



THE REPUBLIC OF UGANDA



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NATIONAL FORESTRY AUTHORITY

North Rwenzori Central Forest Reserve

Final Report

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

October, 2011

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LIST OF ABBREVIATIONS/ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BP	Bank Procedures
CAO	Chief Administrative Officer
CBD	Convention on Biological Diversity
CBO	Community Based Organisation
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CFR	Central Forest Reserve
DEOs	District Environment Officers
DFS	District Forest Services
DWD	Directorate of Water Development
EIA	Environmental Impact Assessment
EMCBP	Environmental Management Capacity Building Project
EMMP	Environmental Management and Monitoring Plan
EMS	Environment Management System
ESIA	Environment and Social Impact Assessment
FMP	Forest Management Plan
GHG	Greenhouse Gas
HH/Hh	Household
HIV	Human Immune Virus
IPCC	Intergovernmental Panel on Climate Change
Km	Kilometre
LC	Local Council
MFPED	Ministry of Finance, Planning and Economic Development
MSW	Municipal Solid Waste
MW&E	Ministry of Water and Environment
NFA	National Forest Authority
NEMA	National Environment Management Authority
NFTP	National Forest and Tree Planting
NGOs	Non Government Organizations
OP	Operational Policy
OSH	Occupational Safety and Health
PAP	Project Affected Persons
PCR	Physical Cultural Resources
PDO	Project Development Objective
RDC	Resident District Commissioners
SC	Sub County
Sq. Km	Square Kilometres
tC	Carbon per Hectare
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WMD	Wetlands Management Department

EXECUTIVE SUMMARY

Background

The current (undated) draft Management Plan, which covers the entire Itwara Group of Central Forest Reserves, set out the vision, mission, objectives of Management and Working Cycles as well as the period of the plan.

The vision of the plan is “sustainably managed forest resources contributing to better community livelihoods and national development” while the mission is “improved forest management to raise the stocking and socio-economic values of the forest resource base in Management Plan Areas (MPA)”.

The following are objectives of management and working cycles: conservation of the forest biodiversity and ecological conditions; production of timber and non-timber products in the natural forests, grasslands and woodlands to the benefit of the people of Uganda; restoration of the functions of the degraded forests and deforested parts/reserves; enhancement of partnerships with communities surrounding the forests in the management of reserves; and advancement of knowledge in forest management and the resultant benefits to the stakeholders (local, national and global).

The above objectives are expected to be achieved through the following working circles: conservation of biodiversity, production, plantation development, community participation and research.

This first integrated management plan brings all the small forest reserves of Itwara Group of Forest Reserves including North Rwenzori CFR under one management and covers the period from July 2008 to June 2018. However, it is important to note that the plan is still at draft stage and many things are expected to change in the final version.

The activities in this Management plan are designed to contribute to and support economic growth in line with the national development goal for the forestry development and under the relevant Millennium Development Goals.

Need for Environmental Impact Assessment

In line with the Environmental Impact Assessment (EIA) Guidelines (1997) and Regulations (1998) for Uganda, it is the responsibility of any developer intending to set up a project for which an EIA is required to carry out the EIA and bear all the costs associated with its conduct.

Because the proposed forestry development falls under the category of a sensitive ecological nature which is listed under Schedule 3 of the National Environment Act, Cap. 153; under Part 1 (General) sections a, b, and c among the projects requiring

mandatory Environmental Impact Assessment before implementation, an Environmental Impact Study is thus required before the proposed forest activities before they can be approved by NEMA for implementation.

Methodology for Environmental Assessment

In general, the scoping exercise will use a combination of the following methodologies:

- Meetings and discussions with stakeholders, including members of the local community, and Lead Agencies i.e. National Forestry Authority (NFA), Districts local governments and urban centre/ trading Centres , Ministry of Water and Environment, NEMA etc with a stake on various aspects of the project,
- Field surveys of the proposed project site, including baseline inventory of environmental conditions and resources in the project area,
- Expert judgment and technical evaluation of technical issues related to the nature of the proposed activities, and
- Review and reference to literature, including existing laws, regulations, policies and plans to verify how the proposed project conforms to them.

Anticipated Positive Impacts

The study identified a number of anticipated positive and negative impacts during and after the forest management plan is implemented. Among the positive impacts expected, the communities in project areas are expected to benefit in a number of ways; namely:-

- Improvement on climate change and the environment in general.
- Employment opportunities to communities living around North Rwenzori Sector Central Forest Reserve areas during implementation.
- increased acreage of planted tree species country wide;
- reduced soil erosion and sedimentation;
- increased groundwater recharge with related increase in spring discharges and base flow, or at least more even year round flow;
- preserved varied tree species;
- improved peoples livelihood especially for the private plantations;
- The proposed tree planting will lead to growth in the local economy and wealth creation.
- The sales of carbon emissions reductions will also lead to revenue
- increased income from the sale of good quality trees;
- may improve the appearance of the landscape;
- restoration of degraded areas;

- will increase on supply of improved charcoal, construction materials and other forest products, even while protecting soil and water resources
- Matching species to sites that suits them and where they can express their maximum biological potential was undertaken and species as *Pinus caribaea* (*Brazil*) are already tested and approved for the area.

Enhancement Measures

The majority of the residents in the project area welcomed the project as a good gesture for the entire transformation of the area. The positive impacts of the projects are very crucial to the population in order to be involved in sustainable forest management. The associated services of the project should be made known to the population in order to get confidence.

Anticipated Negative Impacts

Potential for social disharmony between the local residents and immigrant project employees who may come with some new behaviours and cultures not in harmony with the norms of the local residents

Mitigation Measures

The Contractors and NFA should endeavour to inform and sensitize both the new employees and the residents on the importance of respecting local customs and norms.

Fire (Bush) Burning and Grazing of Animals

Fires are often started by hunters during hunting and these fires have been responsible for the destruction of natural trees and vegetation in the past. Fires are a major problem in forest management and keen interest should be adopted on how to mitigate them.

Unauthorized grazing is causing degradation of the forests through removal of vegetation, trampling and destruction of fragile ecosystems. Some of the cattle keepers have come from outside the districts of Bundibugyo and Ntoroko. There has been conflict in the past where cattle have grazed on trees plant by private farmers close to the Itojo area.

Proposed Mitigation Measures

Establishment of fire lines in addition to conducting fire campaigns and sensitization shall be conducted before the dry season to enlist community support in fire fighting and control. North Rwenzori forest reserve should procure a fire danger index which is based on average weather seasons.

Illegal Cultivation and Charcoal Burning

Illegal cultivation has given way for the cutting down of trees. The trees that are cut are then used for charcoal burning which is one of the sources of livelihood for homesteads. Illegal charcoal burning has been observed in North Rwenzori CFR.

Proposed Mitigation Measures

Recognizing that forest adjacent communities depend partially or entirely on North Rwenzori CFR for fuel wood and food especially from dry fallen logs, branches, slabs, leaves and farming respectively, is very vital in forest management. These communities should be allowed to freely collect such wood for their domestic needs and in this process it will reduce the amount of inflammable materials in the forest.

Local residents usually provide relatively cheap labour and they should be actively involved in working in the forest as an alternative means of livelihood to supplement for the loss of charcoal burning.

The forest management plan has a component of growing trees which will be used for charcoal growing. There is also a plan for public-private partnerships in tree planting with the seeds provided by NFA.

Carbon Sequestration Capacity

No attempts have been made to measure the carbon sequestration capacity and therefore the carbon sequestration value of Uganda's forests. The carbon sink capacity of the impacted forest area for this project is, therefore, largely based on secondary information. The Centre for Social and Economic Research on the Global Environment (CSERGE, 1993) put the carbon stocking capacity of tropical evergreen forests at 144.0 tonnes of carbon per hectare (tC/ha) for total above ground biomass and 66.0 tonnes per hectare for soil and below ground or a total of 210 tonnes of carbon per hectare. At the time of carrying out the EIA, NFA was carrying out Baseline Surveys in North Rwenzori to determine the amount of Biomass so as to determine the existing carbon stocks in the area.

Mitigation Measures

There should be an attempt to measure the carbon sequestration capacity of North Rwenzori CFR.

Management of Herbicides

Herbicides are to be used at the nursery bed and in subsequent spraying activities. Attempting to eradicate pests by unnecessarily high use of herbicides may have negative impacts that need to be mitigated.

Mitigation Measures

NFA is to carry out training and careful selection of products and application techniques in order to minimize impact on beneficial organisms, humans and the environment. When selecting herbicides, NFA will use a product that: (a) is effective in controlling the pest; (b) is highly specific to the pest and does not significantly affect beneficial organisms; (c) has a low human toxicity.

Recommendations

- Generally, the impact of the proposed project on the environment of the North Rwenzori CFR will be positive, and particularly in regards to the improvement of forestry resources, employment and improved climate for the entire country.
- Some limited negative impacts will occur during the implementation of the FMP but will not be significant and can be easily mitigated and monitored.
- An environmental management and monitoring plan for North Rwenzori has been proposed with the aim of addressing the impacts. The project will also have positive spin-off effects on plantation farmers.
- The Itwara Sector Group of CFRs Management Plan design should incorporate appropriate environmental mitigation measures that are practicable and achievable.
- Regular consultative meetings of all stakeholders should be convened to review and address any concerns that may rise during the implementation of North Rwenzori sector forest reserve management plan period.
- This study recommends that the program be approved by NFA as North Rwenzori sector central forest reserve management plan for implementation
- The current management proposals for North Rwenzori FR should not be detrimental to the fauna and Flora of the area.
- Nevertheless, increasingly common changes in land use in these areas, partly through burning, and clearance for crops or better grazing lands, means that this forest reserve will become increasingly important as refuge, where those species that do not survive such changes can continue to exist. It is probable that at least a half of the bird species, together with all of the mammals, fall into this category.
- Good relations with the neighbouring communities, supported by active patrols to contain illegal activities, are needed for this.
- Carbon sequestration is valuable in its own right and should be enhanced.
- There should be periodic continuous matching of species and soils to ensure maximum tree production.

- In case of chance finds of physical cultural resources, planting activities will stop in that area and the area will be delineated and the relevant authority notified by NFA.
- Ensuring that the general character of these woodlands is maintained is also valuable for the biodiversity that they hold, whereas their destruction would certainly entail very substantial loss of biodiversity.

In the view of the anticipated impacts to accrue to the communities around North Rwenzori forest reserve and the nation as a whole, if the proposed mitigation measures are implemented, the study recommends that the proposed North Rwenzori forest Central project be allowed by NEMA to be implemented.

Conclusion

As a requirement in the National Environment Act, developers of projects for which EIA has been carried out are required to carry out periodic monitoring to ensure that the mitigation and environment management measures identified and recommended through the EIA are adhered to and implemented. It is further required, under the law, that such developers keep and maintain monitoring records which should be made available during inspections and that monitoring reports should be submitted to the appropriate authorities on an annual basis. We thereby conclude by putting the condition on the developer (NFA) to ensure that periodic monitoring is carried out after implementation.

CHAPTER ONE

1. INTRODUCTION

1.1. Background

1.1.1. Project Description

National Forestry Authority has got support from the World Bank to kick start a new public-private partnership programme to avoid climate change and reduce emissions from deforestation and degradation through efficient tree planting for carbon sequestration in North Rwenzori. This funding is contained under the Project Paper on Additional Credit to the Republic of Uganda for the Environmental Management Capacity Building Project (EMCBP) dated July 17, 2008, Report number 44024-UG. This project paper contains the purpose, project development objectives and expected outputs as well as project activities.

The project paper indicates that this project is financed under the Ministry of Finance, Planning and Economic Development (MFPED). National Environment Management Authority (NEMA) and National Forestry Authority (NFA) are the responsible agencies for project implementation.

North Rwenzori was first gazetted under Legal Notice number 275/1940. Various amendments were made under Legal Notice numbers 245/1947 and 41/1948 which were consolidated in the Revised Laws of Uganda, 1951. This was later repealed by the 1998 gazette.

1.1.2. Purpose

The project is intended to contribute to sound management systems that allow economic use of woody biomass species while fostering a natural regeneration and establishment of fast growing dedicated energy plantations in formerly degraded woodlands and forested areas. It provides an opportunity for land restoration, biodiversity rehabilitation and re-absorption of atmospheric carbon dioxide.

1.1.3. Project Development Objective and Expected Outcomes

The Project development objective of the Environmental Management Capacity Building Project (EMCBP II) is “to contribute to sustainable management of environmental and natural resources at the national, district, and community levels. The implementation arrangements for the additional financing remained the same as the previous project for all activities apart from tree planting. This was because tree planting was proposed to be carried out by NFA with a new Designated Account opened by NFA to facilitate project implementation.

The following are objectives of management and working cycles:

1. Conservation of the forest biodiversity and ecological conditions
2. Production of timber and non-timber products in the natural forests, grasslands and woodlands to the benefit of the people of Uganda
3. Restoration of the functions of the degraded forests and deforested parts/reserves
4. Enhancement of partnerships with communities surrounding the forests in the management of reserves
5. Advancement of knowledge in forest management and the resultant benefits to the stakeholders (local, national and global)

The above objectives are expected to be achieved through the following working circles:

1. Conservation of biodiversity
2. Production
3. Plantation development
4. Community participation
5. Research

This first integrated management plan brings all the small forest reserves of Itwara Group of Forest Reserves under management and covers the period from July 2008 to June 2018. However, it is important to note that the plan is still in draft form and many things are expected to change in the final version.

The activities in this Management plan are designed to contribute to and support economic growth in line with the national development goal for the forestry development and under the relevant Millennium Development Goals.

1.1.4. Project Activities

The extension and additional financing of US\$ 15 million under this request retained the same component structure (revised cost tables attached in **Annexes 3 and 4**). The duration of eligible activities was set for 3 years starting from July 1, 2008. The combined design and allocation was built on four lessons which also related to other agencies such as National Environment Management Authority (NEMA). Of importance to this assessment is the tree planting activity which was built on the success of the Rwoho plantation supported under the previous project through NFA.

In total the project activities will cover an area of 2,000 hectares within North Rwenzori CFR. The project will allow the involvement of the community using the community based tree planting initiatives. Community involvement will be within the context of detailed rights and responsibilities as stipulated in the negotiated community forest management agreements and affirmed in the Tree Farming License. NFA will provide seedlings and technical advice to the community groups. In return, the community groups will be in charge of protecting the plantations

from fire and the remaining patches of the natural forests from encroachment. However, NFA will retain all rights, titles and interest to the emissions reductions produced by community groups and will compensate community groups for the carbon sequestered by NFA upon delivery, but NFA will retain the overall responsibility for the project implementation and delivery of the emissions reduction.

The different activities that will be carried out at the different development stages include these below;

Pre-project /Preparatory Activities

Conduct a baseline survey on existing woody stock;
Forest boundaries opened, clearly marked and maintained;
Preparation of project design documents;
Procure Seedlings (both indigenous-750,000 seedlings (500ha) and 3 million seedlings (1500 ha));
Establishment of a Nursery bed;
Develop water supply system;
Site clearance and ground preparation for plantation development (2000ha);
Soil studies and species matching;
Contractual issues; and
Purchase of tools and equipment maintenance.

Development Activities

Lining, pitting and Planting of trees. Lining out and pitting shall maintain a straight line in all directions. (Prescription 10);
Thinning. This will be carried out twice in order to remove poorly formed trees, so that the stands produce only large, high quality trees which can be sold at a premium price;
Weeding and route Pruning. Weeding will be done in the young crop to ensure that the crop is free from competition while Pruning will be carried out to facilitate easy access through the plantation and to produce knot free timber of the final crop; and
Applying inputs such as manure and fertilizers for the planted section.

Operation Activities

Regular watering if necessary;
Enforcement;
Logging/harvesting; this will concentrate in areas, which have reached the rotation age. This will be done by NFA;
Bush clearing;
Fire fighting;
On site nursery operations

Replanting after logging; and
Information, education and communication flow with the community.

1.1.4.1 Technology to be Employed, Species and Forest Management Techniques

The proposed project is a reforestation of degraded grasslands in North Rwenzori forest reserve. Nursery technology, planting, tending and harvesting regimes will be in line with nationally developed standards. Within the project Portfolio, 2000 hectares of timber plantations will be established in one normal CDM and Gold Standard Compliant project. The plantation area will be stocked with 75%¹ *Pinus caribea*, already introduced and tested specie in the area, 20% *Prunus africana* and 5% other indigenous species. From *Prunus africana* the bark and the timber will be used. Pine will be managed on a 22-year rotation. The plantation will be established in contour based blocks.

Around each block, a fire line will be maintained since the project involves establishment of a fire prone pine plantation. All the tree species to be used in afforestation are proven in the area, matched with the soil type and not known to be invasive. Site preparation to enhance the early growth and development of the planted seedlings will be used. This implies that the area around the planting spots will be weed free before planting. Appropriate planting techniques for the local conditions will be adopted.

1.2. State of North Rwenzori Central Forest Reserve

1.2.1. Planted Section

The forest is currently regenerating after many years of neglect and degradation from grazing, fires and cultivation. Currently, the most dominant species being planted are *Pinus caribaea* (Brazil), *Terminalia superba*, *Cedrela odorata* and so far 700 hectares have been planted in the various blocks as portrayed in the table below. This section of the forest that is to be planted with exotic species is about 2000 hectares with the remaining maintained under natural habitat. Of the 2000 hectares, 165 have so far been allocated to private tree farmers in the respective local communities traversed by North Rwenzori forest reserve.

