURU	DIOGENE	Agriculteur
			HARINDINTWARI	ALPHONSE	Agriculteur
			UWITONZE	VIRGINIE	Agriculteur
			BARANGAMIRWA	ALOYS	Agriculteur
			MUKANTWARI	DATIVE	Agriculteur
			BIZENGARAMA	AMIEL	Agriculteur
2007-04-24	Gisagara	NYESONGA	HAKIZIMANA	J.DE.DIEU	Agriculteur
			KABANZA	DAMASCENE	Agriculteur
			TWAMUGIZE	EUGENE	Agriculteur
			NDABERETSE	J.CLAUDE	Agriculteur
			NSENGIMANA	PAUL	Agriculteur
			MUKANDINDA	PASCASIE	Agriculteur

			RUBAYIZA	TACIEN	Agriculteur
			UWIZEYIMANA	VIANNEY	Agriculteur
			NSENGIYUMVA	THADDEE	Agriculteur
			KANAKUZE	SARA	Agriculteur
			NSENGIYUMVA	STANLEY	Agriculteur
2007-04-28	Gisagara	KABAGARI	NSABIMANA	JOSEPH	Agriculteur
			HAKIZAYEZU	AUGUSTIN	Agriculteur
			NIYIGABA	SILYDIO	Agriculteur
			BIZIMANA	ETIENNE	Agriculteur
			MURWANASHYAKA	SILYDIO	Agriculteur
			NDEKEZI	DANIEL	Agriculteur
			NSHIYIMANA	EVARISTE	Agriculteur
			NYANDWI	EMMANUEL	Agriculteur
			NSHIMIYIMANA	CHARLES	Agriculteur
			NIKUZE	FRANCINE	Agriculteur
2007-04-21	Gisagara	GASENYI	MINANI	LAMBERT	Agriculteur
			KAMBIBI	JULIENNE	Agriculteur
			MUKANYANDWI	REGINE	Agriculteur
			NTEZIRYAYO	GASPARD	Agriculteur
			RUTAYISIRE	VIANNEY	Agriculteur
			NDERABARIKURE	FAUSTIN	Agriculteur
			GAKURU	GIOGENE	Agriculteur
			KAZUBWENGE	EVARISTE	Agriculteur
2007-05-01	Gisagara	RUHANGAYI	NTAHOBARI	THOMAS	Agriculteur
			TWAGIRAMARIYA	CHANTAL	Agriculteur
			MUTARAMBIRWA	MATHIEU	Agriculteur
			MBUNABUCYA	EMMANUEL	Agriculteur
			NZEYIMANA	IGNACE	Maçon
			MUNYANKINDI	CELESTE	Agriculteur
			RUTAYISIRE	PIERRE	Agriculteur

			MINANI	J.PIERRE	Agriculteur
			NSHIMIYIMANA	MARK	Agriculteur
			TWAGIRAYEZU	NOEL	Agriculteur
			MUKAMENYO	FLANCOIS	Agriculteur
			UWINEZA	COLETTE	Agriculteur
			NIKOMBABONA	INNOCENT	Agriculteur
			NIHEBOSE	MARIE	Agriculteur
2007-04-25	Gisagara	NYABURONWE	NYIRANVUNABANDI	VENANTIE	Agriculteur
			NSABIMANA	ONESPHORE	Agriculteur
			NIYONSABA	EUGENE	Agriculteur
			NTABONVURA	LEOPORD	Agriculteur
			SENUMA	FREDERIC	Agriculteur
			SEMANA	THEOGENE	Agriculteur
			MUKANKURIZA	ODETTE	Agriculteur
2007-04-27	Gisagara	AGASHARU	NSENGIMANA	SIMEON	Agriculteur
			SIBOMANA	LAURIEN	Agriculteur
			NSHUTIRAGUMA	SAMSON	Agriculteur
			BIMENYIMANA	EZEKIEL	Agriculteur
			MUNYANEZA	EMMANUEL	Agriculteur
			RUKUNDO	ALEXIS	Agriculteur
			BAGENZI	PANE	Agriculteur
			NKUNDINFURA	INNOCENT	Agriculteur
			SANZURWIMO	ANTOINE	Agriculteur
			UWAMARIYA	JOSIANE	Agriculteur
			MUHIMANA	JEAN DAMACENE	Agriculteur
			MUKESHIMANA		Agriculteur
			MUKARUTESI	YOLANDE	Agriculteur
			MUKABARINDA	ESPERANCE	Agriculteur
			RURANGWA	FAUSTIN	Agriculteur
			TWAGIRAYEZU	DEOGRATIAS	Agriculteur

			NIYITEGEKA	CLARISSE	Agriculteur
2007-04-28	Gisagara	GASHARU	NDAGIJIMANA	EVARISTE	Agriculteur
			NGABONZIZA	SYLVESTRE	Agriculteur
			MUVUNYI	EMMANUEL	Agriculteur
			SEKERUKUNDA		Agriculteur
			NSANIMANA	TACIEN	Agriculteur
			MUGEMANA	ATHANASIE	Agriculteur
			MUKARUBUGA	PASCASIE	Agriculteur
2007-05-03	Nyaruguru	URURAMBO	IYAKAREMYE	ALPHONSE	Agriculteur
			BUTOYI	AUGUSTIN	Agriculteur
			NSABAMAHORO	FELICIEN	Agriculteur
			BIRUKA	STANISLAS	Agriculteur
			MUTARAMBIRWA	JOSEPH	Agriculteur
			HARERIMANA	JOSEPH	Agriculteur
			NDAYISENGA	OSCAR	Agriculteur
			KAMUHANDA	MATIEN	Agriculteur
			NSENGIMANA	AUGUSTIN	Agriculteur
			NDAGIJIMANA	PASCAL	Agriculteur
			BWANAKEYE	BONIFACE	Agriculteur
			KIRANGANTWARI	DAMASCENE	Agriculteur
			SENTORE	J.M.V	Agriculteur
			HITIMANA	J.BAPTISTE	Agriculteur
			NTIGIRINZIGO	STEPHANIE	Agriculteur
			NYIRABAKUGA	JOSEPHINE	Agriculteur
			UWAMBAJIMANA	VALENTINE	Agriculteur
			UWAMAHORO	MARIE CHANTAL	Agriculteur
2007-05-03	Nyaruguru	UMUGOBE	UMKAROSHEMA	BEATHE	Agriculteur
			UWIZEYIMANA	ALPHONSINE	Agriculteur
			MUKABARINE	ADELPHINE	Agriculteur
			NAHIMANA	MARIE AGNES	Agriculteur

			MUTEZIMANA	SERAPHINE	Agriculteur
			NZABONARAMA		Agriculteur
			NYIRAMISAGO	FRANCINE	Agriculteur
			MUNYANEZA	PHILLIPPE	Agriculteur
			RURINDA	LADISLAS	Agriculteur
			NDABERESTE	PHIRMEN	Agriculteur
			MUREKATETE	CLAUDINE	Agriculteur
			UWITIJE	THERESE	Agriculteur
			NIYONSABA	PATRICIE	Agriculteur
			NYIRACUMI	LAURENCE	Agriculteur
			MUVUNANDINDA	JONAS	Agriculteur
			NZABANDORA	MARTIN	Agriculteur
			KARABA	LEATITIA	Agriculteur
			NYIRASONI	JOSEPHINE	Agriculteur
			IYAMUREMYE	SUSANE	Agriculteur
			MUKAMARARA	BONIFRIDE	Agriculteur
			UZIKWAMBARA	PASCAL	Agriculteur
			KARIMANZIRA		Agriculteur
			UTABAZI	ELIAS	Agriculteur
			MUKABARINDA	VELARIE	Agriculteur
			NZABIRINDA	ALEXIS	Agriculteur
2007-05-04	Nyaruguru	KARAMBO	RUTAYISIRE	INNOCENT	Agriculteur
			BUCUMI	ALOYS	Agriculteur
			TWISHIMIYIMANA	LEONILLE	Agriculteur
			NYIRANDIKUMANA	JOSEPHINE	Agriculteur
			HABYARIMANA	JEAN	Agriculteur
			NYIRINYWARI	AUGUSTIN	Agriculteur
			UKURARINDA	ANTOINE	Agriculteur
			RWANGURINDE	FAUSTIN	Agriculteur
			GASANA	AUGUSTIN	Agriculteur

			TUYAMBAZE	LEVERIEN	Agriculteur
			MUKANKIRIHO	BEATRICE	Agriculteur
			NDAJIMANA	INNOCENT	Agriculteur
			MUSABYIMANA	FRANCOISE	Agriculteur
			MUSABYIMANA	EVARISTE	Agriculteur
			MINANI	ANASTASE	Agriculteur
2007-04-04	Ruhango	KIGIMBU	MUKAMUGANGA	PASCASIE	Agriculteur
			MUKAGATARE	VALENTINE	Agriculteur
			MUKAMUTARA	IMMACULEE	Agriculteur
			MUNYESHYAKA		Agriculteur
			NSHIMIYIMANA	J.CLAUDE	Agriculteur
			UWIMBABAZI	MARIANNE	Agriculteur
			MINANI	VEDASTE	Agriculteur
			BIZIMANA	GILBERT	Agriculteur
			NSENGUMUREMYI	SADI	Agriculteur
			NGIRUWONSANGA	VINCENT	Agriculteur
			NSHIMYUMUKIZA	EMMANUEL	Agriculteur
			UZAMUKUNDA	MARIE	Agriculteur
			RUBAYITA	YOUSOUF	Agriculteur
			NYIRAMINANI	BONIFRIDE	Agriculteur
2007-04-05	Ruhango	GASHARU	MUTABARUKA	ERIC	Eleveur
			NDEKEZI	CELESTIN	Agriculteur
			MUKASHYAKA	TOFIA	Agriculteur
			MUKAMUGEMA	ELEVANIE	Agriculteur
			MINANI	CHARLES	Agriculteur
			MUSHIMIYIMANA	LOUISE	Agriculteur
			MUKANDANGA	LIBEREE	Agriculteur
			NYIRAMISAGO	CLAUDINE	Agriculteur
			BIZIMUNGU	CLAUDE	Agriculteur
			UWIMBABAZI	CLARISSE	Agriculteur