¹ National Forestry Authority, 2008. Forest component of the Supplementary Credit for Uganda Environmental Management Capacity Building project (EMCBPII)

Table 1-1: Areas planted from October to December 2010

SNo	Area name	Size	Species
1	Ngisi Block 1	150	<i>Pinus caribaea (Brazil), Terminalia superba, Cedrela odorata</i>
2	Ngisi Block 2	100	<i>Pinus caribaea (Brazil), Cedrela odorata</i>
3	Hill Tank Block 3	150	<i>Pinus caribaea (Brazil), Cedrela odorata</i>
4	Nyabisokoma A Block 4	120	<i>Pinus caribaea (Brazil), Terminalia superba</i>
5	Nyabisokoma B Block 5	80	<i>Pinus caribaea (Brazil), Terminalia superba</i>
6	Nyabisokoma Block 6	100	<i>Pinus caribaea (Brazil), Terminalia superba, Cedrela odorata</i>
7	Total area planted	700	



Figure 1-1: Photo of Planted Pine Plantation

1.2.2. Natural Part of North Rwenzori CFR

Part of North Rwenzori forest reserve neighbouring Itojo and Burangapass (1,531 Hectares) has been maintained as natural habitat. With a variety of natural tree species regenerating in this natural section, we can now experience thick thickets characteristic of natural forestation. However, there is need to map and ascertain the exact size of the section of natural habitat in North Rwenzori CFR. This section of the reserve should be protected against any exotic species which may be invasive affecting its regeneration.



Figure 1-2: Photo of Natural part of the Reserve

1.3. Need for Environmental Impact Assessment

The National Environment Act, Cap 153, 2004 requires that an Environmental Impact Assessment (EIA) is done for forest-related activities. According to Schedule 111 Subsection (7) of the Act, Forest-related activities, including timber harvesting; clearance of forest areas; and reforestation and afforestation are projects to be considered for EIA.

In addition, Section 38 of the National Forest and Tree Planting Act, 2003 require a person intending to undertake a project or activity which may, or is likely to have a significant impact on a forest to undertake an EIA.

Furthermore, section 54 (g) of the same Act provides for NFA to liaise with the National Environment Management Authority (NEMA) while addressing forestry and more so environment related issues. In respect of this, some NFA officers outside the sector already serve as environment inspectors. In ensuring that policy implementation is done effectively, security agents are frequently involved as active partners.

The proposed project activities fall under those that require an EIA before implementation as stipulated in section 2.3.1 of EIA Regulations. A number of activities will be out of the character of the surrounding and will include land clearing which will involve bush and tree cutting, socio-economic aspects, soil exposure and ecological disturbance. The tree planting project funded by World Bank is categorised under section B whose impacts require an Environmental Impact Assessment as a safeguard.

The EIA on this project is therefore based on developments that are likely to or will have significant negative impacts on the environment so that they can be eliminated or mitigated during and after implementation. Furthermore, it is the government policy that EIA process should serve to provide a balance between environmental, social, economic and cultural values for the sustainable development. That is, environmental and social concerns are integrated into all development policies, projects, activities and plans at national, district and local levels at early stages to avoid possible delays in the project implementation.

1.4. Objectives of the Assessment

The assessment was done to ensure that the proposed activities for North Rwenzori Central Forest Reserve incorporate environmental issues in the planning and design stages of the Forest Management Plan in an environmentally sound and sustainable manner. The objectives of the environmental impact assessment are to:

- Explain the need for the Environmental Impact Assessment and describe the physical characteristics, scale and design of the proposed activities which includes: clearing, planting, weeding, pruning, opening of the forest

boundaries, opening of access/internal roads and charcoal production and trading;

- Examine the existing environmental characteristics of the proposed activities and specific forest sites and the area likely to be affected by the proposed forest developments;
- Predict the possible environmental impacts of the proposed carbon tree planting project;
- Describe measures that will be taken to avoid, offset or reduce adverse environmental impacts; and
- Provide the public, Lead Agency and other stakeholders with information on the proposed activities that will assist them in making a decision on the proposed carbon tree planting project.

1.5. Methodologies used during the EIA

The EIA exercise was carried out using a number of different approaches and methodologies as was dictated by the different aspects and dimensions of the forest carbon tree planting project. The methodologies employed included the following:

- Meetings and discussions with National Forest Authority (NFA) staff both at headquarters and at field stations;
- Review of secondary data on North Rwenzori such as forest management plans of the 1960's and 70's and project briefs;
- Expert judgement and evaluation of technical issues related to the nature of the proposed tree planting project;
- Review and reference to literature, including existing laws, regulations, policies and management plans to verify how the proposed afforestation project conforms to them;
- Public consultations with both central and local government officials of Bundibugyo and Ntoroko districts and the respective sub counties;
- Public meetings with local community within and around North Rwenzori Central Forest Reserve (CFR); and
- Collection of soil samples at various locations in the reserve for laboratory analysis to determine soil suitability and species matching for the proposed tree planting.

1.6. Project Alternatives

The Scope of alternatives which have been examined during this EIA, include:

- Preferred Alternative,
- Technology alternatives
- The "No Action" alternative

1.6.1. Preferred Alternative

The carbon sequestration project involves planting of trees on large scale. This project best suits in a forest reserve and North Rwenzori is a clearly gazetted forest reserve. There was no other alternative place that was reviewed for this purpose since North Rwenzori is controlled by NFA and is ideal for the carbon sequestration tree planting because of the following reasons;

The project area is vast enough (3,531 hectares) and apart from the area under natural vegetation, the other large section is vacant and ideal for tree planting;

The land is owned by NFA hence no hustles and wrangles trying to acquire land for the purpose of carbon planting; and

The area is still largely fertile and does not require inducements like fertilizers in order to plant.

1.6.2. Technology Alternative

It is envisaged the project will basically be labour based and we don't anticipate the use of heavy machinery during planting, weeding and opening of access roads. The purpose is to ensure that many locals in the area are employed in planting, nursery bed, weeding and food provision. Heavy machinery is often associated with noise, accidents, vices which the project wants to control such as carbon emission from vehicle exhaust pipes.

1.6.3. No- Action" Scenario

The "no-action" option would eliminate the opportunity carbon tree planting in North Rwenzori obstructing the potential of job creation for many youths, Climate stabilization, carbon trapping, reduced global warming and other secondary socio-economic benefits that are to be associated with this carbon sequestration tree planting project.

Since the globe is warming up rapidly (0.05°C per decade) and the levels of carbon in space are accumulating, this option was viewed as detrimental to the global environment as well as that of Uganda and Bundibuygo, Ntoroko districts.

CHAPTER TWO

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Policy and Forest Management System Framework

Relevant national regulations and international agreements and conventions to which Uganda is a party were reviewed and presented in this Chapter. There is a number of legislation that deals with environmental management in Uganda both in general and specific terms, the most important of which is the Constitution of the Republic of Uganda, 1995. The specific legislations that deal with environmental assessments are the National Environmental Act, Cap 153 and its subsidiary, the Environmental Impact Assessment Regulations, 1998.

An overview of the relevant World Bank Safeguard Policies, potentially including Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), Forests (OP 4.36), Involuntary Resettlement (OP 4.12), Pest Management (OP 4.09) and Physical Cultural Resources (OP 4.11). Other reviews of international protocols and instruments regarding carbon emissions reductions, rights of local communities, and human rights that impinge on the carbon component of the management plan were also carried out.

In this section, the various laws and regulations that are designed to assist in management of environment in Uganda are briefly described.

The overall policy goal of the National Environmental Policy is sustainable development which conserves environment to meet the needs of the present and future generations. The policy specifically seeks, among others, to:

- Provide a broad policy framework for harmonization of sectoral and cross-sectoral policy objectives, principles and strategies.
- Transform existing environmental management systems to an integrated and multi-sectoral approach to resource planning and management.
- Provide the basis for the formulation of a comprehensive environmental management framework.
- Establish an effective monitoring and evaluation system.

2.1.1. The National Environment Management Policy, 1994

The National Environmental policy goal is the promotion of sustainable economic and social development, mindful of the needs of future generations. The policy calls for integration of environmental concerns into development policies, plans and projects at national, district and local levels, using ESIS as one of the vital tools. Thus, the policy requires that projects or policies likely to

have significant adverse ecological or social impacts undertake an EIA before implementation.

2.1.2. Uganda Forestry Policy, 2001

Uganda's first forestry policy was written in 1929 but has undergone a series of changes since then, alternating between stricter conservation on the one hand and more liberal economic use of forest resources on the other hand.

The last policy review was in 1988, but this contained limited guidance on principles and strategies for implementation, on forestry outside the gazetted reserves, and on the balance between production and conservation. It was also silent on the roles of government, the private sector and rural communities in forestry, and the linkages with other sectors and land uses.

There have been a number of recent national and international commitments that affect forestry. National policies and laws have been introduced to change environmental and governance practices and the government has signed international obligations to new conservation and trade practices. It was therefore found necessary for the new policy to be put in place, thus the Uganda Forestry Policy, 2001. The Forestry Policy, 2001 guided by principles that build on the government's national development priorities of poverty eradication and good governance. North Rwenzori Central Forest management plan will be in accordance with the above principles.

2.1.3. The National Water Policy, 1999

The main objective of water policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders.

2.1.4. The Uganda National Wetlands Policy, 1995

The policy on conservation and management of wetland resources aims at curtailing loss of wetland resources and ensuring that benefits from wetlands are equitably distributed to all people of Uganda. The policy specifically calls for application of environmental impact assessment procedures on all activities to be carried out in a wetland to ensure that wetland development is well planned and managed.

2.1.5. The Uganda Gender Policy, 2007

In the context of the road sector, it aims to redress the imbalances which arise from the existing gender inequalities and promotes the participation of both

women and men in all stages of the project cycle, equal access to and control over economically significant resources and benefits.

2.1.6. National Policy on HIV/AIDS, 1997

Main streaming HIV/AIDS in all programmes including forest projects is an important aspect of a national overarching policy. There is, however, need for government to continuously review the policy and design appropriate interventions to fulfil the objectives.

2.2. Legal and Regulatory Framework

2.2.1. Constitution of the Republic of Uganda

Section 237 (2) (b) of the Constitution of the republic of Uganda of 1995 entrusts the management of all forest reserves for the benefit of all into National Forestry Authority (NFA) and District Forestry Services (DFS) that were established by an Act of Parliament.

2.2.2. Uganda Environmental Policies and Procedures

The National Environment Act Cap 153 spells out principles of environmental management and the rights to a decent environment; institutional arrangements; environmental planning, environmental regulations, environmental standard; and environmental easements; records, inspection and analysis; financial provisions; offences; judicial proceedings and international obligations.

The National Environment Management Authority (NEMA) published EIA guidelines in 1997 where the EIA process and procedures are clearly outlined. It is the general policy of the government of Uganda that EIA be conducted for planned projects that are likely to or will have significant impact on the environment, so that adverse impacts can be foreseen, eliminated or mitigated. The document also spells out guidelines for use by developers, EIA practitioners; procedures for public participation; guidelines for use by lead agencies and NEMA and guidelines for monitoring.

Environmental Impact Assessment Regulations, 1998 provide for implementation of the Act. Sections 5 of the EIA regulations include guidance on the content of a project brief that include stating:

- a). The nature of the project in accordance with the categories identified in the Third schedule of the Act.
- b). The projected area of land, air and water that may be affected;
- c). The activities that shall be undertaken during and after the development of the project;

- d). The design of the project;
- e). The materials that the project shall use, including both construction materials and inputs;
- f). The possible products and by-products, including waste generation of the project;
- g). The number of people that the project will employ and the economic and social benefits to the local community and the nation in general;
- h). The environmental impacts of the materials, methods and by-products of the project, and how they will be eliminated or mitigated;
- i). Any other matter that may be required by the Authority.

Part II section (6) of the regulations points out that ‘the developer shall submit five copies of the project brief to the Executive Director of NEMA.

2.2.3. National Forestry and Tree Planting Act, 2003

The National Forest and Tree Planting (NFTP) Act of 2003, section 14 and 32 requires everybody/organization to go through the legally established procedures if is to operate or extract products from the forest reserves. The only privilege that exist as established by section 33 of the NFTP Act of 2003 is extraction of forest produce such as wood fuel for domestic use.

2.2.4. Agricultural Chemicals (Registration and Control) Regulations, 1999

Regulation 4-1 stipulates that no agricultural chemical whether imported or manufactured in Uganda shall be stored, distributed or dealt in Uganda, unless it is duly registered in the register of agricultural chemicals and a certificate is issued. While regulation 34 stipulates that agricultural chemicals shall be disposed of according to stipulated procedures and shall not be disposed into open or any waterway.

2.2.5. The Public Health Act, 1964

Section 7 of the Act provides local authorities with administrative powers to take all lawful, necessary and reasonable practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any infectious communicable or preventable disease to safeguard and promote the public health and to exercise the powers and perform the duties in respect of public health conferred or imposed by this act or any other law.

Section 105 of the Public Health Act (1964) imposes a duty on the local authority to take measures to prevent any pollution dangerous to the health that the public has a right to.

2.2.6. The Uganda Water Act, 1997

The salient objective of this Act is to promote rational management and use of all water bodies in Uganda. This objective can only be achieved if water users can adequately tell the likely project impacts on water resources. This, therefore, requires that all developers, whose activities shall have significant impacts on water and water resources, carry out EIA in that regard.

2.2.7. The Local Government Act, 1997

The Act establishes a form of government based on the district as the main unit of administration. Districts are given legislative and planning powers under this Act. [Sections 36-45]. They are also enjoined to plan for the conservation of the environment within their local areas. District Environmental Committees established under section 15 of the National Environment Act Cap 153 are supposed to guide the district authorities in that regard.

2.2.8. The Occupational Safety and Health Act, 2006

The Occupational Safety and Health (OSH) Act replaces the Factories Act (1964). It departs from the original listing of 'don'ts' and now has a new scientific approach in which the technical measures required in the protection of workers are spelled out to be put in place. In so doing it is preventive in approach. The Occupational Safety and Health Act, 2006 provides for the health, workplace safety and welfare of employees.

2.2.9. Workers Compensation Act, 2000

Section 28 of The Workers' Compensation Act (2000) states that:

- Where a medical practitioner grants a certificate that a worker is suffering from a scheduled disease causing disablement or that the death of a workman was caused by any scheduled disease; and
- The disease was due to the nature of the worker's employment and was contracted within the twenty-four months immediately previous to the date of such disablement or death, the worker or, if he or she is deceased, his or her dependants shall be entitled to claim and to receive compensation under this Act as if such disablement or death had been caused by an accident arising out of and in the course of his or her employment.

If on the hearing of an application for compensation in terms of subsection (l) of this Section the court is satisfied on the evidence that the allegations in the certificate are correct, the workman or his dependants, as the case may be, shall be entitled to compensation under this Act as if the contracting of disease were an injury by accident arising out of and in the course of the workman's employment.

NFA will have to comply with the various laws and regulations that control their operations in Uganda.

2.2.10. Uganda Environmental Policies and Procedures

a). The National Environment (Waste Management) Regulations, 1999

The forest authority management and contractors engaged in forest activities are required by Section 77 of the National Environment Act, Cap 153 to keep a record of the amount of waste generated by their project activities and of the parameters of the discharge.

b). The National Environment (Wetlands, River Banks and Lakeshores Management) Regulations, 2000

The regulations provide principles for sustainable use and conservation of wetlands, riverbanks and lakeshores. They require that ESIS is mandatory for all major activities on riverbanks and lakeshore mitigation measures are in place to prevent soil erosion, siltation and water pollution.

c). The National Environment (Control of Smoking in Public Places), Regulations, 2004

Prohibits smoking in public places including offices and therefore at the Contractors premises should be clearly marked with signage.

d). Any other relevant laws.

It is also important to cite the importance of environmental and social impacts against the provisions of the World Bank social and environment safe guard standards, and other international instruments such as:

- i) The Universal Declaration of Human Rights, 1948
- ii) The International Covenant on Economic, Social and Cultural Rights, 1976
- iii) Declaration on the Right and Responsibility of Individuals, Groups and Organs of Society to Promote and Protect Universally Recognized Human Rights and Fundamental Freedoms

2.3. Administrative Framework

2.3.1. National Environment Management Authority

The National Environment Management Authority (NEMA) is mandated to be the “principal agency in Uganda for the management of the environment” (National Environment Act Cap 153). At district level, the responsibility of the management of environmental issues lies with the District Environment Committees.

While NEMA is responsible overall for the coordination of sectoral environmental issues, NFA must ensure that environmental impact assessment for the forestry

project is adequately carried out, that mitigation measures are incorporated as appropriate, and that the construction process is environmentally and legally compliant. Furthermore, NFA will be responsible for monitoring the environmental repercussions of any forestry activity during regeneration.

2.3.2. National Forestry Authority and District Forest Services

Two institutions have been created with a objective of ensuring proper management of forest reserves and these include National Forestry Authority (NFA) and District Forest Services (DFS). Section 48 (3) of the Act defines the roles of the two bodies. The Act is explicitly clear on the expected linkage / consultation or relationship between NFA and DFS.

Furthermore, section 54 (g) of the same act provides for NFA to liaise with the National Environment Management Authority (NEMA) while addressing forestry and more so environment related issues. In respect of this, some NFA officers outside the sector already serve as environment inspectors. In ensuring that policy implementation is done effectively, security agents are frequently involved as active partners.

2.3.3. Wetland Management Department

The Wetlands Management Department (WMD) under the Ministry of Water and Environment (MW&E) takes the lead in all the day-to-day management issues of wetland resources in Uganda. It implements the Wetlands Policy in collaboration with other lead agencies, notably NEMA.

At the District level, a Department of Environment (headed by the District Environmental Officer) coordinates wetland work and an attempt has been made in various districts to have a Wetland Officer appointed. Even at the village level, one of the members of the Village Council takes care of the environment and wetland related issues.

2.4. International Policy and Environmental Social Framework

The funding agencies have policies, procedures and guidelines that detail the way in which environmental assessment is to be carried out if any of the triggers below are invoked. The key environmental triggers are:

- a). Land acquisition that requires the involuntary resettlement of people;
- b). Projects in protected areas;
- c). Projects with impacts on the habitats of protected and threatened species;
- d). Projects where there are indigenous people. The key issue here is that no minority people are to be unfairly discriminated against, either due to

loss of access to existing resources or to be unfairly excluded from project benefits;

- e). Projects that impact cultural heritage.

The environmental classification of proposed programmes and projects takes into consideration their nature, size and location. There are key environmental triggers that automatically put projects into the top class of environmental and social assessment, and require a much more stringent (and time consuming) assessment approach to be followed.

Below are some of the International Agreements or Conventions of potential relevance to the proposed project, which Uganda signed and/or ratified:

- i) Convention on Biological Diversity (CBD) to ensure the conservation of biological diversity and sustainable use of its components;
- ii) The Clean Development Mechanism defined in the Kyoto Protocol (IPCC, 2007);
- iii) Protocol Agreement on the Conservation of Common Natural Resources (1982);
- iv) The World Bank Group safeguards policies for environmental and social issues. These operational guidelines and procedures offer elements of policy, procedure, good practices and guidance;
- v) The Stockholm Convention on Persistent Organic Pollutants was ratified by the Government of Uganda. It is a convention that gives information on chemicals that are known to be persistent in the environment and how they should be managed.

2.4.1. Clean Development Mechanism and Intergovernmental Panel on Climate Change, 2007

The Clean Development Mechanism (CDM) is one of the "flexibility" mechanisms defined in the Kyoto Protocol (IPCC, 2007). It is defined in Article 12 of the Protocol, and is intended to meet two objectives: to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to prevent dangerous climate change; and

- i) to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (greenhouse gas (GHG) emission caps). "Annex I" parties are those countries that are listed in Annex I of the treaty, and are the industrialized countries. Non-Annex I parties are developing countries.

In the Clean Development Mechanism, only afforestation and reforestation are eligible to produce certified emission reductions (CERs) in the first commitment period of the Kyoto Protocol (2008-2012). Forest conservation activities or activities avoiding deforestation, which would result in emission reduction through the conservation of existing carbon stocks, are not eligible at this time (Manguiat, 2005). Also, agricultural carbon sequestration is not possible yet (Rosenbaum, 2004).

2.4.2. Environmental Assessment Policy- (OP 4.01)

The Bank policy requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. This policy examines the potential environmental risks and benefits associated with Bank financed investments, supports integration of environmental and social aspects of investments into the decision making process, specifies consultation of the affected people, involve NGOs, and provide opportunities for their participation in the environmental assessment aspects.

The principles of this policy are;

- Environmental Assessment (EA) is required by Bank-financed investments;
- The Borrower is responsible for carrying out the EA;
- The Bank advises the Borrower on Bank's EA requirements; and
- The Bank does not finance activities that will contravene national legislation or relevant international environmental agreements identified during EA.

The World Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible. This policy aims at identifying ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

2.4.3. World Bank Safeguard Policy Involuntary Resettlement (OP/BP) 4.12

The resettlement action plan (RAP) aims at involving public in consultations and creating awareness so as to reduce the costs of RAP implementation for the sponsor. It also requires that land acquisition, payment of compensation on affected assets, and resettlements to take place before the onset of the project.

The World Bank involuntary Resettlement Operational Policy/Bank Procedures (OP/BP) Framework 4.12 has been taken into account as they are financiers of the North Rwenzori Central Forest Reserve for tree planting and carbon trade.

The World Bank's requirements regarding involuntary resettlement are detailed in Operational Policy (OP) Framework 4.12. The Directive outlines the following principles:

- Acquisition of land and other assets, and resettlement of people should be minimized as much as possible by identifying possible alternative project designs, and appropriate economic, operational and engineering solutions that have the least impact on people in the project area.
- The populations affected by the project are defined as those who may stand to the consequences of the project, all or part of their physical and non-physical assets, homes, homesteads, productive lands, commercial properties, tenancy, income opportunities, social and cultural activities and relationships, and other losses that are identified during the process of resettlement planning.

2.4.4. World Bank Safeguard Policy on Physical Cultural Resources (OP/BP)

4.11

The World Bank safeguard policy OP/BP 4.11 on physical cultural resources recognize that cultural resources are important as source of valuable historical and scientific information, as assets for economic and social development and as ancestral parts of people's authentic identity and practices. The policy aims at involves or mitigating adverse impacts on cultural resources for development projects that the World Bank finances. In this regard, the policy compliance will be ensured through implementation of the chance finds procedure as described below.

Surveys and consultations with the public did not reveal any physical cultural resources to be impacted upon by the project activities. However, if the chance finds occur, they will be handled according to the existing cultural and national requirements (Historical Monuments Act, Cap 46).

Under the Uganda law, any chance finds should be reported to the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage and the Chief Administrative officer (CAO). If the finds are not of interest to the Department of Museums and Monuments, they should be reburied on a site set aside for such purpose. If they are unknown human remains, such should be handled in line with the cultural norms with the involvement of local leaders and religious leaders.

The Implementing Agency (NFA) staff will ensure that the Contractor is adequately briefed about the chance finds procedures before commencing

works. Procedure on how to handle chance finds of physical cultural resources should be included in all civil works contracts.

If the Contractor discovers any physical cultural resources, such as archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects until the responsible local authorities or the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage take over;
- Notify the supervisory Project Engineer who in turn will notify the responsible local authorities and the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage immediately (within 24 hours or less).

Responsible local authorities and the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage would then be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the staff of the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage.

Decisions on how to handle the finding shall be taken by the responsible authorities and the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage. Such a decision will be documented in writing. This could include changes in the layout (such as when finding irremovable remains of cultural or archaeological importance) conservation, preservation, restoration, and salvage.

Works may resume only a written decision is received by the Contractor and the Implementing Agency (NFA).

2.4.5. World Bank Safeguard Policy on Natural Habitats (OP 4.04)

The World Bank policy on Natural Habitats (OP/BP 4.04) recognizes that the conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The policy therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions. The policy also promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation

of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats.

2.4.6. World Bank Safeguard Policy on Forests (OP 4.36)

The current forests policy (OP 4.36) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. The policy provides new approach to forestry issues, in recognition of the fact that forests play an increasingly important role in poverty alleviation, economic development, and for providing local as well as global environmental services.

It also notes that success in establishing sustainable forest conservation and management practices depends not only on changing the behaviour of all critical stakeholders, but also on a wide range of partnerships to accomplish such successes jointly by central governments, government agencies, donors and interest groups.

2.4.7. World Bank Safeguard Policy on Pest Management (OP 4.09)

In assisting borrowers to manage pests that affect either agriculture or public health, the Bank supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In Bank-financed projects, the borrower addresses pest management issues in the context of the project's environmental assessment.

The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users. With respect to the classification of pesticides and their specific formulations, the Bank refers to the World Health Organization's *Recommended Classification of Pesticides by Hazard and Guidelines to Classification* (Geneva: WHO 1994-95). The following criteria apply to the selection and use of pesticides in Bank-financed projects:

- (a) They must have negligible adverse human health effects.
- (b) They must be shown to be effective against the target species.
- (c) They must have minimal effect on non target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.

(d) Their use must take into account the need to prevent the development of resistance in pests.

The Bank requires that any pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the Bank.⁷ The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

CHAPTER THREE

3. ENVIRONMENTAL SETTING OF THE PROJECT AREA

3.1. Location of the Project Area

3.1.1. Location

North Rwenzori CFR is part of the mountain ranges that include Rwenzori Mountains National Park in Western Uganda and comprises the main part of the Rwenzori mountain chain that includes Africa's third highest peak. The reserve is located on the rain shadow part of the mountain ranges and acts as the buffer to the national park. The proposed tree planting exercise is expected to increase national tree cover, provide extra habitat for the protection of the biodiversity and sequester carbon dioxide.

North Rwenzori CFR is bordered to the north and south by rivers Sempaya and Nyakibale respectively. The forest reserves boundary extends to Fort Portal-Bundibugyo road which is the boundary from river Nyakibale to the Ministry of Works road camp near the top of Buranga-Pass. The western boundary follows approximately the crest of North Rwenzori hills from the source of river Nyakibale. The boundary then follows the river Mongiro from its source to the main road south of river Sempaya and from there it follows sections of the road to the river Sempaya.

North Rwenzori CFR covers the parishes of Itojo, Karugutu and Masandana IN Ntoroko district and Kasitu and Burondo parishes in Bundibugyo district. In total the reserve covers 3,531 hectares of which 2500 hectares are available for re-forestation activities. Of these 3,531 hectares, 26.6% falls within Bundibugyo district and 73.4% falls within Ntoroko district. See table 3.1 for details of area distribution of North Rwenzori CFR per district. Some parts of the reserve have been licensed to private tree growers, and most of them are growing pine and eucalyptus whereas some tree farmers have not yet even started growing anything.

Table 3.1: Area of North Rwenzori CFR per Parish

Bundibugyo District, Bughendera County and Kasitu Sub-county					
S/No	Parish	Area (Km ²)	Perimeter (Km)	Hectares	Percentage
1	Burondo	0.8	12.4	81.9	2.3
2	Kasitu	8.6	21.6	857.7	24.3
Sub-Total		9.4	34.0	939.6	26.6
Ntoroko District, Ntoroko County and Karugutu Sub-county					
S/No	Parish	Area (Km ²)	Perimeter (Km)	Hectares	Percentage
1	Karugutu	8.3	17.2	826.3	23.4
2	Musandama	1.7	6.9	167.4	4.7
3	Itojo	16.0	21.3	1,598.5	45.3
Sub-Total		25.9	45.3	2,592.2	73.4
Total		44.7	113.3	3,531.8	100.0

The location of North Rwenzori Central Forest Reserve within the districts of Bundibugyo and Ntoroko is shown in the map in Figure 3.1.

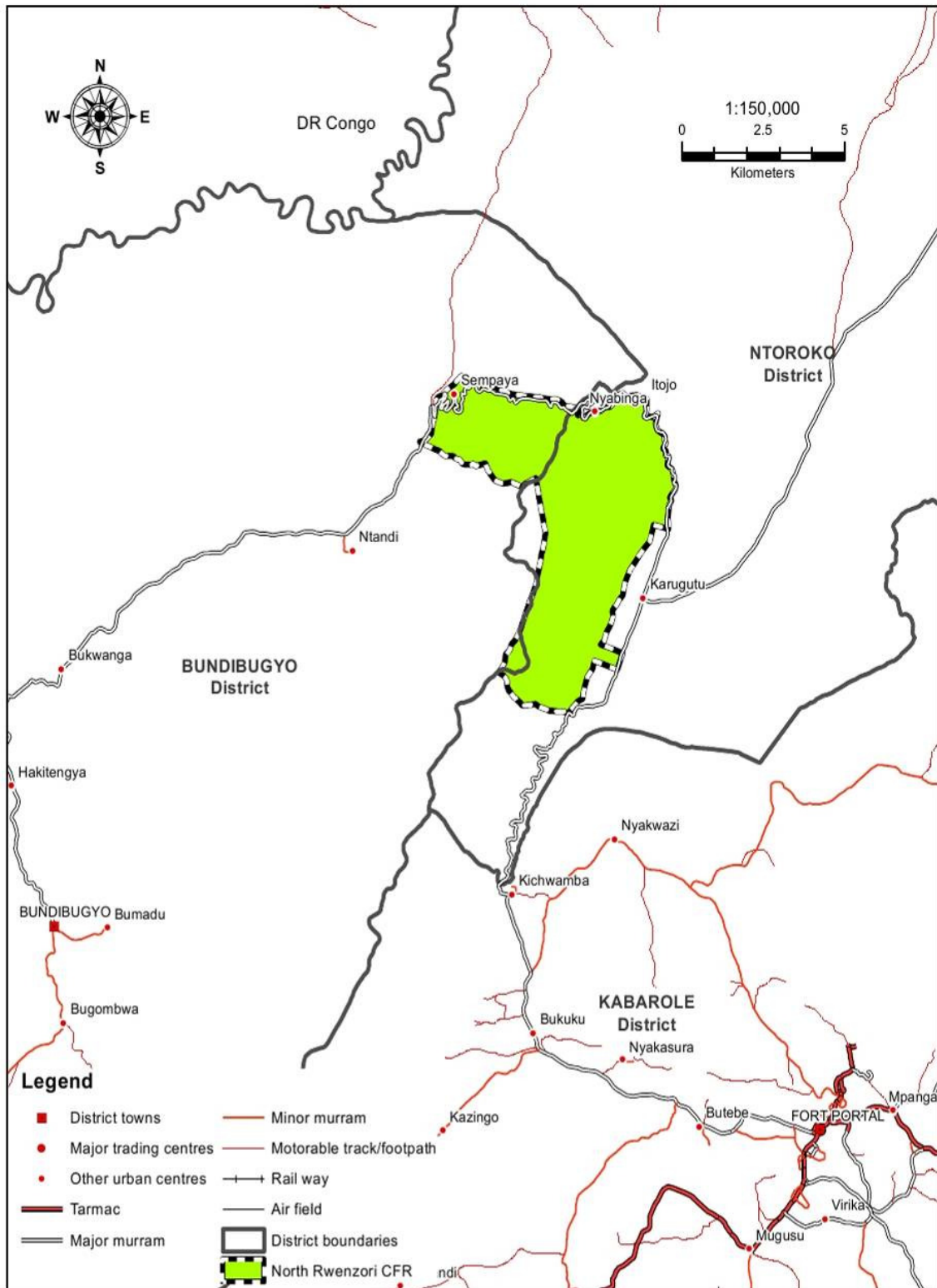


Figure 3-1: Location Map of North Rwenzori CFR

3.1.2. Management Plan Analysis

The first working plan for North Rwenzori CFR was prepared by Dale in 1948. The objective of the plan was to obtain a tree cover over the area to forestall attempts to excise the reserve from the forest estate. The working plan prescribed the following three main activities:

- early burning from the top of the hills downwards to be carried out annually;
- tending the existing sample plots and making new others by Principal Forest Officer in order to know what would grow on these hills while taking into consideration the high costs of future extraction which did not favour the formation of timber plantations;
- Annually inspecting and repairing (where necessary) the boundary corner cairns, although the plan noted that there was little encroachment on the reserve. In addition, the plan also prescribed digging and clearing annually of direction trenches as well as planting of *Cassia spectabilis* (or some other easily recognizable and prominent species) for 50 yards along the boundary on each side of all the corner beacons.

It should be noted that the reserve went through a number of years of relative inactivity during the past decade. However, a lot of effort has been made by NFA to start a number of activities in the reserve as set out in the draft Management Plan.

The current (undated) draft Management Plan being developed by NFA, for the entire Itwara Group of Central Forest Reserves, sets out the vision, mission, objectives of Management and Working Cycles as well as the period of the plan.

The vision of the plan is “sustainably managed forest resources contributing to better community livelihoods and national development” while the mission is “improved forest management to raise the stocking and socio-economic values of the forest resource base in Management Plan Areas (MPA)”

The following are the objectives of management and working cycles:

- 1) Conservation of the forest biodiversity and ecological conditions.
- 2) Production of timber and non-timber products in the natural forests, grasslands and woodlands to the benefit of the people of Uganda.
- 3) Restoration of the functions of the degraded forests and deforested parts/reserves.
- 4) Enhancement of partnerships with communities surrounding the forests in the management of reserves.
- 5) Advancement of knowledge in forest management and the resultant benefits to the stakeholders (local, national and global).

The above objectives are expected to be achieved through the following working circles:

- a). Conservation of biodiversity
- b). Production
- c). Plantation development
- d). Community participation
- e). Research

This first integrated management plan brings all the small forest reserves of Itwara Group of Forest Reserves under one management and covers the period from July 2008 to June 2018. However, it is important to note that the plan is still in draft form and many things are expected to change in the final version.

The activities described in this Management plan are designed to contribute to and support economic growth in line with the national development goal for the forestry development and under the relevant Millennium Development Goals.

3.2. Biophysical Environment

On the steep foothills there is a conspicuous break between the grassland and forest which, although partly an artificial boundary, does in fact also represent a change in soil conditions. Where uncultivated, the vegetation is dominated by *Pennisetum purpureum* and *Hyparrhenia cymbaria*, a community which is continuous with that of the adjacent lowlands.



Figure 3-2: The photo showing the biophysical state of North Rwenzori CFR

3.3. Topography

The reserve is part of the mountainous massif of the Rwenzori which lie on the eastern side of the western Rift Valley. The range is about 97 kilometres long and about 32 kilometres wide at its broadest part. Extremely steep ridges and deep valleys (see figure 2) running in as east to west direction give a somewhat fishbone effect to the topography. The western side of North Rwenzori, from the sources of rivers Nyakibale to Mongiro, is over 1,524 metres (5,000 feet) with the highest ridges in the south west reaching 1,981 metres (6,500 feet) in altitude. The land falls away steeply to between 1,067 to 1,219 metres (3,500 - 4,000 feet) to the east and north, and to under 914 meters (3,000 feet) near Sempaya. About one quarter of the reserve is over 1,524 metres (5,000 feet) and about half is over 1,372 metres (4,500 feet).

3.4. Geology

The underlying rocks are those of the Basement Complex which have been extruded by great pressure above the surrounding country. Much faulting occurs which causes frequent earth tremors in the area.