			UWIMANA	VENUSTE	Vétérinaire
			MUKAMIHIGO	JEANNE	Agriculteur
2007-04-20	Huye	KIGALI	BUTERA	J.CLAUDE	Agriculteur
			UWIMANA	CLAUDINE	Agriculteur
			UWIZEYIMANA	BEATRICE	Agriculteur
			NDIMUKUNZI	GERMAIN	Agriculteur
			HABINEZA	CYPRIEN	Agriculteur
			HIGIRO	MATHIEU	Agriculteur
			BIGIRIMANA		Menuisier
			DIGIDIGI	ALEXANDRE	Menuisier
			NSENGIMANA		Maçon
			MACUMI	DAMASCENE	Agriculteur
			MAZIMPAKA	JEAN	Agriculteur
			UHAGAZE	J.CLAUDE	Agriculteur
			KARISA	INNOCENT	Agriculteur

APPENDIX 6: LIST OF LEADERS CONSULTED IN BURUNDI

Ligne Rwegura-Kigoma

N°	Nom et Prénom	Poste
1	Senel Nduwimana	Conseiller Principal du Gouverneur Kayanza
2	Victor Ntakirutimana	Administrateur de Kabarore
3	Mathias Manirunva	Secrétaire Communal de Kabarore
4	Libère Nzeyimana	Chef de Zone Kabarore,
5	Emmanuel Hakizimana	Directeur du Collège Communal de Kiziba, membre du Conseil Communal
6	Nyandwi Léopold	Directeur de l'Ecole primaire de Kiziba
7	Geneviève Ntawiha	Administrateur de la Commune Muruta
8	Alfonse Mbazumutima	Chef du Parc National de la Kibira

APPENDIX 7: LIST OF LEADERS CONSULTED IN RWANDA

Dates	Nom	Titre	Institutions
6/2/2007	Mr Eugène RURANGWA	Conservateur National des Titres Fonciers. MINITERE	MINITERE
6/2/2007	Mr Vincent SHYIRAMBERE	Chargé de la gestion foncière	MINITERE
6/2/2007	Mr Donatien	Chargé de l'expropriation	MINITERE
27/02/2007	Mr François BYABARUMWANZI	Maire du District	District de Ruhango
27/02/2007	Mr Wellars RUBURAGATARE	Secrétaire Exécutif	District de Ruhango
27/02/2007	Mr Etienne KARIMA	Chargé des Infrastructures	District de Ruhango
27/02/2007	Mme Jeanne IZABIRIZA	Secrétaire Exécutif	Province du Sud
27/02/2007	Mr Didace KARANGWA	Secrétaire Exécutif	District de Nyanza
27/02/2007	Mr François MUNYANKINDI	Maire du District	District de Nyanza
27/02/2007	Mr Védaste MBARUBUKEYE	Secrétaire Exécutif	Secteur Kigoma
28/02/2007	Mr Egide BIZIMANA	Secrétaire Exécutif	Secteur Muyira
28/02/2007	Mr Bénoit MUKABU	Secrétaire Exécutif	Secteur Ntyazo
28/02/2007	Mr Ananias HIGIRO	Secrétaire Exécutif	District Nyaruguru
28/02/2007	Mr Modeste RUHUMULIZA	Chargé des Infrastructures	District Nyaruguru
28/02/2007	Mr Jean Damascène MUGENZI	Secrétaire Exécutif	Secteur Ngoma

APPENDIX 8: SOCIO-ECONOMIC QUESTIONNAIRE FOR THE HOUSEHOLDS

Questionnaire socioéconomique à l'intention des ménages

Province :	Questionnaire No. :
District :	Chaînage (donnée du topographe) :
Secteur :	Localisation GPS :
Cellule :	Village :
Nom de famille du répondant :	Prénom du répondant :
Nom de l'interviewer :	Date :

Est-ce que ce ménage sera affecté par l'établissement de l'emprise ?	1- Oui	2- Non	3- Ne sait pas
Par exemple : a) Besoin d'enlever des bâtiments et/ou des arbres			
b) Accès restreint pour les cultures et le pâturage, etc.			
c) Doit être complètement déplacé de l'emprise			

Si OUI, compléter les sections A à D. Si NON ou NE SAIT PAS, compléter les sections A à C seulement.

SECTION A: DONNÉES SUR LE MÉNAGE

Les données sur le ménage sont recueillies pour a) le chef de ménage, b) les membres du ménage demeurant actuellement dans la résidence principale du ménage et c) les membres du ménage demeurant la plupart du temps ou de façon permanente à l'extérieur de la résidence principale du ménage.

Chef de ménage

1	Nom de famille:			Prénom:	
2	Âge		4	État civil	
3	Sexe (M/F)		5	Groupe ethnique	
6	Occupation : agriculteur □ éleveur □ artisan □ commerçant □ fonctionnaire □ autre □				
7	Réside actuellement à l'intérieur de la zone du projet ou à l'extérieur (la plupart du temps ou de façon permanente)				a) Intérieur □ permanente □ plupart du temps □ b) Extérieur □ permanente □ plupart du temps □
8	Nombre d'années de résidence dans la zone du projet				

Membres du ménage résidant actuellement dans la zone du projet

	Groupe d'âge	Nombre de personnes		Travaillant SUR la propriété rurale/ferme familiale		Travaillant AILLEURS que sur la propriété rurale/ferme familiale		Sachant lire et écrire ≥15 ans	
		M	F	M	F	M	F	M	F
1	0-4								
2	5-14								
3	15-24								
4	25-54								
5	55-64								
6	65+								
7	Total par sexe								
8	Total								

9.	Combien de familles résident dans votre ménage?	

Membres du ménage résidant la plupart du temps ou de façon permanente à l'extérieur de la zone du projet

	Groupe d'âge	Nombre de personnes		Avec un travail		Sachant lire et écrire	
		M	F	M	F	M	F
1	0-14 ans						
2	15 ans et plus						
3	Total par sexe						
4	Total						
						Oui	Non
5	Ces personnes envoient-elles de l'argent au ménage ?						
6	Si oui, combien par année ?						

SECTION B: MOYENS DE SUBSISTANCE ET REVENU DU MÉNAGE

Terres exploitées par le ménage

Compilez toutes les terres utilisées par le ménage pour sa subsistance et son revenu, incluant les terres qui sont la propriété du ménage tout comme les terres louées ou communales, etc. Notez les terres à l'intérieur et à l'extérieur de l'emprise.

Parcelle de terrain				Titre de propriété/Droits d'utilisation	Terres louées: Coût par année	Terres en location: Revenu par année	Utilisation principale (cultures, plantations d'arbres, pâturages, revenus de location, etc.)
Terrain No.	Superficie estimée		Distance de la résidence (m)	Propriété (P), Location (L), Terre communale (C) ou autre (spécifiez)			
	Unité	Taille					
1							
2							
3							
4							
5							
6							
7							
8							

Nombre total de parcelles	
Superficie totale possédée (ha)	
Superficie totale utilisée pour l'exploitation agricole (ha)	

Incluant les terres louées et communales

Production de l'exploitation agricole et du ménage

Compilez la production totale de l'exploitation agricole ou de la ferme au cours des 12 derniers mois, selon les estimations du répondant.

Élément		Unité	Production totale	Consommé/Utilisé par le ménage		Vendu ou troqué		
				Nombre	% Total	Nombre	% Total	Revenu d'argent net
	CULTURES COMMERCIALES (thé, café, canne à sucre, pyrèthre, autre)							
1								
2								
3								
4								
5								
6								
	Sous-total							
	CULTURES DE SUBSISTANCE (maïs, manioc, riz, pomme de terre, patates douces, sorgho, bananes, haricots, petit pois, autre)							
1								
2								
3								
4								
	Sous-total							
	AUTRE: Artisanat, transformation de produits agricoles, fabrication de charbon de bois, etc.							
1								
2								
3								
4								
5								
	Sous-total							
	Sous-total bétail (ajouter le montant de la page suivante)							
	REVENU TOTAL NET							

V. Production de l'exploitation agricole et du ménage (suite)								
BÉTAIL								
Élément	Nombre total	Produits	Total produit en litres/kg	Consommé/utilisé Par le ménage		Vendu ou troqué		Revenu net en argent
				Montant	Total %	Montant	Total %	
1. Vaches		Lait						
		Viande						
		Peaux						
		Labour						
		Vente						
2. Chèvres		Lait						
		Viande						
		Peaux						
		Vente						
3. Moutons		Lait						
		Viande						
		Peaux						
		Vente						

4. Porc		Viande						
		Vente						
5. Poulets		Viande						
		Oeufs						
		Vente						
6. Autres								
Sous-Total (ajouter au bas du tableau précédent)								

NB : **Artisans** : Poterie, Sculpture, Forgeron, Couture, Menuiserie, Miniers, Fabrication de tuile et briques

Revenu salarial du ménage

Compilez tout le travail rémunéré effectué à l'extérieur de la ferme par tous les membres du ménage au cours des 12 derniers mois.

	Type de travail	Durée (heure, jour, semaine, mois)		Salaire			Localisation du travail (Province, district, ville, village)
		Unité	Nombre	Unité	Taux	Montant gagné	
1							
2							
3							
4							
5							
REVENU SALARIAL TOTAL							

SECTION C: ÉLECTRIFICATION RURALE

Accès à l'électricité

		O/N	Ne sait pas	Utilisation(s)
1	Avez-vous l'électricité à la maison?			
	Si OUI, quelle utilisation en faites-vous?			
2	Avez-vous l'électricité sur votre lieu de travail?			
	Si OUI, quelles utilisations en faites-vous?			
3	Y a-t-il l'électricité au village ou au centre de commerce?			
	Si OUI, pour quelle(s) raison(s) est-elle utilisée?			

Sources d'énergie utilisées par le ménage

Quelles sont les sources d'énergie utilisées par le ménage pour a) l'éclairage, b) la cuisine et c) le chauffage, en ordre d'importance du type d'énergie (1, 2, 3, etc.)?

		Éclairage	Cuisine	Chauffage

1	Bois de chauffage			
2	Bougies			
3	Pétrole			
4	Gaz de pétrole liquéfiés (butane, propane, etc.)			
5	Électricité			
6	Charbon de bois			
7	Autre (spécifiez):			

Demande pour l'électricité

Si l'électricité était disponible au coût de [insérer prix au kW/heure], seriez-vous en mesure de l'utiliser pour les activités suivantes?