3.5. Soils

The soils belong to the following series on Harrop's (1960) classification:

- Mapping unit, Bugangari Series; dominant soil type, shallow dark brown or black sandy loams often very stony; and parent rock, BC granites, gnEIAases, schists, amphibolites
- Mapping unit, Mulinda; dominant soil type, brown gritty clay loam and clay loam; and parent rock, BC granites, gnEIAases, amphibolites

Harrop divided the mountain soils into three units. The division between the upland and lowland soils, however, was not based on topography alone but also based roughly on the vegetation zones which in turn are dependent on altitude. On the steep slopes the striking red colours of the lowland soils are no longer apparent and colours range from yellowish to greyish-reddish-brown. This may be an indication of their immaturity for it is reasonable to suppose that the mountain slope soils are younger than those of the gently undulating lowlands.

The three zones from top to bottom are:

- alpine vegetation consisting of dense stands of tree heather and giant groundsel with glades of "everlasting" (*Helichrysum*) flowers;
- broad-leaved montane rain forest;
- Tall grassland.

From the field study, it was observed that erosion effects have been removing top soil at a far greater rate from steep slopes and weathering is retarded by the generally lower temperature of these upland sites. It is also possible that leaching is less severe through the profile on steep slopes and that there is some base enrichment down slope. The soil sampling techniques, results and analysis carried out during this study are presented in **Section 4.5**.

3.6. Vegetation

According to the District Forest Officer (Beaton), over 90% of the reserve is grass covered with scattered trees. The reserve is predominantly dry *Combretum* savannah. The majority of the area is occupied by woodland savannah, classified as type N1 (*Combretum - Terminalia - Loudetia savannah*), and W2 (*Sorghastrum Grassland*) Langdale -Brown *et al.*, 1964. The three main vegetation types can be distinguished as:

- i) Savannah woodland
- ii) Grassland Communities
- iii) Montane forest

The savannah woodland extends from 10 metres to about 15metres and varies considerably in composition. On the eastern slopes, it is composed of grass land with grass up to 2 metres and shrubs and small trees from 1.5 to 3 metres, nearly 8 metres. On the more fertile western slopes above Sempaya, there is a more developed wood land with a height of 8-12 metres. Common tree species include; *Acacia hockii*, *Annona chrysophylla*, *Bridelia scleroneuroides*, *Combretum guenzii*, *Cussonia arborea*, *Erythrina abyssinica*, *Grewia mollis*, *Maytenus senegalensis*, *Pilistigma thonningii*, *Stereospermum kunthianum*, *Terminalia brownie* and *Vitex doniana*.

On other sites near the eastern boundary *Acacia polyacantha* forms almost pure woodland with a height of 12-15 metres and a dense under storey of *Pennisetum purpureum*.

Borassus palms are fairly common on the eastern side of the reserve and *Gardenia jovis-tonantis* is also found in this area. The rare tree fern *Cyathea dregei* has been found along with a *Lobelia sp. (L. giberroa)* in a valley at about 1,676 metres (5,500 feet) just outside the western boundary.

NFA undertook a baseline study in May 2011 for biomass distribution in North Rwenzori Central Forest Reserve. The report has not been published but the sample plots are shown in the map in figure 3. This study is expected to provide new information about changes in species composition in the last 50 years.

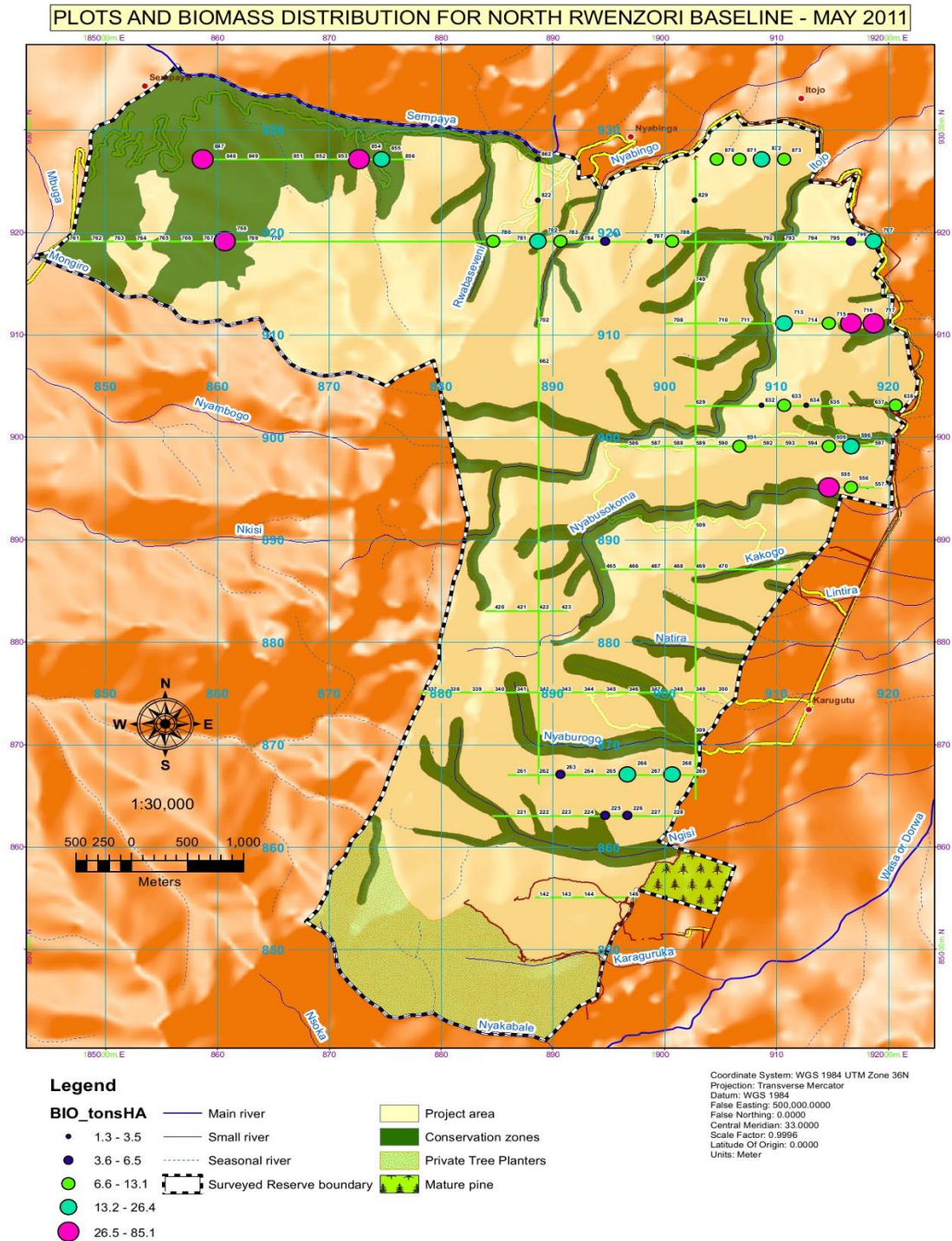


Figure 3-3: Baseline Study map for Biomass Distribution

3.7. Climate

The climate is tropical, affected by altitude, topography and the seasonal movements of the Inter Tropical Convergence of the southeastern monsoon with winds from the northeast. Most of the plains at the foot of Rwenzori Mountain lie in a rain shadow and receive as little as 750 mm of rain a year (WHC-AS, 2004). Rwenzori Mountain traps the humid air of the Congo basin and are very wet, rains falling on most days even in the dryer months. There are two rainy seasons, the short rains extending from the end of March to the beginning of June and a long rainy season from August to November. The periods December to March and June to July are comparatively dry though mist may be troublesome to climbers at the higher altitudes. The prevailing wetness causes snow and ice to lie well below the 4,877 metres (16,000 feet) level which reckoned as the line of permanent snow in East Africa.

However, this line of snow has been receding in the past years due to global climate change. Many of the stakeholders interviewed testified that the region is experiencing unpredictable rainfall variability thereby affecting crop growing patterns due to failure by farmers to time their seasonal planting, weeding and harvesting activities.

The prevailing wind is easterly and during dry seasons, hot winds from the Ntoroko flats causes rapid drying out on the steeper slopes and shallower soils of North Rwenzori.

3.8. Water Supply

The reserve forms the largest and most important catchment area in Uganda. Numerous rivers rise in the Rwenzori but the main ones for North Rwenzori CFR are Nyakibale, Ngisi and Isolo rivers that flow eastwards as well as the Mongiro and Sempaya rivers that flow westwards.

The Sempaya and Mongiro rivers are said to be permanent and probably also the upper reaches of the Nyakibale and Isolo except during the driest periods. The nursery is supplied by gravity water pumped into a 500 litres plastic tank. The gravity water is also connected to a tape that supplies water to the surrounding communities.

3.9. Biodiversity

There has been very little detailed investigation into the fauna and flora of the North Rwenzori Central Forest Reserve since the 1980's. However, the draft management plan indicates that Itwara and North Rwenzori CFRs are important biodiversity reserves. Among the mammals there is a high level of sub-specific endemism, for instance the montane squirrel *Heliosciurus ruwenzorii*, Rwenzori

shrew *Ruwenzorisorex suncoides* (VU), Ruwenzori otter-shrew *Micropotamogale ruwenzorii* (EN), Ruwenzori horseshoe bat *Rhinolophus ruwenzorii*, Ruwenzori vlei rat *Otomys dartmouthii* and Ruwenzori colobus monkey *Colobus angolensis ruwenzorii* (Ruwenzori Abruzzi, 2006). Some globally threatened species are still found in the area such as the l'Hoests monkey *Cercopithecus l'hoesti*. (Yeoman, 1985).

The Ruwenzori range frog *Africana ruwenzorica* is an endemic, the Uganda clawed frog *Xenopus ruwenzori* is of restricted range. There are two species of forest horned chameleons endemic to the range *Chamaeleo adolfi-friederici* and *Chamaeleo ituriensis* (WWF, 2003). The only snakes so far recorded are Jackson's black snake *Thrasops jacksoni* and *Atheris vividis* (WHC-AS, 2004).

The management report states that the greatest importance of North Rwenzori CFRs is that the area lies in the biodiversity corridors within the Albertine Rift biodiversity hotspot.

There are at least 177 species of forest birds (17.6% of the country's total) in North Rwenzori CFR and in the park according to Wilson (1995) including 19 birds endemic to the Albertine rift. Notable species are the endemic Ruwenzori turaco *Ruwenzorornis johnstoni*, bamboo warbler *Bradypterus alfredi*, Shelley's crimson-wing *Cryptospiza shelleyi* (VU) and four sunbirds, the regal *Cynnyris regius*, larger scarlet-tufted malachite *Nectarinia johnstonii*, golden-winged *Nectarinia reichenowi* and Stuhlmann's double-collared *N. stuhlmanni*. Other near threatened species include dwarf honeyguide *Indicator pumilio*, Grauer's cuckoo-shrike *Coracina graueri*, Lagden's bush-shrike *Maloconotus lagdeni* and ground robin *Cossypha archeri*.

There are also 15 species of butterfly (22% of the country's total) (Howard, 1991) and a 1948-49 study of invertebrate life forms listed 60 species in the alpine zone alone, 25 of which were new to science (Salt, 1987). This suggests that a more extensive fauna may still be awaiting discovery.

3.10. Land cover and Land use of North Rwenzori

Legally, North Rwenzori Forest Reserve can be used only for forestry because it is a gazetted forest reserve and it is the only realistic land use identified. In the reserve carbon dioxide will be sequestered from the atmosphere through reforestation and afforestation and stored in the living above and below ground biomass. The land cover in north Rwenzori has changed over the years as indicated in the table below;

Table 3.2: Land Cover and Land Use Change for North Rwenzori CFR from 1990 to 2005

Reserve Portion	Land Cover and Land use class number and name	1990	2005	Change	Implication
North Rwenzori	Tropical high forest (THF) normally stocked	85.17	15.14	70.03	To be maintained
North Rwenzori	THF depleted or encroached	14.86		14.86	To be protected
North Rwenzori	Woodland (>4m)	183.29	5.62	177.68	To be maintained
North Rwenzori	Bush Land (<4m)		159.76	159.76	To be protected
North Rwenzori	Grass land	2584.68	2,562.84	21.83	To be afforested
North Rwenzori	Wetlands	663.62	788.25	124.63	To be maintained
		3,531.611	3,531.61	0.00	

3.11. Socio-Economic Environment

3.11.1. Demography

The 2002 national census estimated the population of Bundibugyo District (before Ntoroko broke off) at about 158,900. The annual population growth rate in the district was estimated at 4%. Currently, the population of Bundibugyo district and Ntoroko is estimated to be 217,500 people indicating an estimated population density of 56 people per sq.km.

3.11.2. Land Ownership

The land is owned by NFA and it is clearly mapped and surveyed with visible mark stones. There is no land wrangle as all the people consulted indicated that there is no wrangle on the boundary. Previously people had encroached on the reserve for farming purposes and hunting but since the start of the planting by NFA in 2008, there has been no encroachment.



Figure 3-4: Photo showing Ownership marks

3.11.3. Cultural Heritage

North Rwenzori CFR is located in the homeland of the Bakonjo and Bwamba peoples. The Bakonjo are a Bantu-speaking people who have lived in the foothills of the Rwenzori Mountain for many generations, and whose culture is adapted to the steep slopes and climate of Rwenzori.

3.11.4. North Rwenzori CFR Neighbourhood

North Rwenzori central forest reserve is surrounded by communities of Karugutu and Itojo centres. The reserve is also bordered by Rwenzori mountains wild life reserve and Semiliki game reserve. Most people from these trading centres directly interface with the forest reserve by getting medicinal products and some food crops from the forest reserve.



Figure 3-5: Photo showing Itojo centre next to the Reserve

CHAPTER FOUR

4 STAKEHOLDER CONSULTATIONS

4.1 The Process

According to the Guidelines for Environmental Impact Assessment in Uganda public involvement in the EIA is an on-going process and shall be facilitated prior, during and after the EIA exercise. Methods of public participation mentioned are:

- Informing the public about the proposed project;
- Participation in the scoping exercise;
- Public meeting or hearings about the project (see figure 4.1);
- Written comments;
- Use of community representatives; and
- Making relevant documents and EIA report available and invitation to comment.

Community participation and consultation has been done and views and opinions analyzed. A synopsis of the views of the forest beneficiaries, project affected people, as well as national and local district representatives, who have been interviewed, are presented. Sector specific information solicited during these discussions has been included in the identification of impacts and mitigation measures. There will be continuous community awareness throughout the project cycle.



Figure 4-1: Stakeholder Consultation Process

4.2 The Stakeholders Groups Consulted

Public consultation were also undertaken at national levels in order to ensure that issues of concern were addressed in the ESIS and for purposes of institutional collaboration with NFA during implementation. The consultations revealed that although the respective national institutions are mandated to carry out certain functional services there is no budget allocation and therefore find it difficult to carry out their responsibilities. These are willing to closely work with NFA.

- Bundibugyo and Ntoroko local government;
- National Environment Management Authority (NEMA);
- Associations and NGOs; and
- Private tree farmers and other community members.

4.3 Findings from the Local Government

The project team composed of land use expert, biodiversity specialist, forests specialist, sociologist, environmentalists, who consulted with district officials such as the Chief Administrative Officers (CAO), Resident District Commissioners (RDC), Local Council Chairpersons, and some technical staff of Bundibugyo and Ntoroko.

The purpose of the consultations were to inform both the technical and political leaders of the objectives and planned activities for Carbon Planting in the North Rwenzori central forest reserve in the respective districts. The meetings were also intended for gathering views on and proposals for implementation of the proposed project.

The views at the local government level is that long-term and immediate benefits of the forest activities will outweigh the problems provided that proper mitigation measures are planned and implemented on time.

4.4 Findings from the Local Communities

The local communities (especially the people who own and derive livelihoods from North Rwenzori forest reserve) were mobilized by their local council chairmen and other community leader for public meetings at their respective locations.

There was a lot of interest in those meetings and the team registered good turn up where both men and women were well represented. While there was high expectation among the people about the forest activities, in some cases there was doubt as to how the local community will benefit directly from the activities. It not was surprising therefore to note that the mobilization team was

always confronted with a question of how the forest revenue would be shared with the district and the local villages.

The team members used Rukonjo and Rotoro for communication and to illustrate their points. Providing accurate information was important to allay the communities' fears about the impacts of the forest.

The local meetings provided an opportunity for generating discussions and ideas on the proposed project which were partially but also formed the basis of our recommendation. The communities meetings also acted as awareness raising forum about their future involvement in the on-going forest activities. This project was based on the understanding that locally-based sensitization, mobilisation, and empowerment efforts can be effective tools in ensuring that peoples' concerns, fears and expectation are brought to the forefront as part of the process of the forest management plan activities.

Informal discussions were held with people who are close to the forest reserve boundary such as those settled at Buranga Pass. This was to get their view on the current status of the forest activities, problems associated with the forest management and whether tree planting (charcoal and carbon sequencing) would be beneficial to them.

The forest activities within North Rwenzori central forest were seen as positive. There were no real objections to the proposed tree planting. The major concern of the communities was that food security would be a problem as the population in the district continues to grow and most of the district land is gazetted as Forest Reserve or national park. However, it was generally agreed that with appropriate mitigation measures these impacts can be minimized.

The local leaders also urged NFA to ensure that the local people were employed during the planting, weeding and pruning of the trees. Grazing of cattle within the forest reserve has generally been contained although NFA staff used to allocate same pieces of land for both grazing and tree planting. Major issues of general concern are summarised in Tables 4.1 to 4.3.