	Utilisation de l'électricité	O/N	Si NON, indiquez la ou les raisons					
			Trop cher	Ne peut s'offrir l'équipement nécessaire	Non nécessaire	Préfère autres sources d'énergie	Ne peut s'offrir la location d'un espace de travail	Autre (spécifiez)
À LA MAISON								
1	Éclairage							
2	Cuisine							
3	Conservation des aliments							
4	Chauffage/climatisation							
5	Appareils (ex. : fer à repasser)							
6	Machinerie							
AU VILLAGE/CENTRE DE COMMERCE [Par exemple, si vous louez un espace de travail et/ou de vente]								
7	Éclairage de l'espace de travail/vente							
8	Chauffage de l'espace de travail/vente							
9	Machinerie							
10	Autre (spécifiez):							

SECTION D: IMPACTS LIÉS À L'EMPRISE DE LA LIGNE ÉLECTRIQUE

N.B. Rassemblez les informations suivantes seulement pour les ménages qui utilisent des terres à l'intérieur de la future emprise. Certaines informations sont similaires à des données déjà notées ci-dessus, mais l'emphase est ici dirigée vers l'emprise.

Terres situées dans l'emprise

Quelles terres possédées, louées ou utilisées par vous sont situées en partie ou entièrement à l'intérieur de l'emprise? Offrez le meilleur estimé possible des superficies affectées situées à l'intérieur de l'emprise.

Terrain	**Utilisation** (Habitation, cultures annuelles, plantations d'arbres, pâturages, etc.)	Superficie estimée (m^2)		Titres de propriété/Droits d'utilisation			
		Totale	À l'intérieur de l'emprise	Propriété		Location en échange de paiement	Utilisation avec la permission du propriétaire
				Titre enregistré	Tenure coutumière		
1							
2							
3							
4							
5							

Structures et bâtiments principaux

Quels structures et bâtiments principaux possédez-vous à l'intérieur de l'emprise et qui seront entièrement ou partiellement affectés? Fournissez le meilleur estimé possible des superficies affectées à l'intérieur de l'emprise.

Structure/ bâtiment	**Utilisation** (Maison, magasin, atelier, autre (spécifiez)	Type de construction			Superficie (m^2)		Titres de propriété/Droits d'utilisation Propriété (**P**), Location (**L**) ou utilisation avec la permission du propriétaire (**U**)
		Durable Murs : brique cuite (blocs ciment) et ciment Toit : tuiles ou tôles	**Semi-durable** Murs : pisé, adobe, planches Toit : tuiles ou tôles	**Non-durable** Murs : Pisé, adobe et autre Toit : chaume et paille	Totale	À l'intérieur de l'emprise	
1							
2							
3							

4	Avez-vous un terrain à l'extérieur de l'emprise sur lequel reconstruire votre structure/bâtiment principal ? (O/N)	
5	Si OUI, possédez-vous ce terrain, le louez-vous ou l'utilisez-vous avec la permission du propriétaire? (P/L/U)	
6	À quelle distance de votre structure/bâtiment principal actuel ce terrain est-il situé? (km)	

Structures/ et bâtiments secondaires

Quels structures/bâtiments secondaires possédez-vous qui sont entièrement situés à l'intérieur de l'emprise? Les structures/bâtiments secondaires peuvent consister en un abri pour animaux, une cuisine ou toilette séparée, une clôture, un puits, etc.

	Type de structure/bâtiment	Unité (m, m^2, etc.)	Valeur
1			
2			
3			
4			
5			
6			

Cultures/arbres à l'intérieur de l'emprise

Énumérez les arbres et cultures que vous possédez qui sont entièrement situés à l'intérieur de l'emprise? N.B. : SVP fournir l'information séparément pour a) les grands arbres de plus de 4,5 m, b) les arbres plus petits et cultures pérennes (ex.: café, thé) et c) les cultures annuelles. Estimez le total pour chacun.

	Type de cultures/arbres	**Unité** (m^2, arbre)	Total estimé
	ARBRES DE PLUS DE 4,5 m DE HAUTEUR		
1			
2			
3			
4			
5			
	PETITS ARBRES (< 4,5 m) & CULTURES PÉRENNES		
6			
7			
8			
9			
10			
	CULTURES ANNUELLES		
11			
12			
13			
14			
15			

Pâturages pour animaux

Faites-vous brouter vos animaux dans l'emprise? Si OUI, SVP fournir l'information suivante.

Type d'animaux		Nombre
Animaux en pâturage libre		
1		
2		
3		
4		
5		
ANIMAUX EN ESPACE CLÔTURÉ		
6		
7		
8		
9		

Préoccupations sur les impacts de l'établissement de l'emprise

Avez-vous des préoccupations à formuler entourant l'établissement de l'emprise de la ligne électrique et comment cela pourrait affecter votre ménage ? Si OUI, quelles sont-elles?

		O/N
1	Avez-vous des préoccupations?	
	Si OUI, quelles sont-elles?	
2		
3		
4		
5		
6		
7		
8		

Section E: GENRE

Problématique du genre

		Mari	Femme	Enfants	Autre
1	Qui du ménage est responsable des besoins en énergie ?				
2	Qui décide du type d'énergie à utiliser ?				

3	Qui est responsable de l'achat ?				
4	Si l'électricité était disponible dans votre village, qui serait celui qui paierait pour le raccordement et les paiements subséquents ?				
5	Pourquoi la réponse ci-dessus, expliquer ?				

Combien dépensez-vous approximativement chaque mois pour les besoins suivants :		
6	Bois	
7	Bougies	
8	Pétrole	
9	Bombones de gas	
10	Électricité	
11	Charbon	
12	Solaire	
13	Biogaz	
14	Restes de récolte : canne à sucre, tiges de maïs et de sorgho, manioc	
15	Autres (spécifiez)	

Signature de l'interviewé…… No de carte d'identité……..……

Signature de l'enquêteur... …… Date.....

APPENDIX 9 : ENVIRONMENTAL CLAUSES TO INSERT IN THE FILES OF EXECUTION OF THE PROJECT

The specific environmental clauses to be integrated in the tender document detail the precautions to be taken when executing the project. This list is indicative, non exhaustive, and will have to be possibly completed when detailing preliminary draft and will form part of the administrative and technical regulations of the construction works contracts.

The inscription of the environmental clauses in the files of execution will engage the responsibility for the project superintendent.

I - INSTALLATION OF THE BUILDING SITE

The contractor must take necessary measures so that all the employees implied in all the stages of the project respect the laws and the regulations relating to the contracted environmental requirements. The contractor must thus diffuse, before the beginning of work, all the requirements relating to the contract and make sure that all the employees had access and took part in the meetings of information.

The contractor must name a permanent officer on the field for the duration of the contract, who is responsible for all the questions relating to the environment.

The contractor must subject for approval the plan of all the temporary installations.

The contractor must use in priority the zones of loans existing or envisaged with the contract and for which the necessary authorizations were obtained. In the event of opening of new zones of loan, the limits of the surface of exploitation will be delimited clearly on the field.

The contractor should embank neither to excavate in agricultural or urban medium, nor in the vegetable protective strip in edge of banks of the lakes, the rivers or the wet mediums without the necessary permission.

The contractor must pickle any surface of fill and excavated material excavation or storage as any surface where leveling is necessary. He must put side the arable soil horizon and position it back at the time of the repairing of the ground.

The contractor must locate, delimit and protect the sensitive elements (well, sources of supply drinking water, archeological site, etc.) identified with the contract. If the contractor discovers an archaeological vestige at the time of work, he must suspend his activities, inform without delay the representative of the Promoter and avoid any intervention likely to compromise the integrity of the good or the site discovered.

The contractor must delimit the surfaces clearly to be deforested indicated to the contract, using reference mark, and he must obtain the necessary authorizations before undertaking the demolition of the trees.

The contractor must make a statement of the state of the bridges or culverts existing that it will use and draw up the points of crossing of the elements of drainage as well as the bridges and culverts to be installed.

The contractor must respect the natural drainage of the area and take all suitable measurements to allow the normal flow of water. When the drainage of surface is likely to involve sediments in rivers, the contractor must apply measures to contain the sediments or to divert them so that they do not reach the rivers.

The contractor must take all the precautions and apply the necessary techniques in order to reduce erosion due to the streaming, particularly to the fields of high slope, and to prevent that the sediments do not reach a lake or a river.

For the installation of a coffer dam, the contractor will use not contaminated materials.

He will ensure himself to capture and relocate out of interstitial water alive fish imprisoned in the drained zone.

For the installation of bridges and culverts, the contractor will take care not to modify the hydrological conditions, not to block the circulation of fish and not to increase the turbidity of water.

The contractor will take every time necessary measures in order to prevent the solid remains fall, whose woody remains, in the water level and, if necessary, he will have to recover them and eliminate them in accordance with the requirements.

When using of explosives, the contractor must use adequate working methods not to cause disturbances on the natural environment and frame surrounding and to limit projection of rock and remains outside the surface authorized for work and in the water levels. For the explosion out of water or close to water, the contractor must use mechanical processes or electronic to move away fish and the explosion must take place as soon as possible after this intervention to prevent that the fish do not reconsider the spot.

II – MANAGEMENT OF RESIDUAL AND DANGEROUS MATTER

The contractor is responsible for recovery, storage, the transport and the elimination of the totality of the various types of waste which he generates.

Solid waste must be eliminated by the contractor and with his own expenses in an authorized place.

The generated residual dangerous matters must be eliminated by the contractor and with his expenses in a place authorized by the authorities and ministries concerned, except for the dangerous residual matters belonging to the Promoter which are eliminated by this one and with his expenses.

The contractor should not mix or dilute dangerous residual matters with other matters (dangerous or not dangerous). The mixture of the dangerous matters is allowed only when the matters are compatible between them and the result of the mixture also constitutes of the dangerous matters.

The contractor will install, with his expenses, concreted surfaces to carry out the storage and all handling of the fuels and oils (supply, discharge, draining, etc). These sites must allow the containment of the contaminants in the case of accidental discharge. They will have to be located at a distance of 60 meters of the sensitive elements and water levels identified in the contract.

The draining oils as well as the all material and oil filters (water, rags, etc.) of cleaning soiled by hydrocarbons will be recovered and stored.

The company will hold a stock book (entry and exit) also including the hydrocarbons stock.

The material being used for transport and the installation of the concrete must be washed in a surface envisaged for this purpose, by ensuring that this washing area does not overflow during its use. It can be a mud tank which the contractor must dig in the ground. If necessary, the contractor must remove, at the end of work, the elutriated solid residues and deposit them in a dry material container. Finally, he must embank the mud tank with the ground of origin, by taking care to give the layer of vegetable matter to surface.

The contractor must present a plan of intervention in the event of accidental discharge of contaminants. He must make sure that the plan of intervention contains, at least, a diagram of intervention and a structure of alarm, that he is placed in an easy place of access and with the sight of all his employees and that his employees are sensitized with their responsibilities in the event of accidental discharges, with the importance of a fast intervention, just as with the application of the plan of intervention.