Table 4.1: Summary Issues Identified in Bundibugyo District

Stakeholders consulted	Summary of issues raised/identified
Bundibugyo Senior Environment, Officer Maate Jochus	<ul style="list-style-type: none"> i) Unpredictable rainfall pattern in the past which affects crop growing (caused failure by farmers to time their planting, weeding and harvesting activities) ii) Lack of technical and financial support for training farmers iii) Lack of supply of seedlings to tree farmers
Bundibugyo Acting Forest Ranger District, Mr. Suuma Steven	<ul style="list-style-type: none"> i) Charcoal burning by hunters ii) Cattle grazing by pastoralists iii) Encroachment for cultivation iv) Boundaries of reserves are not well maintained and demarcated v) Bush burning especially by hunters vi) Soil erosion
Bundibugyo Deputy Local Council VI	<ul style="list-style-type: none"> i) Growing population which exerts pressure on the land resources ii) Land use for human activities is limited due to the presence of gazette areas such as North Rwenzori CFR, Ituri Forest Reserve, Semiliki National Reserve, Rwenzori Forest Reserve, River Semiliki and Lake Albert. iii) Food production is impacted negatively causing food security iv) Cocoa is produced on commercial scale competing for land with food crops

Table 4.2: Summary Issues Identified in Ntoroko District

Stakeholders consulted	Summary of issues raised/identified
Musoke Justice, Deputy Vice Chairperson Ntoroko District	<ul style="list-style-type: none"> i) Compensation to encroachers ii) Allocation of land for community planting iii) Compensation to the encroachers iv) Wood fuel is increasingly becoming a problem in the district due to scarcity of trees v) Strengthening of community liaison with NFA vi) Collaborative effort in tree planting vii) Preparedness to support the proposed project viii) That WWF provided support but focused on Musandama parish
Chief Administrative Officer, Ntoroko District, Mr. Kiiza Silvestyr	<ul style="list-style-type: none"> i) Provided an electronic copy of the District Development Plan.
Buranga Pass Trading Centre community.	<ul style="list-style-type: none"> i) The new road being constructed that bypasses Buranga Pass can cause the current one through the Trading Centre to close thereby causing overgrowth and insecurity. ii) The community should be given patrol jobs iii) Lembamba Women’s group requested for seedlings to be supplied by NFA to their members for carbon planting iv) The Abakwakae Widows Group informed the team that they are already involved in coffee growing (of over 4 hectares) and goat rearing v) Charcoal is the main source of income to the community vi) Fruit trees such as mangoes, paw paws, guava and pineapples are commonly grown by the community vii) Trading Centre was built partly in the Forest Reserve and there is a Stone within the Trading Centre that marks the disputed boundary of the reserve.

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Stakeholders consulted	Summary of issues raised/identified
Itojo Trading Centre Community	<ul style="list-style-type: none"> i) The issue of ownership of trees planted in reserves should be addressed before the community gets involved in tree planting. This means that their stake of ownership in any forest raised with their participation should be clearly defined and legally protected. ii) Some community members participated in tree planting in the Forest Reserves in the past but were later evicted by NFA iii) NFA official licensed the reserve for grazing by Cattle keepers and at the same time allowed tree planting by the community on the same pieces of forest land. During this co-sharing of space for different land uses, the cattle destroyed the plants. Although these kinds of incidences were reported and cattle confiscated, NFA officials later released the cattle unconditionally. However, this practice has stopped.
Councillors, Karugutu Sub-county	<ul style="list-style-type: none"> i) A member asked know whether there is any possibility for individual farmers to be supplied with seedlings ii) It is proposed that community members who are not adjacent to the Forest Reserve should be considered for participation in the Carbon planting iii) Fear of insecurity as a result creating a dense forest that can be used as hideout by criminals iv) A big portion of the district is occupied by National park, wildlife reserve, forest reserve, hills and water bodies. This reduced the area available for cultivation and settlement by the communities. They, therefore, proposed that some parts be considered for degazettement v) The Musana Disabled Development Association was involved in planting with support from WWF but their project left out some community members although WWF later provided some trees vi) The community used to harvest non wood products such as mushroom and honey from the forest which has since been banned /prohibited. They, therefore, requested for support to start apiary projects as alternative sources of income vii) A member asked to know distance from the forest boundary that will be considered as a neighbouring

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Stakeholders consulted	Summary of issues raised/identified
	<p>community</p> <ul style="list-style-type: none"> viii) The community reported cases of disturbance by wild animals and sought to know how NFA will control the animals which will increase in number by creating the Carbon forest. ix) The communities are traditional hunters who engage in hunting Bush rats and other animals to supplement their diet. They propose goat rearing as alternative sources of income and meat x) It was proposed that the flat plain be degazetted and steep slopes be utilized for Carbon planting xi) The communities should be involved in order to get a sense of ownership xii) Goat rearing should be allowed in parts of the reserve with older trees xiii) NFA should allow for provision of access roads to the community
<p>Chairman, Rwenzori Mountains United Farmers Association (RMUFA)</p>	<ul style="list-style-type: none"> i) RMUFA has an ongoing Collaborative Forest Management (CFM) backed by a signed Memorandum of Understanding with NFA. Under this agreement the association was allocated 150 hectares for planting trees. ii) Identifying the area to be planted became a challenge because the reserve lies across two districts of Ntoroko and Bundibugyo iii) The association welcomes other community members to join them for allocation of land for planting and that tree planting preparation should have started in June 2011 iv) NFA committed itself to providing seedlings v) The association requested for assistance in pre-planting activities vi) The association promotes ecotourism as one of the associations objectives including beekeeping vii) The association provides technical and financial support to communities who were depending on the forest for their livelihood viii) The association submitted a request for permission to use forest road network ix) The association engages in sensitization of the communities about global warming x) Promotion of concept and practice of evergreen agriculture where trees are inter-planted with crop to

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Stakeholders consulted	Summary of issues raised/identified
	<p>provide complete ground cover with the notion that “where there is a tree there should be other plants”</p> <ul style="list-style-type: none">xi) Herbal demonstration site to be started in the land allocated to the associationxii) The association promotes research in indigenous knowledgexiii) After awareness meetings for communities organized by the association understanding of the importance of forests improvedxiv) Bush burning has so far reduced as a result of the awareness campaign and the community became interested in tree plantingxv) The association established a project for Nature Conservationxvi) The association has 300 members of which 120 are women and 180 are menxvii) Other activities undertaken by the association include Child Care Protection and HIV/AIDS campaign

Table 4.3: Summary Issues Identified in N Rwenzori CFR Station

Stakeholders consulted	Summary of issues raised/identified
Forest Supervisor Mr. Grace Mudhalya, North Rwenzori CFR Station	i) A total of 165 hectares were allocated to farmers for tree planting in 2008. ii) Grazing by cattle keepers has been reduced. iii) Annual fires are still big problems although fires fighters were trained and employed by NFA. iv) The problem of Encroachers has been solved since the eviction people who settled in the forest between the years 2007 - 9. v) Communities have applied for land for woodlots in the fertile areas. vi) Encroachment for tree cutting for timber is still continuing. vii) Charcoal burning by the surrounding communities is still continuing. viii) Stone querying was reported in the past but this was stopped. ix) Hunting for wild meat occasionally occurs. x) There is a significant change in rainfall patterns (thought to be the effect of climate change) which has caused delays in planting. xi) The available record (on the notice boards) showed the following information: <ul style="list-style-type: none"> - A total of 165 hectares were allocated to farmers for tree planting in 2008. - A total of 700 Hectares were planted between October and December 2010. The details are shown in Table 1.1.

Table 4.4: Areas planted from October to December 2010

SNo	Area name	Size	Species
1	Ngisi Block 1	150	<i>Pinus caribaea (Brazil)</i> , <i>Terminalia superba</i> , <i>Cedrela odorata</i>
2	Ngisi Block 2	100	<i>Pinus caribaea (Brazil)</i> , <i>Cedrela odorata</i>
3	Hill Tank Block 3	150	<i>Pinus caribaea (Brazil)</i> , <i>Cedrela odorata</i>
4	Nyabisokoma A Block 4	120	<i>Pinus caribaea (Brazil)</i> , <i>Terminalia superba</i>
5	Nyabisokoma B Block 5	80	<i>Pinus caribaea (Brazil)</i> , <i>Terminalia superba</i>
6	Nyabisokoma Block 6	100	<i>Pinus caribaea (Brazil)</i> , <i>Terminalia superba</i> , <i>Cedrela odorata</i>
7	Total area planted	700	

4.5 Soil Sampling and Analysis

4.5.1 Sampling Methodology

Soil samples were collected from various locations in the reserve using a hoe by digging (as shown in figure 5) 40 centimetres deep at 20 centimetre intervals each. Each sample was then mixed and packed in a water tight polythene bag and transported for Laboratory testing and analysis. The soil samples were collected from different clusters each with three sites as follows:

- North Rwenzori Forest Station with 3 clusters consisting of 9 sites.
- Itojo Trading Centre with 3 clusters consisting of 9 sites.
- Buranga Pass Trading Centre with 1 cluster of 3 sites.

The testing and analysis techniques are given in section 4.5.2.



Figure 4-2: Digging of soil for sample collection

4.5.2 Laboratory Analysis Methodology

a). Analysis techniques

Thirteen soil samples were delivered to the laboratory with a request for routine analysis. This analysis included testing for pH; organic matter (OM); total nitrogen (N); available phosphorus (P); exchangeable bases; potassium (K); calcium (Ca); magnesium (Mg); Sodium (Na) and texture. The pH was analysed in water by a ratio of 1:2.5 soil: water. Organic matter was analysed using the partial wet oxidation method while total nitrogen was done by the Kjeldhal method. Exchangeable bases were analysed using ammonium acetate extraction and individual elements read on flame photometry (K and Na) and atomic absorption spectrophotometry (Mg and Ca). The laboratory data is presented in the Annex 4.

b). Interpretation of data

- i) pH*: the pH is in the acidic range though a few are under medium acid (above 5.5). Under acidic pH, the soil tends to make some nutrients unavailable to plant utilization yet others like iron, manganese and

aluminium become toxic. It is therefore important that pH is raised towards neutral range.

- ii) Organic matter: apart from one soil sample from Itojo summit (20-40 cm), all the other soils indicated that they contain substantial high levels of OM. This is a good attribute of these soils for both nutrient and moisture retention as well as improvement of soil structure which in effect contributes to the modulation of other soil physical parameters like hydraulic conductivity, infiltration, bulk density and others. Such parameters influence plant root development for good anchorage and nutrient uptake.
- iii) Nitrogen: among all the parameters tested, N is the most limiting in these soils. With the exception of a few samples, most of the others have N levels below the critical value of 0.2. Even those that are above the critical values, their values are very close to the critical values implying that they also need monitoring. In addition, nitrogen is always prone to leaching due to its chemical nature and thus requiring periodic management.
- iv) Phosphorus: interestingly, the majority of the soils are rich in P. Special consideration for replenishment should be taken for those soils whose P values are below 15 mgkg^{-1} .
- v) Exchangeable bases: the bases are not much of a big problem, but about 50% of the samples have K levels the critical values. However, if the soils are going to continuously be under the forest/tree plantations, the nutrients are likely to build up over time when the trees start nutrient translocation from deeper horizon to the surface through littering. The litter will then decompose to release the nutrients. Sodium is fine because this is not a nutrient and should not exceed $1 \text{ cmol}/100\text{g}$ beyond which it starts interfering with the uptake of other nutrients or may lead to sodic conditions that are too hard to manage.
- vi) Soil texture: all the soils have similar textural class of sandy clay loam. This type of texture is ideal of most plant root development and water infiltration which may not be too high to encourage leaching or too low to promote water runoff.

CHAPTER FIVE

5 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1. Environmental Significance and Evaluation

Environmental impact can be defined as any alteration in the physical, chemical and biological properties of the environment caused by any type of matter or energy resulting from human activities that directly or indirectly affect the health, safety, and wellbeing of the population, social and economic activities, the biota, the aesthetic and sanitary conditions of the environment and the quality of the environmental resources.

Both positive and adverse environmental impacts could arise during site preparation and construction, operation phases of North Rwenzori forest management. This chapter is based on the NEMA Environmental Impact Assessment Guidelines, identifies sources of impacts, analyses them and recommends appropriate mitigation measures while opportunities of enhancing positive impacts are also suggested.

General significance criteria identified in the environmental social assessment and of particular relevance to the North Rwenzori central forest management are:

- The degree to which the proposed action affects the biophysical and social environmental including public health, occupation and safety;
- The degree to which the effects on the quality of the human and land use on the environment are likely to be highly controversial. Under the National Environmental Act Cap 153.

The proposed project would be considered to have significant environmental impacts if it would:

- Induce substantial population growth in the area, either directly (e.g., attracting more people) or indirectly (e.g., through extension of plantation);
- Result in substantial adverse physical impact associated with the provision of new or physically altered public service facilities in order to maintain acceptable levels of service, response times, or other performance objectives of such public services;
- Displacement of communities on land; and

- Displace significant numbers of existing homesteads, necessitating the construction of replacement of housing elsewhere. The impacts have been identified based on two phases (construction and operational phases).

5.2. Issues Considered for Determination of Extent of the Impacts

The following are the issues considered for determining the extent of the impacts:

- a). Plantation of tree in a sensitive ecological system such as wetlands, (description of the wetland weather seasonal/permanent), type of vegetation, flood characteristics if any.
- b). Soil structures, stability, susceptibility to erosion.
- c). Community use of valuable resources i.e. wood collection, honey collection, charcoal burning, hunting, grazing, and sand/brick mining, within the forests.
- d). Opening of access road within the project area.
- e). Matching of species to soil suitability.
- f). Social/cultural acceptance of the project.
- g). Water sources such as catchment areas, rivers and streams.
- h). Cattle route/ access to water.
- i). Occupation, safety and health of workers.
- j). likely general and specific impacts (positive and negative and
- k). Tree plantation may eliminate food and shelter of some species of animals.

5.3. Environmental Impact Matrix

An environmental matrix has been developed to assist in assessment of the potential environmental impacts that are likely to accrue from the tree planting project in North Rwenzori CFR.

Analysis of the potential impacts was assessed according to the various stages; pre-project /pre-paratory, development and operation. These were collected by use of a matrix in the table below;

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Table 5-1: Matrix of Likely Environmental Impacts

Environmental Impact	Impact type						Mitigation	
	Significant	Not significant	Short-term	Long-term	Irreversible	Reversible	No mitigation required	Mitigation required
Negative impacts								
1 Sanitation Issues								
Domestic wastes e.g. foodstuffs, paper, polythene etc		X		X		X		x
Timber wastes	X		X			X		x
Oil spills and herbicides	X		X			X		x
2 Accessibility								
Run-off from opened access roads	X			X		X		x
Vegetation clearance		X	X			X	x	
3 Health and Safety issues								
Injury during construction work	X		X			X		x
Fire out breaks	X		X			X		x
HIV/AIDS	X			X		X		x
4 Water Related issues								
Competition for water leading to conflicts		X	X			X	x	
Water pollution by oils	X			X		X		x
Positive impacts								

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1	Climate							
	Climate Stabilization	X			X	x		x
	Carbon Sequestration	X			X	x		x
	Rainfall production	X			X	x		X
2	Water benefits							
	Safe water provision by NFA	X			X	x		x
3	Collaborative forest Management							
	Provision of seeds	X		x		x		x
4	Socio-Economic Impacts							
	Employment	X			X	x		x
	Income generation for workers	X			X	x		x
	Aesthetics	X			X	x		x

Generally the sites present minimal impacts once the forest management plan is implemented. The recommended forestry development activities have been subjected to an assessment North Rwenzori and mitigation measures have been incorporated in the draft Forest Management Plan.

5.4. Anticipated Positive Impacts

The study identified a number of anticipated positive and negative impacts during and after the forest management plan is implemented. Among the positive impacts expected, the communities in project areas are expected to get social benefits from the project.

Employment: The project is likely to diversify community employment opportunities. North Rwenzori CFR is in a region of low incomes and a few people have access to income generating activities. The project will therefore add on the diversity of security of work. It is anticipated that about 400 locals will get labour jobs in the first three years. Communities will obtain the first priority for activities that generate an income to them such as seedlings production, land preparation and planting and maintenance of the crop under full guidance of NFA's field staff.

Capacity Building: Skills are limited in the project area and the tree planting project will offer free learning skills on job. Considerable effort will be put on skills development to enable the locals of the area start income generating activities.

Species Matching: Matching species to sites that suits them and where they can express their maximum biological potential is an important consideration that has been undertaken in North Rwenzori. For example, it has already been established that *Pinus caribaea* grows well in North Rwenzori. A soil suitability survey was carried in North Rwenzori to ascertain the soils potential of the area in relation to the intended tree species (*Pinus caribaea*-75%, *Prunus africana*-20% and other indigenous species-5% (see chapter four section 4.5)

Enhancement Measures

In addition to the already tested and proven species in the area, National Forestry Authority should periodically continue with species matching to ensure maximum tree production is achieved.

Presence of Natural habitats. North Rwenzori has a significant portion still under indigenous forest vegetation. This vegetation is vital for carbon sequestration and should be maintained. Some of the species in the natural

habitat are unique and this natural hub is a good ecological setting for many animal species. This part of the forest neighbouring Burangapass and Itojo (about 1,531 hectares) should be preserved to enhance its carbon reduction importance.

Enhancement Measures

NFA is going to ensure that the natural habitat is left intact and other indigenous trees planted to foster the existing ones. The habitat is to be protected against invasion of the exotic species which may adversely affect the regeneration of the natural forest.

NFA is to ensure that this natural habitat is surveyed, mapped and protected against fire and logging. This is aimed at fostering the regeneration of the natural vegetation in this section of North Rwenzori CFR; and

A comprehensive inventory should be conducted to ascertain the biomass, rare, unique and endangered species in the natural habitat for proper management and enhance the species protection against extinction.

Opening of Property Boundaries

The boundaries of North Rwenzori forest reserve have been opened and surveyed which has helped in removing boundary conflicts between NFA and local community and enhancing the status of the forest reserve.