At the time of a discharge of contaminants, the Contractor must immediately apply the plan of intervention in the event of discharge.

The contractor must have at least a case of intervention on the building site. It must contain products adapted to the characteristics of the place of work and be near work.

At the time of an unforeseen discovery of grounds presenting of the indices of contamination (odors, color, etc), the contractor must stop his work of excavation and warn without delay the Promoter.

The contractor must eliminate the contaminated soil coming from excavation and drilling (carrots, mud, etc.) in an authorized site and to provide a proof of elimination to the representative of the Promoter.

Recoverable materials belonging to the Promoter (such as iron, coppers, aluminium, etc.) are deposited by the contractor in the containers provided by the Promoter. These materials are then eliminated by the Promoter.

The contractor must channel and recover waste water entirely rising from work.

The contractor must filter, elutriate his waste water or use any other method approved in order to satisfy the regulation. If the waste water is rejected into the hydrographic network, the contractor must refer to the contractual clauses or to the Promoter representative for the criteria of rejections. It is interdicted to dilute waste water before his rejection in the receiving area to satisfy the envisaged criteria. The contractor must show by analyses that he respects the criteria of rejections.

III - CIRCULATION ON THE BUILDING SITE

The vehicles necessary for the realization of work must be selected by taking into account of the characteristics of the site (standard of ground, period of the year, environmental sensitivity, etc.) in order to limit the impacts on the site.

The contractor must limit circulation to the ways and the surfaces identified with the contract. He must if not to obtain an authorization before using any other way or path.

The contractor must maintain in good condition every time the paths that he and other users are using take necessary measures so that these paths can be used and crossed without problem.

The contractor must carry out progressively the filling of the ruts with the progress of the work.

The contractor must protect the edges and the riding surface of the asphalted ways, and it must maintain them clean.

The contractor must stop any heavy circulation, for example, sensitive site to erosion, in particular at the time of an abundant rain or on mediums of low bearing capacity.

The contractor is held to limit the emissions of dust coming from the circulation of his material and to subject for approval the type of cut down-dust which it intends to use.

The contractor must maintain a system of functional drainage on each side of the roads crossed by his way of circulation. He must install a culvert in the ditches in edge of the ways, in order to avoid any blocking of drainage and to prevent scrubbing, the erosion or any other deterioration of the roads.

The contractor must use the access paths only during the regular hours of work, with special permit.

IV - SALUBRITY, AND SAFETY HEALTH MEASURES,

The contractor must envisage a plan of communication to sensitize all the employees with the risks and the means of preventing the sexually transmitted diseases of which the HIV.

The contractor must envisage a plan of communication to sensitize all the employees with the risks and the means of preventing the hydrous diseases (diarrheas, amoebic dysentery, and cholera). It is advised to drink only treated water or pulp, drinking water of the arranged sources or terminals fountains.

The contractor will have to ensure himself of the quality and availability of drinking water by the means of periodic controls carried out by qualified personnel or trained for this purpose.

If water proves being non drinkable after a control, the contractor must warn the personnel of the building site and to cure the situation quickly.

The employees must avoid urinating and making the saddles in or near the lake, river and pond. The company will install with its expenses of the latrines improved on the basis of the building site.

The pharmaceutical products of first aid, suitably preserved, must be available on the basis of company and the building sites of work.

The contractor will take care that the working conditions endanger neither health, nor life of the workers. He will provide a protection clothes to each worker and he will take care that no worker is allowed on the building site without a minimum of protection.

The contractor will take all the necessary precautions on the building site such as constructions in height, handling of dangerous products, emanation of dust, protection against the noises and explosions. He will take care that all constructions are made in the code of practice, in particular with regard to the scaffolding, the nets of protection, the hoisting of loads.

The contractor will take care that the building site is obviously delimited and that its access is strictly regulated to limit the risks of accidents.

V - PROHIBITIONS ON THE BUILDING SITE

Any form of poaching is prohibited and the weapons are not allowed on the building site.

It is interdicted to have and consume alcohol or drug on the building site.

It is interdicted to cut trees without authorization or to encourage the cut and the sawing of wood.

It is interdicted to emit, deposit, give off or reject a dangerous matter in the environment.

Any crossed to ford of river is prohibited unless having obtained the necessary authorizations of the authorities concerned. If necessary, the machinery must be cleaned in the surfaces envisaged for this purpose and of suitable measures must be taken to restore the places when the crossing of the river disturbed the region.

It is strictly interdicted to hide or transport out of the site of the deforestation of the woody residues, unless it is not in an authorized site.

It is interdicted to be useful itself of old tires or oils spent to help with the combustion of the residues of cut.

VI - REPAIRING OF THE PLACES

The contractor must disencumber the site of all materials, the temporary installations (bridges, culverts, etc.) and waste, and this according to suitable and authorized procedures'.

The contractor must carry out necessary work for the rehabilitation of the damaged sites.

The contractor must put the topsoil on the surface of the working or storing sites.

The contractor must level the ground in order to give to him his form of origin or a form harmonizing itself with the surrounding area.

The contractor must cut down damaged trees at the time of work and lay out about it according to their commercial value.

The contractor must restore the profile of origin of the bed and the banks of the rivers.