Other benefits that will come with the project are namely:-

- improvement on climate change and the environment in general
- increased acreage of planted tree species country wide
- reduced soil erosion and sedimentation
- increased groundwater recharge with related increase in spring discharges and base flow, or at least more even year round flow
- preserved varied tree species
- improved peoples livelihood especially for the private plantations
- the proposed tree planting will lead to growth in the local economy and wealth creation
- the sales of carbon emissions reductions will also lead to increase household revenue
- increased income from the sale of good quality trees
- may improve the appearance of the landscape
- restoration of degraded areas
- will increase on supply of improved charcoal, construction materials and other forest products, even while protecting soil and water resources

Enhancement Measures: The majority of the residents in the project area welcomed the project as a good gesture for the entire transformation of the area. The positive impacts of the projects are very crucial to the population in order to be involved in sustainable forest management. The associated services of the project should be made known to the population in order to get confidence.

5.5. Anticipated Negative Impacts

5.5.1. Social Disharmony

There is potential for social disharmony between the local residents and immigrant project employees who may come with some new behaviours and cultures not in harmony with the norms of the local residents.

Mitigation Measures

First priority for employment should be given to the locals of the area especially those living in the sub-counties where North Rwenzori CFR falls. While employing emphasis should be placed on gender balance where by 20% of all workers should be women and this number should increase progressively to 30% in the first five years.

The Contractors and NFA should endeavour to inform and sensitize both the new employees and the residents on the importance of respecting local customs and norms. The immigrant workers should be known to the local chairmen of the area so that in case of any wrong doing they are easily tracked down.

5.5.2. Annual Fires

The history of North Rwenzori point to the fact that this area has experienced in the past a challenge of bush fires. These bush fire we often attributed to hunting activities. Fires are detrimental forest activities and cause destruction of fragile ecosystems and trees. Since this re-generation exercise for carbon sequestration involves planting of fire prone tree species like pine, there is need for proper planning and fire management. Fire in this case if not properly managed may become a danger to the whole tree planting project.

Proposed Mitigation Measures

Sensitization of the stakeholders to avoid burning bushes within North Rwenzori CFR for purposes of fire wood should be conducted continuously until positive results are achieved;

Awareness campaigns shall be conducted before and during the volatile dry season to enlist community support in fire fighting and control against illegal hunting activities often responsible for starting forest fires;

Prescribed burning shall be encouraged in the management of woodland areas, and early burning carried out to avoid extensive fire damages to the forests;

National Forest Authority in collaboration with both Bundibugyo and Ntoroko District Environment /forest office together with lower local councils should initiate a process of enacting by-laws against fire and grazing in gazetted areas;

Fire line of not less than 5 metres should be established between tree blocks and spacing between lines to ensure that in case of fire, it does not affect all the blocks;

Fire fighting equipments such as fire extinguishers and a fire brigade vehicle should be provided for the respective field stations to ensure that there is rapid response in case of fire; and

A fire fighting team should be established comprising of personnel adequately trained in fire management and the team should be adequately provided with fire fighting safety gear to minimise advances of injuries and death.

5.5.3. Loss of soil fertility

Researchers at Duke University in North Carolina² have found that planting trees to soak up carbon can have detrimental knock on effects. The team found that nutrients in the soil were also affected by tree planting. Calcium, magnesium and potassium were all depleted while sodium was enriched, meaning that plantation soil was more salty on average. All of these changes would affect the range of plant species.

Proposed Mitigation Measures

The two most common plantation species recommended are pines trees. These fast-growing species rapidly suck CO₂ out of the atmosphere, but they result in monoculture forests which support a meager range of biodiversity. Emphasis should therefore be placed on planting more indigenous species.

² James Randerson, Science Correspondent , The Guardian, Friday 23 December 2005

In addition, any woodland should not be created on soils with an organic (peat) layer of more than 50 cm. This is in accordance with the Woodland Carbon Code.

5.5.4. Illegal Cultivation and Charcoal burning

Previously, there was illegal cultivation which is said to have been responsible for the cutting down of trees in North Rwenzori CFR. The trees that were cut were then used for charcoal production as a source of livelihood for homesteads around North Rwenzori CFR. Although these illegal activities have since stopped due to strong enforcement since late 2008, there is evidence of the harm done by these activities to the forest reserve. Charcoal wastes are littered at various points of the reserve especially those areas neighbouring Itojo and Buranga pass. These wastes are not well managed may in the long run affect soil fertility thus affecting faster re-generation of North Rwenzori forest reserve.



Figure 5-1: Evidence of Illegal Charcoal Burning activities

Proposed Mitigation Measures

NFA recognizes that forest adjacent communities depend partially or entirely on North Rwenzori CFR for fuel wood and food especially from dry fallen logs, branches, slabs, leaves and farming respectively, is very vital in forest management. These communities will be allowed with supervision to freely collect wood for their domestic needs and in this process it is hoped this will deter any illegal charcoal burning activities;

The local communities and other stakeholders will be actively involved in forest management through collaborative forest management (CFM) to offer them an alternative means of livelihood to deter them from resorting again to charcoal burning;

NFA will ensure that all the remaining charcoal wastes from previous illegal charcoal burning activities is removed and disposed off in appropriate recommended areas so as to protect the soils from carbon which may affect their fertility; and

There is continuous need for strong enforcement by NFA forest rangers to ensure that illegal activities are not again attracted in future as the forest regenerates.

5.5.5. Opening and Widening of Road Access

Clearing of land for construction of access road within the forest may cause aggravated erosion by water or wind on sloping terrain when soil is left bare after the site is cleared, levelled or filled. Generally, the consequences of opening access roads persist after construction is complete. Eroded land does not regain its fertility.

Proposed Mitigation Measures

Plant fast growing vegetation species outside the constructed areas;

Construction of the infrastructure should be limited to the natural slope to avoid any cutting and where it cannot be avoided the cut slopes should be benched and planted with fast growing grass. Drainage channels should be ridged at different intervals to reduce the speed of runoff to protect the soil from being washed away by storm water; and

Animal transport such as donkeys should be experimented and adopted where successful in the steep slopes and high areas to avoid opening of access on steep slopes.

5.5.6. Loss of Vegetation

There is likely to be loss of natural vegetation, which will take place on previously vegetated land. It was noted that some clearing of vegetation for planting of new trees is being done. There is possibility of habitat fragmentation, interruption of ecological corridors and migration paths, loss of some natural species, erosion and stream sedimentation. This could lead to potential spread of alien plants in the wider area of the project influence.



Figure 5-2: Mountain range with scarce vegetation

Proposed Mitigation Measures

It is proposed that unnecessary clearing of vegetation should not be encouraged or done; and

It is advisable that there should be replanting of vegetation with appropriate species wherever the gaps occur.

5.5.7. Carbon Sequestration Capacity

No attempts have been made to measure the carbon sequestration capacity and therefore the carbon sequestration value of Uganda's forests. The carbon sink capacity of the impacted forest area for this project is, therefore, largely based on secondary information. The Centre for Social and Economic Research on the Global Environment (CSERGE, 1993) put the carbon stocking capacity of tropical evergreen forests at 144.0 tonnes of carbon per hectare (tC/ha) for total above ground biomass and 66.0 tonnes per hectare for soil and below ground or a total of 210 tonnes of carbon per hectare.

The International Pilot Project for Carbon Sequestration and Community Forestry in Chiapas, Mexico estimates that protection of threatened closed forests can prevent emissions of up to 300 tC/ha, while careful management and restoration of tropical evergreen forests could increase carbon storage by

around 120 tC/ ha. The pilot project also quotes the average cost of sequestering carbon at around **US\$ 20 per tC**.

Proposed Mitigation Measures

There should be an attempt to measure the carbon sequestration capacity of North Rwenzori CFR.

5.5.8. Occupational Health and Safety

The issue of Personal Protective equipment (PPE) for workers will be addressed both during bush clearing, planting, weeding, harvesting and application of herbicides. This is to ensure that workers are protected against accidents and death.

Proposed Mitigation Measures

Workers should be provided with adequate protection gear such as hard hats, boots, gloves, overalls, pangas and safety latches to workers working higher than 2 meters off ground level.

Workers involved in herbicides application should be trained and provided with adequate protective gears such as; eye protection, breathing protection (masks), gloves, protective clothing during spraying or handling and rubber boots.

The workers should be sensitised on the use and importance of PPE's. And there should be equally punitive measures for those who disregard their use such as warnings for first time offenders; suspensions for second time offenders and expulsion for those who make it a habit not to use the PPE's.

There should be a first aid kit on site during work. The workers should also be trained on how to use the first AID kit.

5.5.9. Establishment of Nursery Beds

A nursery bed is to be established to help in the process of regeneration of North Rwenzori forest reserve. Nursery beds require a lot of water and in some cases result in conflicts with neighbouring communities. There is also use of herbicides at nursery beds and these should be handled properly to ensure that they don't get into water points.

Proposed Mitigation Measures

NFA should locate nurseries where there is enough water and should not be in areas where they could compete with local communities for drinking and

domestic use. For North Rwenzori, NFA has already tapped water using gravity flow and put up a tank for its use as wells setting up one tap outside NFA area for community use as corporate responsibility.

There is need for NFA to train the workers applying herbicides at the nursery beds to ensure that the chemicals do not get into water points as they many result to the death of animals and aquatic ecosystems.



Figure 5-3: North Rwenzori CFR nursery with water tank

5.5.10. Solid Wastes and Timber Wastes

Solid waste generated during preparation, planting and harvesting will include: food wastes, human wastes, paper, oils, cans, polythene bags, timber pieces etc. This waste will negatively impact on the site and the surrounding environment if not properly managed and disposed off. Wastes burned onsite would generate smoke, negatively impacting ambient air quality.

Proposed Mitigation Measures

A site waste management plan should be prepared by the contractor/ NFA prior to commencement of the forest planting exercise. This should include the designation of appropriate waste storage areas, collection and removal

schedule, identification of approved disposal site, and a system for supervision and monitoring;

Special attention should be given to minimizing and reducing quantities of solid waste produced;

Combustible waste must not be burned on the site but in gazetted areas by National Environmental Management Authority;

Proper solid waste collection and storage containers should be provided in sufficient numbers, to prevent littering on the site;

All organic and inorganic materials should be placed and/or disposed off so as not to directly or indirectly impact any watercourse or groundwater. The placement and disposal of all such products and materials should be done in an environmentally acceptable manner;

Organic wastes should be separated and used as manure compost in the forest reserve while the non - bio degradable wastes should be taken to the incinerate and incinerated;

All temporary toilets should be equipped with approved septic tanks having safe drainage or with closed holding tanks that are emptied only into approved treatment plants or sewage tanker truck. All temporary toilets used on site will be placed in environmentally acceptable areas, and should be secured to avoid or minimize damage from animals or vandalism;

Waste oils, special wastes, and refuse generated during the servicing of equipment (e.g. saws for cutting trees) should be stored, transported and disposed of in accordance with regulations and Standard and Special Specifications, and should not be disposed of by dilution, burial or incineration; and

Where possible, waste oil, lubricants and other waste materials generated during the servicing of equipment and machinery should be recycled. The dumping of oil or other deleterious materials on the ground or in a watercourse is strictly prohibited.

5.5.11. Community Rights to Land and the Forests

The legal rights of the private trees farmers who planted or plan to plant in the forest reserves and on private land was reported as one of the serious concerns of the communities. This led to waste of their efforts in past planting and

reluctance of the communities to participate in this proposed project. Legal requirements should therefore be put in place to protect the interests of the tree farmers.

Proposed Mitigation Measures

To ensure that carbon is removed from the atmosphere long term, NFA should establish an agreement (Carbon Agreements) with the landholder seeking a commitment to maintain the forest for a minimum of 100 years, with a preference for 'forever' plantings.

The agreement should also specify the legal rights of NFA and the landholder to the carbon sequestered by the forests in their lifetime.

Upon acceptance of a project the landholder should sign an "Interim Agreement". During the establishment phase forest management plans and mapping should be conducted by NFA to feed into the formal Agreement which is then attached to the Title of the property.

In addition, NFA should observe the following:

1. NFA should research the site to discover the best possible mix of indigenous trees to plant.
2. NFA should source the seeds or saplings for the planting.
3. The landholder (tree farmer) should generally be responsible for the preparation of the site including soil preparation and weed control. In some cases NFA should provide some assistance with this stage.
4. NFA staff and planting contractors should supply all planting equipment (unless otherwise agreed) and plant the site.
5. Fencing or tree guards (if required) should be supplied by the tree farmer.

5.5.12. Management of Herbicides

Herbicides are to be used at the nursery bed and in subsequent spraying activities. Attempting to eradicate pests by unnecessarily high use of herbicides; easy access to products unsuitable for use by farmers and lay personnel; general ignorance of farmers regarding herbicides and hazards associated with their use; lack of adequate training and/or affordable protective gear; poor spraying equipment and missing or inappropriate labels may lead to the following effects;

- Acute toxicity, headache, nausea, vertigo, skin problems to the workers spraying.

- Chronic health effects, through routine occupational exposure such as; cancer, birth defects, suppressed functioning of the auto-immune system, reductions in nervous system functions and reproductive disorders.
- Environmental contamination of water resources and agro-ecosystems disrupting ecosystems such as; fish, frogs, animals and destabilize production.

NFA is committed to ensure that the following mitigation measures are adhered to offset the likely impacts of herbicide use.

Proposed Mitigation Measures

NFA should build a proper store for keeping herbicides and also follow the guidelines for proper storage handling and housekeeping. The herbicides should be stored in original containers with labels and kept in a safe place preferably a well built store.

Selection and application: appropriate application methods based on the target pests, the environmental setting, and prospective users will be followed. The application methods that will be used are spraying with liquid formulations using spray equipment carried by hand or backpacks or mounted on a tractor. Spot applications, where pesticides are sprayed only on affected plants, are preferred over blanket applications, where the whole field is sprayed.

Packaging requirements: Careful selection of packaging will be done. Designs and materials of packaging that withstand anticipated levels of handling, climatic conditions and prolonged storage under sub-standard conditions.

Transportation: Specific risks include storage and transport through densely populated or protected areas. A hazard assessment may be appropriate for transport of large volumes of pesticides that pose risks to human health or the environment.

Storage: The minimum requirements for such stores will be: location at safe distance from water and human dwellings; compound fenced and access limited to authorized staff; floors of impermeable concrete; ramps to contain leaking liquids; adequate ventilation; doors under lock; store keepers trained in handling pesticides; emergency shower facilities; adequate quantities of materials and protective gear to deal with emergencies. Storage in air-tight storage containers, training, and post treatment caution will be additional safer and good environmental practice.

Obsolete pesticides and their disposal: The recommended mode of disposal for obsolete pesticides is incineration at a dedicated hazardous waste incineration

plant. Risks associated with the transportation and storage of pesticides should be addressed in the Pest Management Plan. Auditing of storage facilities may be necessary as part of project preparation if procurement of large volumes is envisaged.

Training: NFA will ensure that the workers involved in the use of herbicides are adequately trained on the safe and efficient methods of spraying. Farmers will be provide with knowledge on alternative pest management approaches, cost aspects of various control options, and, where chemical control remains desirable, on the proper selection, handling and use of pesticides and their hazards.

Training and information will also be extended to farmer groups involved in the sale or distribution of pesticides within the area. Ideally, pesticide retailers should be licensed, with appropriate training as a prerequisite.

- **Protective gear:** Requirements for personal protection should be indicated on the pesticide label. Depending on the level of hazard, protective gear may range from long-sleeved shirts, long pants, and enclosed shoes, to chemical resistant gloves, footwear, headgear and apron, plus goggles and respiratory protection ranging from simple dust masks to fully enclosed gas masks.
- Protective gear also needs regular replacement. Particularly respiratory protection masks or filter cartridges need to be replaced according to recommended replacement schedules (humid and dusty environments may require daily changes).

Procurement: Any procurement or distribution of pesticide equipment should therefore take into consideration the availability of local repair services and users' knowledge of equipment. A good supply of spare parts and training of retailers to provide equipment maintenance and repair services may be necessary when selecting equipment. Tenders for procurement of pesticide equipment should set very specific and high quality standards, because otherwise suppliers may be tempted to compromise on the quality in order to table lower bids.

Monitoring: Monitoring of pesticide use is required to detect health and environmental impacts, and to provide advice on reducing risks. Depending on the circumstances, this may include monitoring of:

- appropriate use of protective gear,
- incidence of poisoning,
- pesticide residues in food crops and drinking water,
- contamination of surface water and ground water,

- environmental impact (impact on non target organisms, ranging from beneficial insects to wildlife), and
- Efficacy.

CHAPTER SIX

6. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

6.1. Concepts

The Environmental Management and Monitoring Plan (EMMP) have been developed to meet the environmental standards of the NFA and Uganda in general. All works will be performed in accordance with current environmental practices and guidelines. The EMMP has been developed with project knowledge and information available to-date. Concerns of the plan are disturbances to the biophysical and socioeconomic aspects. The basic concepts of EMMP for smooth implementation of the project include:

- Environmental monitoring to assess and monitor conditions at or in the vicinity of the project to ensure acceptable levels of disturbances are not exceeded and to ensure compliance by the NFA and project beneficiaries. Furthermore, environmental protection advice will be provided to the beneficiaries/stakeholders personnel as and when required.
- A monitoring mechanism ensures that the proposed mitigation measures are successful. The monitoring of environmental and social indicators has been developed and is compatible with existing or proposed systems
- Environmental monitoring will be done by NFA designated officer at North Rwenzori CFR station to ensure acceptable levels of disturbances are not exceeded and to ensure compliance by the contractor and his personnel. Furthermore, environmental protection advice will be provided to the North Rwenzori forest reserve by NEMA as and when required.
- The NFA designated officer should be on site during the planting especially when working in the environmentally sensitive areas.
- Monitoring process is introduced to check progress and the resultant effects on the environment as the implementation of the project proceeds although the negative impacts identified can be mitigated.
- Much of the work during the forest activities should form part of NFA inspection that will be included in monitoring.
- The planned measures indicated below should therefore be included on the list of contractual items. These should be planned and checked against their effectiveness in reducing the negative impacts/ or enhancing the benefits identified in this ESIS. The process should also include regular reviews of the impacts that cannot be contemplated at the time of doing this ESIS.
- Appropriate new actions should be undertaken to mitigate any upcoming negative effects that have not been anticipated during this EIA study.
- All mitigation measures should be implemented as described in this plan.

The cost of the EMMP is estimated to be USD 33,000 per year.

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Table 6-1: Environmental Monitoring Plan for North Rwenzori CFR

Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
Social Disharmony	Denial of Employment to the locals in North Rwenzori CFR	Development and Operation	Priority should be given to local residents	Monthly	\$2,000	Contractor National Forest Authority Bundibugyo and Ntoroko district law enforcement
	Incase of Low payment to the workers by the contractor		The contractor should have agreements with every worker and should provide adequate payment and other motivation facilities to the workers like lunch	Quarterly		
	In case of refusal by NFA for the communities neighbouring the reserve to use forest services such as fuel wood, medicinal and leaves.		Regularly incorporate the views of the neighbours The community should be allowed to have access to services in the forest except cutting of trees for timber and charcoal needs	Annually		
	Use of bad Language by workers used by the contractor		Introduce a clause in the contractual agreement to oblige the contractor to ensure ethical behaviour among its employees. The Contractors and NFA should endeavour to inform and sensitize both the new employees and the residents on the importance of respecting local customs and norms			

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
Ecological Disruption	Alien and invasive species may be attracted to North Rwenzori CFR as a result of the exotic tree species	Pre-project, development and Operation	Emphasis should be on protecting the natural habitat from any exotic species The ecology of the area should be recorded and studied to ascertain the best environment that will enhance their continued stay and minimise migration	Annually	\$4,000	National Forest Authority NEMA
	Some migratory animals may migrate as a result of the new planted vegetation					
Annual Fires	Tree species adopted in the area such as pine are often susceptible to fires	Operation	Portable fire extinguishers as well as fire hoses connected to the water supply will be installed. The extinguishers will regularly be inspected. Awareness campaigns shall be conducted before and during the volatile dry season to enlist community support in fire fighting and control Fire line of not less than 5 metres should be established between tree blocks and spacing between lines to ensure that in case of fire, it does not affect all the blocks	Monthly	\$3,000	NFA Forest supervisors Sector manager Plantation manager NFA Monitoring Team Bundibugyo and Ntoroko district Law enforcement Units Police fire brigade section
	Hunting activities have been responsible for seasonal fires in North Rwenzori			Quarterly		
	Smoking habits especially the youth who hide in forested areas to smoke cigarettes and other burned substances			Annually		
Logging by clear felling	Loss of ground cover and loosening of soils		Replanting of the harvested areas immediately after	Seasonally	\$4,000	-

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
			logging within a period of 1 year.			
Loss of Soil Fertility	Destruction of natural vegetation to give way for the planting exotic species may remove nutrient fixing plants	Development and Operation	Nutrient fixing plants like pine are recommended for planting	Quarterly	\$1,500	NFA and Ministry Agriculture, husbandry and Animal industry
			Woodland should not be created on soils with an organic (peat) layer of more than 50 cm Any spills on soil should be removed and stored in containers	Annually		
Illegal Activities	Cultivation is largely responsible for the cutting done of trees		Illegal activities should be avoided through tough enforcement	Operation		Forest supervisors Sector manager Plantation manager NFA Monitoring Team
	Charcoal burning for fuel wood		Community participation in tree planting Neighbouring communities should be allowed to freely collect h wood for their domestic needs			
Access road construction and maintenance	Excessive run off /soil erosion and soil compaction as result of leaving the soil bare after the site	Pre-project and Operation	Sufficient drainage channels should be constructed on the road side to direct runoff	Monthly	\$3,000	NFA and Ntoroko/Bundibugyo districts

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
	is cleared, levelled or filled.		water. Construction of roads along contours to minimize excessive runoff and soil erosion Use of light equipment and manual labour, during roads construction to avoid soil compaction	Quarterly Annually		
	Vegetation destruction to give way for access		Minimise destruction of vegetation			
	Minimal Noise Pollution resulting from the construction of access road especially if machinery is used		Servicing of the equipments used to open up roads to ensure that they are in good working conditions Emphasis should be put on the use of manual labour when opening the roads to minimise the use of machinery			
Vegetation Clearance	Loss of grass and tree species to give way for the planting exercise of the exotic species	Pre-project	Minimize as much as possible destruction of vegetation and rare species which may be extinct	Monthly	\$1,000	District Environmental officers-Ntoroko and Bundibugyo, NEMA and NFA
Health and Safety Impacts	Injuries and accidents during planting, weeding, cutting of trees and handling of herbicides. E.g. falling trees, pangas, snake	Development and Operation	Personal Protective Equipment (PPE) will have to be supplied to the workers involved in tree	Monthly	\$6,000	District Health Inspectors-Ntoroko and Bundibugyo

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
	bites and axe cuts etc.		<p>planting/cutting activities for safety e.g. helmets, hand gloves, Gum boots, overalls, pangas etc</p> <p>Workers involved in applying and handling herbicides will be provided with training and PPEs such as eye protection, breathing protection (masks), gloves, protective clothing during spraying or handling and rubber boots.</p> <p>Training and sensitization of workers on the importance of using PPE'S</p> <p>Presence of First Aid Kits at planting, weeding and cutting points;</p> <p>Enforcement of use of personal protective gears.</p>	<p>Quarterly</p> <p>Annually</p>		
	Improper sanitation resulting in diseases such as cholera and poor aesthetics.		<p>Provision of waste bins at working point in the forest</p> <p>Provision of temporary toilets on site and placed in</p>			

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
	Increase in HIV/Aids a result of influx of workers from other areas		<p>environmentally acceptable areas.</p> <p>Awareness campaigns conducted to educate the resident and new members of the community on the dangers of HIV/Aids</p> <p>Provision of free condoms to the workers and taught on how to use them</p>			
Water Impacts	Water competition with the local community in case of sharing water points	Pre-project, Development and Operation	NFA has constructed its own water storage tank for water use at the nursery bed	Monthly	\$2,500	DWD, NEMA and NFA
	Water Pollution caused by oil spills from axe saws and Herbicides from the nursery bed		<p>Oiling activities should be conducted in gazetted areas far away from water points</p> <p>All oil wastes spilled should be immediately removed and stored in containers and dispose off according to the set environmental standards</p> <p>NFA is to carry out training and careful selection of herbicides and application techniques in order to minimize impact on</p>	<p>Quarterly</p> <p>Annually</p>		

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
			beneficial organisms, humans and the environment. When selecting herbicides, NFA will use a product that: (a) is effective in controlling the pest; (b) is highly specific to the pest and does not significantly affect beneficial organisms; (c) has a low human toxicity.			
Wastes	Oil wastes from axe saws and other equipments may affect water aquifers and soil	Pre-project, Development and Operation	The developer should ensure clean up and proper disposal of any used oil and chemicals that may result to oil spills at the site. Oiling should be restricted to a particular area with fill and leak prevention measures through routine checkup of the oil tanks to detect leakages and standard safety measures such as impervious lining.	Monthly Quarterly	\$5,000	Ntoroko and Bundibugyo district health, environment offices, NFA and NEMA
	Solid Wastes such as timber wastes, domestic wastes, polythene and faecal materials		All organic and inorganic materials are properly stored on site and/or disposed off according to environmentally acceptable standards. Provide waste bins at various	Annually		

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
			<p>planting sites and Prompt collection of these wastes</p> <p>Organic wastes will be separated and used as manure compost</p> <p>Non - bio degradable wastes e.g polythene should be incinerated or recycled for further use</p> <p>All temporary toilets should be equipped with approved septic tanks having safe drainage or with closed holding tanks that are emptied only into approved treatment plants or sewage tanker truck</p> <p>All temporary toilets used on site will be placed in environmentally acceptable areas</p>			
	<p>Herbicides especially at the nursery beds may affect ground water.</p>		<p>Herbicides should be stored properly, transported and disposed of in accordance with regulations and Standard and Special</p>			

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Project Impact	Components and Implications	Schedule	Mitigation Measures	Frequency of Monitoring	Cost of Monitoring and mitigation (USD)	Responsible Party for Monitoring
			Specifications, and should not be disposed of by dilution but in gazetted landfills.			
Loss of forest services	Fire wood will no longer be accessible to the community with out permission	Development and Operation	Neighbouring communities should be allowed to freely collect wood, medicinal plants and hunt in the reserve but responsibly in order to stop fires	Quarterly	\$1,000	NFA sector Agency
	Medicinal plants and leaves will be restricted			Annually		
	Food from the reserve such as game will be restricted since hunting wont be cordoned					
Physical-cultural resources such as; archaeological sites, historical sites and remains e.g. graves.	There were no such resources identified but in case of chance finds necessary measures should be undertaken	Operation	Stop the construction activities in the area of the chance find; Delineate the discovered site or area; Secure the site to prevent any damage or loss of removable objects; Notify NFA who in turn will notify the responsible local authorities and the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage immediately	seasonally	-	Local authorities and the Department of Museums and Monuments of the Ministry of Trade, Wildlife and Heritage.
Total					- USD 33.000	-

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6.2. Environmental Awareness Training Plan

For the EMMP to be implemented, it is imperative that an environmental awareness training plan be extended to all stakeholders/beneficiaries during the implementation of North Rwenzori forest reserve management plan development. The training will be as and when required in the field and may consist of formal and informal training techniques by an environmental officer/monitor or his/her designate on behalf of the NFA. This will help in ensuring that environmental issues associated with the FMP are made known to the stakeholders/beneficiaries and NFA staff that would be in charge and responsible to implementing them. The content of the training will include the following:

- Aware of the environmental issues associated with forestry management and development in the North Rwenzori sector forestry reserve project area;
- Understand their responsibilities with respect to these issues;
- Understand requirements for protection of the environment, best management practices and avoidance measures; and
- Aware of the relevant Acts, Regulations and Guidelines.

CHAPTER SEVEN

7. RECOMMENDATIONS AND CONCLUSIONS

7.1. Recommendations

Based on the analysis of the findings of EIA from the previous sections, the following recommendations are presented for consideration:

- 1) Generally, the impact on the environment of the North Rwenzori central reserve forest development project implementation will be positive, and particularly in regards to the improvement of forestry resources and climate for the entire country.
- 2) Some negative impacts will occur during the implementation of the EMMP as moderately significant and can be mitigated and monitored.
- 3) An environmental management and monitoring plans have been proposed with this aim. The project will also have positive spin-off effects on NFA and plantation farmers and CFMs.
- 4) The North Rwenzori forest project should be allowed to be implemented if the identified issues are addressed.
- 5) The North Rwenzori forest monitoring and management plan design has been incorporated appropriate environmental mitigation measures that are practicable and achievable.
- 6) Regular consultative meetings of all stakeholders should be convened to review and address any concerns that may arise during the implementation of North Rwenzori CFR management plan period.
- 7) In the view of the anticipated impacts to accrue to the communities around North Rwenzori forest reserve and the nation as a whole, if the proposed mitigation measures are implemented, the overall negative impacts of the project will be minimised.
- 8) This study recommends that the program be approved by NFA as North Rwenzori CFR Environmental Monitoring and management plan for implementation.
- 9) The importance of the Mount Rwenzori reserves is considerable as described in the forest management plan. Provided that the grassland areas in the valleys are retained as they are, and the woodlands improved by the enrichment planting which has already begun, the current management proposals for North Rwenzori CFR should not be detrimental to the fauna and flora of the area.
- 10) Nevertheless, increasingly common changes in land use in these areas,

partly through unsustainable (and probably illegal) charcoal burning, and clearance for crops or better grazing lands, means that these forest reserves will become increasingly important as refuges, where those species that do not survive such changes can continue to exist. It is probable that at least a half of the bird species, together with all of the larger mammals, fall into this category.

- 11) Good relations with the neighbouring communities, supported by active patrols to contain illegal activities, are needed for this.
- 12) In case of chance finds of physical cultural resources, planting activities will stop in that area and the area will be delineated and the relevant authority notified by NFA.
- 13) Ensuring that the general character of these woodlands is maintained is also valuable for the biodiversity that they hold, whereas their destruction would certainly entail very substantial loss of biodiversity.

7.2. Conclusion

As a requirement in the National Environment Act, developers of projects in this case NFA for which EIA has been carried out will carry out periodic monitoring to ensure that the mitigation and environment management measures identified and recommended through the EIA are adhered to and implemented. It is further required, under the law, that such developers keep and maintain monitoring records which should be made available during inspections and that monitoring reports should be submitted to the appropriate authorities on an annual basis.

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ANNEXES

Annex 1: ToR for the EIA for the Proposed North Rwenzori CFR

1.0 INTRODUCTION

1.1 Background

North Rwenzori Central Forest Reserve lies across the parishes of Itojo, Karugutu and Masandana of Ntoroko district as well as Kasitu and Burondo parishes of Bundibugyo district. The Forest Reserve covers about 3,531.8 hectares out of which 26.6 percent fall within Bundibugyo district and 73.4 percent fall within Ntoroko district.

North Rwenzori was first gazetted under Legal Notice number 275/1940. Various amendments were made under Legal Notice numbers 245/1947 and 41/1948 which were consolidated in the Revised Laws of Uganda, 1951 (p. 2135).

The Northern and Southern boundaries of North Rwenzori are the rivers Sempaya and Nyakibale respectively. On the last, the boundary extends to the Fort Portal-Bundibugyo road which is the boundary from the Nyakibale River to the Ministry of Works road camp near the top of the Buranga pass. The western boundary follows approximately the crest of the north Rwenzori hills from the source of the Nyakibale River. The boundary then follows the Mongiro River from its source to the main road south of Sempaya and from there it follows sections of the road to the Sempaya river.

1.2 Project description

The project is to carry out afforestation activities in North Rwenzori CFR with the main objective to contribute to sustainable management of environmental and natural resources at national, district and community levels. The project aims at establishing 2,000 hectares of plantation of exotic (pine) and indigenous tree species including nursery establishment and associated water supply infrastructure on the grassland and degraded areas within the CFR using a community co-management model and with a purpose to sale carbon credits from the project in future. NFA is now in the process of implementing Afforestation activities in North Rwenzori CFR. The activities under this FMP may have negative environmental impacts; hence the need for an EIA. NFA therefore is to carry out an EIA for the North Rwenzori CFR activities to ensure sound forest management planning and implementation.

Some parts of the FR have been licensed to private tree growers, and are growing pine and eucalyptus whereas some tree farmers have not yet even started growing anything.

1.3 Purpose and objective of the TOR

These TOR has been prepared after undertaking a scoping exercise which have also been attached, and constitute a part of this report. The EIA report shall be prepared in accordance with these Terms of Reference and the requirements prescribed under the NEMA Guidelines, 1997 and NEMA Regulations, 1998. As a result, Urban Research and Training Consultancy Ltd (URTC) has been contracted to carry out an Environmental Impact Assessment (EIA) for the proposed North Rwenzori Central Forest Reserve management plan on behalf of the NFA.

The overall objective of the EIA is to ensure that implementation of the proposed North Rwenzori Central Forest Reserve management plan is done in such a way that it does not impact negatively to the host environment. The specific objectives of the EIA are:

- a) To identify would-be environmental and socio-economic impacts of the proposed forest management plan and recommend appropriate mitigation measures;
- b) Evaluate the likely beneficial and adverse environmental impacts of the Kasagala CFR planned activities, with a view of eliminating, where possible or minimizing the negative impacts while optimizing the positive impacts
- c) To carry out consultations with identified relevant stakeholders, local authorities and the community around the proposed project area with a view to getting their thoughts on the likely impacts of the management plan implementation;
- d) To carry out a detailed study on the activities to be conducted during pre-plantation, plantation and post plantation phases of the projects with a view to establishing their likely impacts; and
- e) To propose practical mitigation and an environmental management and monitoring plan.

1.4 Scope of the Environmental Impact Assessment (EIA) Report

NFA will prepare and submit an EIA report that examines the environmental and socio-economic effects of the planting, weeding and maintenance of the North Rwenzori Central Forest Reserve located in both Bundibugyo and Ntoroko Districts. The study area for the EIA report will include the Project Area and associated infrastructure, as well as the spatial and temporal limits of individual environmental components outside the Project Area boundaries where an effect can be reasonably expected.

1.5 Tasks and Methodology

The Environmental Assessment proposes will use several methods to identify key significant environmental issues and assess the potential impacts of the proposed project on the environment.