The contractor must restore the natural drainage and dig with the need for the ditches to ensure a good drainage of the area.

The contractor must give the ways in a similar state or higher compared with their state of origin.

If work of drilling reaches the ground water, the contractor must fill the hole with gravel or clean sand in the area of the ground water and take necessary measures in order to create an impervious material stopper on the surface of the hole to prevent the infiltration of contaminants in this one.

The contractor must fill the bore holes and reconstitute the geological conditions of origin with excavated materials.

ANNEXE 10 : NOISE STANDARDS

SCHEDULES

FIRST SCHEDULE
MAXIMUM PERMISSIBLE NOISE LEVELS

PART 1
Regulations 6(1)

Maximum Permissible Noise Levels for General Environment

FACILITY	NOISE LIMITS dB (A) (Leq)	
	DAY	NIGHT
Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites.	45	35
Residential buildings	50	35
Mixed residential (with some commercial and entertainment).	55	45
Residential + industry or small scale production + commerce.	60	50
Industrial	70	60

Time Frame: use duration
Day 6.00 a.m. - 10.00p.m
Night - 10.00 p.m. - 6.00a.m

The time frame takes into consideration human activity.

PART II
Regulation 6(2)

Maximum Permissible Noise Levels (Continuous or intermittent noise) from a Factory or Workshop

Leq dB (A)	Duration (Daily)	Duration (Weekly)
85	8 hours	40 hours
88	4 hours	20 hours
91	2 hours	10 hours
94	1 hour	5 hours
97	30 minutes	2.5 hours
100	15 minutes	1.25 hours
103	7.5 minutes	37.5 minutes
106	3.75 minutes	18.75 minutes
109	1.875 minutes	9.375 minutes

Noise Levels shall not exceed a Leq of—

Factory/Workshops 85 dB (A)
Offices 50 dB (A)
Factory/Workshop Compound 75 dB (A).

PART III
Regulation 6(3)

Maximum Permissible Noise Levels for Impact or Impulsive Noise

Sound Level dB (A) (Lmax)	Permitted number of Impulses or Impacts per day
140	100
130	1,000
120	10,000

PART IV
Regulation 6(4)

Maximum Permissible Noise Levels for Construction Site

Facility	Maximum noise level permitted (Leq) in dB (A)	
	Day	Night
Hospital, schools, institutions of higher learning homes for the disabled, etc	60	50
Buildings other than those prescribed in paragraph (i).	75	65

PART V
Regulation 6 (5)

Maximum Permissible Noise Levels for Public Announcement System or Device

Noise Control Zone	Sound Level db (A) (Leq)	Sound Level dB (A) (Leq)
Residential	60	40
Commercial	75	50
Industrial	85	65

Time Frame:
Day - 6.00 a.m. - 10.00 p.m.
Night- 10.00 p.m. - 6.00 a.m.

The time frame takes into consideration human activity

PART VI
Regulation 6(6)
Maximum Permissible Noise Levels for Places or Establishment of Entertainment

Noise Control Zone	Sound Level db (A) (Leq) Day	Sound Level dB (A) (Leq) Night
Residential	60	40
Commercial	75	50
Industrial	85	65

Time Frame:
Day 6.00 a.m. - 10.00 p.m.
Nigh 10.00 p.m. - 6.00 a.m.

The time frame takes into consideration human activity

PART VII
Regulations 6(7)

Maximum Permissible Noise Levels for Places or Areas of Worship

Noise Control Zone	Sound Level dB (A) (Leq) Day	Sound Level dB (A) (Leq) Day
Residential	60	40
Commercial	75	50
Industrial	85	65

Time Frame:
Day 6.00 a.m. - 12.00 p.m.
Night 12.00 a.m. - 6.00 a.m.

The time frame takes into consideration human activity.

PART VIII
Regulations 6(8)
Maximum Permissible Noise Levels for Accelerating Vehicles

	VEHICLES CATEGORY	MAXIMUM SOUND LEVEL IN dB (A)
1.	Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver's seat	78
2.	Vehicles intended for carriage of passengers, and equipped with not more than nine seats, including the drivers seat and having maximum permissible mass of more than 3.5 tones:-	
a	with an engine power of less than 150KW	80
b	with an engine power of less than 150 KW	83
3.	Vehicles intended for carriage of passengers and equipped with more than nine seats including the drivers seat: vehicles intended for carriage of goods:-	
a	with a maximum permissible mass not exceeding 2 tonnes.	79
b	with a maximum permissible mass exceeding 2 tonnes but not exceeding 3.5 tonnes.	80
4.	Vehicles intended for the carriage of goods and having a maximum permissible mass exceeding 3.5 tonnes.	
a	with an engine power of not less than 75 KW	81
b	with an engine power of not less than 75 KW but less than 1.50 KW.	83
c	with an engine power of not less than 150KW	84

PART IX
Regulation 6(9)
Maximum Permissible Noise Levels for Mines and Quarries

	FACILITY	LIMIT VALUE IN Db (C)
1.	For any buildings used as a hospital, school, convalescent home, old age, home or residential building.	109dB (C)
2.	For any building in an area used for residential and one or more of the following purposes. Commerce, small-scale production, entertainment, or any residential apartment in an area that is used for purposes of industry, commerce or small-scale production or any building used for the purpose of industry commerce or small-scale production.	114 dB (C)