- Description of the projects and their environmental baseline settings. This will include;, location, physical characteristics, ecological, religious and socio-cultural settings;

- Review of Ugandan policy, legal and institutional framework and requirements as regards to medical facilities. These will be reviewed in order to ensure compliancy and that necessary measures are included in the forest management plan
- Review international protocols and instruments regarding carbon emissions reductions, rights of local communities, human rights, etc. that impinge on the carbon component of the management plan.
- Provide a brief overview of the relevant World Bank Safeguard Policies, potentially including Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), Forests (OP 4.36), Involuntary Resettlement (OP 4.12), Pest Management (OP 4.09) and Physical Cultural Resources (OP 4.11).
- Assess the applicability (triggering) of World Bank Safeguards to the proposed activities. For policies that are “triggered”, explain how they are triggered and identify necessary mitigation measures/responses
- Explore possibilities for carbon leakage by displacement of activities
- Discussion of the site selection process for various project components including: the factors that were considered in evaluating and delineating the various zones of production to determine the preferred locations for the each zone;
- Citing factors versus existing activities or other resources and the need to either modify /adjust the forest management plan /development or relocate the existing activity; and
- Establish how stakeholder consultation input, and technical, geotechnical and environmental criteria were considered during decision-making for the North Rwenzori forest management plan.
- Identification of forest activity impacts direct that are anticipated, including cumulative consideration;
- Undertake soil testing for species matching;
- Suitable maps, charts and other illustrations will be included to identify the components of the Project, the existing conditions, and the environmental and the socio-economic implications of the development.
- Liaise, consult and hold meetings with relevant Lead agencies, stakeholders, including, potentially affected persons, to obtain their views and suggestions regarding the environmental and social impacts of the proposed project;
- The EIA report will include issues raised during the public consultation process. It will also identify the environmental and other specific regulatory approvals, policy directives and legislation that are applicable to the Project at the local government and central government levels.
- Discuss the need for the Project and the potential alternative of not proceeding with it. Include the following: an analysis of the alternative means of carrying out the project, including need for the project, alternate projects and scope of the project (major components included and excluded). For the project components, include a comparison of their environmental and technical performance potential and other relevant variables;

- Rationale for the decisions made by the NFA about project component alternatives including how environmental, socioeconomic, community information and elements of the forest management influenced project design. Discuss the status of any ongoing analyses, including a discussion of the options not chosen and the rationale for their exclusion;
- Evaluate alternative technologies for the planned activities and provide information on the consideration of alternatives to avoid and/or minimize the potential adverse environmental impacts on the environment;
- contingency plans if major project components or methods prove infeasible or do not perform as expected;
- The implications of a delay in proceeding with the project, or any phase of the project.
- Proposed management plan(s), mitigation measures and monitoring and residual effects.
- Prepare and environmental management and monitoring plan

The proposed study will be done in an estimated 1.5 man-months comprising of different specialists as indicated below.

2.0 PROPOSED ESIA TEAM

In order to successfully address the issues identified above, the proposed team includes two certified EIA specialists one of whom will be the team Leader of the EIA team/practitioners.

1. Dr. Charles Koojo Amooti (CEP)-Team Leader/EIA Specialist
2. Mr. Amadra ori-Okido-Forest Specialist
3. Mr. Charles Kiiza - Soil Specialist
4. Mr. Moses Oluka(CEP)-Socio-economist
5. Dr. Robert Kityo Robert-Biodiversity Expert
6. Prof. Derek Pomeroy-Ecologist

Associate professionals

- 1 Ms. Jalia Kiyemba-Terrestrial Ecologist
- 2 Mr. Wafula Samuel David-Land use Specialist

Annex 2: Summary of Project Costs (in US\$ million equivalent)

Table 1: Project Cost by Component

Project Cost by Component	Total	Year 1	Year 2	Year 3
MSW	6.500	4.819	1.344	0.337
Petroleum & Gas Sector	1.700	0.575	0.515	0.610
NEMA Monitoring/Enforcement	2.100	0.912	0.631	0.557
NFA Tree Planting	3.300	1.690	0.885	0.725
Contingencies	1.400	0.823	0.347	0.230
Total Project Costs - Incremental	15.00	8.819	3.722	2.459
Total Project Costs - Cumulative		8.819	12.541	15.000
Total Project Costs - Cumulative		58.8%	83.6%	1000.0%

NB: Figures may not add due to rounding

Source: Project Paper on a Proposed Additional Credit EMCBP II, July 17, 2008 -
Report No. 44024-UG

Annex 3: Detailed Project Costs

Budget request from EMCBP/II for site 1 increasing forest cover, protecting Biodiversity and sequestering Carbon dioxide in North Rwenzori

Out put	Activity	Units	Quantities	Rate(US dollars)		Funding source
Baseline data on existing woody stock established	Conduct baseline survey for the project sites (North Rwenzori= 2,000ha)	Nos	1	25,000	25,000	
Project design and documents prepared	Preparation of project design documents	Nos	1	25000	25,000	
Stakeholder capacity to participate in forest management and equitable use forests strengthened	Strengthen capacities of community groups in each central forest reserve in order to participate in forest management	Nos	6	5000	-	
Management plans prepared	Management plan for North Rwenzori Central Forest Reserve completed	Nos	1	5000	5000	
Planning Materials raised	Procure assorted indigenous seed to raise 750,000 seedlings for planting (500 ha)	kg	500	180		
	Procure assorted exotic seed to raise 3 million seedlings (1500ha)	kg	120	1500	180,000	-

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	Procure potting material for nursery work	kg	14,820	5	74,100	-
	Local contract to raise 2,25million seedlings of exotic species	Nos	2,250,000	0.12	270,000	-
	Local contract to raise 750,000 seedlings of indigenous species	Nos	750,000	0.20	150,000	
	Establish and maintain a nursery site and develop water supply system for North Rwenzori CFR	Nos	1	25,000	25,000	
	Seedlings Transport	Nos	420	200	-	84,000
Planting and weeding	Site clearing and ground preparation for plantation development	Ha	2000	100	200000	-
	Lining, pitting and planting for plantation development	Ha	2,000	70	140,000	-
	Weeding year 1 plantation development	Ha	2,000	150	300,000	
	Weeding year 2 plantation development	Ha	2000	150	300,000	-
	Weeding year 3 plantation development	Ha	2,000	80	160,000	
Protection	Protection against fires and animal damage for three years	Ha	2,000	30	60,000	-
Purchase of tools and equipment maintenance	Assorted tools(pangas, hoes, bow saws, axes, wheel barrows)	Nos	20,000	3	-	
Information, education and	Develop and disseminate information packages	Nos	2	20,000	-	40,000

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communication						
Forest boundaries opened, clearly marked and maintained	Resurvey and reopen forest reserve boundaries	Km	72	300	21,600	-
	Mark Forest Reserve boundaries with permanent features	Km	72	450	32,400	-
Administration and human resource	Personnel	Man-month	96	331	31,776	31,776

EMCBP II Additional Financing - Appraised Activities (5 June 2008)

Part B					Year 1	Year 2	Year 3
4.0.0	NFA Tree Planting and Carbon Trade			\$3,000,000	\$1,690,000	\$885,000	\$725,000
4.1.0	Central Institutional Strengthening (Carbon Trade)						
4.1.1	Staff Training and Workshops incl. External travel	S	\$100,000		\$30,000	\$40,000	\$30,000
4.1.2	Vehicles (2)	EQ	\$80,000		\$80,000		
4.1.3	Monitoring (fuel and domestic travel)	OP	\$60,000		\$20,000	\$20,000	\$20,000
4.2.0	North Rwenzori Tree Planting (2000 ha)						
4.2.1	Baseline Surveys and Planning	S	\$50,000		\$50,000		
4.2.2	Seeds + Potting Material	EQ	\$255,000		\$225,000		
4.2.3	Boundary Marking	CW	\$35,000			\$35,000	
4.2.4	Operations	OP	\$1,000,000		\$200,000	\$400,000	\$400,000
4.2.5	Kiln Materials and Assorted Tools	EQ	\$100,000		\$50,000	\$50,000	
4.2.6	Boundary Marking	CW	\$65,000			\$65,000	
4.2.7	Operations	OP	\$650,000		\$130,000	\$260,000	\$260,000
4.3.0	Administrative Support						

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4.3.1	Accounting System	EQ	425,000		\$25,000		
4.3.2	Software Licenses	EQ	\$5,000		\$5,000		
4.3.3	Audits	S	\$45,000		\$15,000	\$15,000	\$15,000

Source: Project Paper on a Proposed Additional Credit EMCBP II, July 17, 2008 - Report No. 44024-UG

Annex 4: North Rwenzori CFR Soil Profiles of Different Site Zone

Sample	pH	N	OM	Av.P	K	Ca	Mg	Na	Sand	Silt	Clay	Textural Class
		%	Mgkg ⁻¹	cmol/100g				%				
Buranga Pass (6); 0-20 cm	5.80	0.23	6.22	2.18	0.48	4.40	1.70	0.06	62	13	25	Sandy clay loam
Buranga Pass (6); 20-40 cm	4.86	0.18	4.06	31.42	0.17	3.08	0.74	0.06	65	15	20	Sandy clay loam
Karugutu Pine; foot slope; 0-20 cm	5.19	0.13	3.89	171.36	0.25	2.20	0.52	0.03	66	12	22	Sandy clay loam
Karugutu Pine; foot slope; S/C 20-40 cm	4.90	0.11	3.67	198.74	0.11	1.76	0.42	0.03	64	13	27	Sandy clay loam
Karugutu mid slope; 0 -20 cm	5.68	0.27	8.00	178.25	0.56	5.72	1.30	0.05	58	8	34	Sandy clay loam
Karugutu mid slope; S/L; 20 -40 cm	5.47	0.22	7.00	206.47	0.39	4.84	1.80	0.04	64	9	27	Sandy clay loam
Karugutu summit; S/L; 0 -20 cm	5.38	0.18	6.22	110.38	0.39	3.96	0.96	0.05	64	12	24	Sandy clay loam
Karugutu summit; 20 -40 cm	5.02	0.17	4.41	68.88	0.17	3.52	0.86	0.06	65	11	24	Sandy clay loam
Itojo; valley; 0-20 cm	5.55	0.20	7.56	2.35	0.34	5.72	1.40	0.66	56	13	31	Sandy clay loam
Itojo; valley; 20-40 cm	5.47	0.18	4.97	0.50	0.11	4.40	1.50	0.07	55	22	23	Sandy clay loam
Itojo; mid slope; 0-20 cm	5.15	0.18	12.97	34.44	0.14	2.64	0.50	0.06	52	15	33	Sandy clay loam
Itojo; mid slope; 0-20 cm	5.03	0.17	4.15	4.70	0.11	2.86	0.70	0.07	54	12	34	Sandy clay loam
Itojo; summit; 0-20 cm	5.12	0.17	4.67	2.02	0.11	2.64	0.62	0.05	62	10	28	Sandy clay loam
Itojo; summit; 0-20 cm	4.70	0.13	1.47	3.19	0.11	1.54	0.35	0.06	63	12	25	Sandy clay loam
Critical values	5.5	0.20	3.0	15	0.22	4.0	0.5	<1.0				

ANNEX 5: Lists of People Consulted

30th-06-2011

CONSULTATIVE MEETING HELD AT KARUGUTU
SUB COUNTY ON THE SCOPING OF NORTH RWENZORI
CENTRAL FOREST RESERVE

NAME	SIGNATURE / POSITION
1. MUDHALYA GRACE	FIS NFA N/R.
2. JOASH T.M. LOMBO	CFM/RMUFA DIRECTOR
3. RWABUKINGI LAWRENCE	C/man L. CI KIBW
4. MAATHE THADDEUS	I TO SO L. CI
5. BAMBWENDYALE BAMBWALE N. FRANCO	G/secretary IIBW
6. TEMBO JOH	- Karugutu West.
7. SHADIBA SEREMITH	IBANDA I
8. MUGABE ENOCK	Kyabandara II
9. KYAMUHANGIRE YUSUFU	MUSEPH. MUSANDAMATI VILLAGE
10. MWAYIBWA EZEKYERI	M.E. KATAMBI
11. KULE BENEFASI	Kule - Kyamutema
12. KATAITO JOHN	JK C/man L. CI Ibandara II
13. KISEMBO WILSON	WILSON C/man L. CI KAWANBATA
14. BATYEBUZA IBRAHIM	IBRAHIM C/person L. CI KAKUSA
15. SIKEBYACHO AINECH	AINECH Ag s/c chief, Nomsel.
16. SASU L. FRANCO	AINECH nomber
17. DR CHARLES BAMBWALE	BAMBWALE nomber DELICIOUS LEADER
18. BAMBWALE M. MOSES	MOSES C/person Kyabandara III
19. JIMMY PURUSA	PURUSA C/man Kyabandara I
20. BABUNU JONETHANE	BABUNU Bukonzo I
21. MUGABE ZACKARI	MUGABE C/man KATAMBI
22. BAMBWENDYALE R. ENKANYEM	ENKANYEM C/person KISIINYA
23. MASEREKA BRIAN	BRIAN church

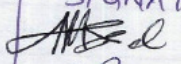
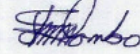
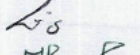
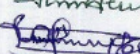
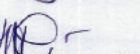
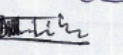
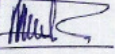
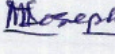
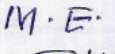
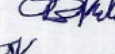
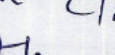
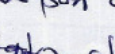

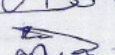

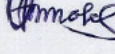
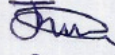
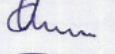
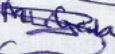

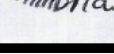


CONSULTATIVE MEETING HELD AT ITOJO ON
SCOPING OF NORTH RWENZORI CENTRAL FOREST RESERVE
30th - 06-2011

NAME	SIGNATURE
1 MUDHALYA GRACE.	
2 TIBENDERANA MOHAMMED.	
3 SAKIMU KIDMA	
4 KABUGHO GORETO	K. G.
5 KJANZULIRO ALEN	K. A.
6 Bwambale Eziromi	
7 Kagigazi mugu	
8 KATETA YOSOFU	
9 Bwambanga Dudi	
10 MATE KUYA Bwana	
11 MATHURGU	
12 JENEFA	
13 JOSINTA	
14 KYAKIMWA	
15 KABUGHO AGNESI	K. A.
16 YMASIKA GRACE	
17 NYABACE FAYIS	
18 Edivona Thungu	
19 mbambu ES. ter.	
20 WYEBAHAGA mas. ba	
21 ABABARA	
22 M agureti	
23 KABUGHO	
24 YAKON. YA	
25 FIRIPO	
26 MIBIRI	
27 MUMINDO ERIC (PERSALHE NYAKAOKI M ENZO)	
28 NANIMONGA AMOS (MAM KABASINDAGI)	0789484036

C/m Itojo FC
0779781370

30th-06-2011

CONTINUATIVE MEETING HELD AT KARUGUTU
SUB COUNCIL ON THE SCOPING OF NORTH RWENZORI
CENTRAL FOREST RESERVE

NAME	SIGNATURE / POSITION
1. MUDHALYA GRACE	 FIS NFA M/R.
2. JOASH T.M. LOMBO	 C.F.M./R.M.U.F.A. DIRECTOR
3. RWABUKINGI LAWRENCE	 C/Man L.C.I KIBWA
4. MAATHE THADDEUS	 I.T.O.S.O.L.C.I
5. BAMBUNDYALE BAMBAMBALI FRANCIS	 G-Secretary I.I.S.O
6. TEMBO JOH	 - Karugutu West.
7. SHADIBA SHERMIAT	 IBANDA I
8. MUGABE ENOCK	 Kyabandara II
9. KYAMUHANGIRE YUSUFU	 MUSEPH. MUSANDAMATI VILLAGE
10. MWAYIBWA EZUKYERI	 M.E. KAKAMBI
11. KULE BENEFASI	 Kule - Kyamutema
12. KATAITO JOHN	 JK C/Man L.C.I Ibanda II
13. KISEMBO WILSON	 JK C/Man L.C.I KAWAMBATI
14. BATYEBUZA IBRAHIM	 JK C/person L.C.I KAKAMBI
15. SIKEBYAKHLO AINEKA	 Ag s/c Chief, Nombe
16. SASU L. FRANCO	 nombe RELIGIOUS LEADER
17. DR CHARLES BAMBUNDYALE	 C/person Kyabandara III
18. BAMBAMBALI M. MOSES	 C/Man Kyabandara I
19. JIMMY PURUSA	 Bukonzo I
20. BABUNU JONATHAN	 C/Man K. TOMATI
21. MUGABE ZEKERI	 C/person KISIINYA
22. TIBAMBUNDYALE R. ENKANYEM	 Church elder
23. MASERUKA BRIAN	 Church elder

27	BAHAMWI III	MESHACH		
29	28 WBUZA	Waya	IBANDA III	
30	29 Ezekiel	Sawani	"	Ruwani
31	30 Tinkasimire	Idirisa		
32	31 Adalighane	Isaa		
33	32 KISALGA	ZAMELI	KIBOMA II	Mhuf
34	33 BIRUNGO	MOSES	KYAMUSHEMA LCI	Burungu
35	34 BWAMBARE	ROBERTI	KYAMUSHEMA LCI	Burungu
36	35 Muhumuzi	John	Kyabandara	Jilingo
37	36 BIHAMBA	HERIZOM	NYAKATOKI	Jilingo
38	37 MAGHALITA	ARAMADHAN	MURAMBE I	Mhuf
39	38 Mumbere	Clouis	Kyabandara	Mhuf
40	39 Balyagha	moses	C/PLCI NYAKATOKI II	Jilingo
41	40 MPAHE	MUNENE J.	CIMAN MUBANDAMA III	M. ngan
42	41 TINAMBI	BENEZERI	C/PERSON LCI	Myabikuyu
43	42 Bukombi	Yozefu	Nyakatote	Bukombi
44	43 BWAMBARE	YOSIYA	MUBANDAMA I LCI	Jilingo
45	44 Censajwiso	Alice	Karugutu	Karugutu
47	46 PASITO			
48	47 Kulla Semire	Edward	Karugutu	Rakigwa
49	48 RUSA	DANIEL		RUSA
50	49 Muhuka	Domago		
51	50 Rexina	BIRI		
52	51 Kabugho	MARY		
53	52 MUTHANWA	B-BE		

L.C.III CHAIRPERSON
 KARUGUTU SUB-DISTRICT
 180 JUN 2011
 KARUGUTU
 KARUGUTU DISTRICT