NILE BASIN INITIATIVE
NILE EQUATORIAL LAKES SUBSIDIARY ACTION PROGRAM
KAGERA RIVER BASIN MANAGEMENT PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND DEVELOPING PRELIMINARY RESETTLEMENT POLICY FRAMEWORKS (RPFs) FOR FOUR (4) PROPOSED SMALL MULTIPURPOSE DAMS AT BIGASHA, BUYONGWE, KARAZI AND TABA-GAKOMEYE IN THE KAGERA RIVER BASIN

Burundi, Rwanda, Uganda and Tanzania

NBI/NELSAP/KAGERA/RFP02/2011

FINAL ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA)

BIGASHA DAM

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FINAL REPORT

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ADB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
BP	Bank Procedures
CAO	Chief Administrative Officer
CBD	Convention on Biological diversity
CBOs	Community Based Organizations
CDO	Community Development Officer
CEM	Contractor's Environmental Officer
CFCs	Chlorofluorocarbons
CFRs	Central Forest Reserves
CH_4	Methane
CLO	Community Liaison Officer
CO	Carbon monoxide
CO_2	Carbon dioxide
DBH	Diameter Breast Height
DDHS	;??
DEO	District Environnement Officier
DIZ	Direct Impact Zone
DLG	District Local Government
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EA	East Africa
EAC	East African Community
EALA	East African Legislative Assembly
EIS	Environmental Impact Study
EMS	Environmental Management Specialist
ENSAP	East Nile Subsidiary Action Program
ESIA	Environmental and Social Impact Assessment
ESIS	Environment and Social Impact Statement
ESMP	Environmental and Social Management Plan
FSL	Full Supply Level
GFS	Gravity Flow Scheme
GHG	Green House Gases
GIS	Geographical Information System
GPS	Global Positioning System
HCFCs	Hydrochlorofluorocarbons
HIV	Human Immune-deficiency Virus
ICT	Information and Communication Technology
IDEAH	Integrated Development Alliance for Health
INDIZ	Indirect Impact Area
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
KRBMP	Kagera River Basin Management Project
LC	Local Council
LVBC	Lake Victoria Basin Commission

MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MEMD	Ministry of Energy and Mineral Development
MoLG	Ministry of Local Government
MoWT	Ministry of Works and Transport
Ms-Excel	Microsoft Excel
MTTI	Ministry of Trade Tourism Industry
MWE	Ministry of Water and Environment
MWL	Maximum Water Level
NBI	Nile Basin Initiative
NELSAP	Nile Equatorial Lakes Subsidiary Program
NEMA	National Environment Management Authority
NFA	National Forestry Association
NGO	Non-Government Organization
NLO	National Liaison Officer
NOx	Nitrogen Oxide
NWSC	National Water and Sewage corporation
OD	Operational Directives
OHS	Occupation Health Safety
OM	Operational Manual
OP	Operational Policies
PA	Protected Areas
PAPs	Project Affected Persons
PMTCT	Prevention of Mother to Child Transmission
PWDs	People with Disabilities
RAP	Resettlement Action Plan
RPFs	Resettlement Policy Frameworks
SAP	Subsidiary Action Program
SEO	Senior Environment officer
SO_2	Sulphur Oxides
SPSS	Statistical Package for Social Scientists
STDs	Sexually Transmitted diseases
STI	Sexually Transmitted Infections
SVP	Shared Vision Program
TAC	Technical Advisory Committee
TASO	The Aids Support Organization
ToR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UDHS	Demographic and Health Survey
UDHS	Uganda Demographic and Health Survey
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commission for Refugees
USD	United States Dollar
UTM WGS	Universal Traverse Mercator World Geodetic System
UWESO	Uganda Women Effort to Orphans
VCT	Voluntary Counselling and Testing
VOCs	Volatile Organic Compounds
WGS	World Geodetic Systems

EXECUTIVE SUMMARY

1.0 Introduction

The Kagera River Basin Management Project (KRBMP) objective is to establish a sustainable framework for the joint management of the water resources of the Kagera River Basin and prepare for sustainable development investments, in order to improve the living conditions of the people and to protect the environment.KRBMP and the Uganda Government selected Bigasha dam site for the development of a multipurpose reservoir on the Bigasha River. The Bigasha River feeds into the Kagera River downstream.

The KRBMP identified Newplan Consulting Engineers and Planners to undertake an Independent Environmental and Social Impact Assessment (ESIA) of the Bigasha dam site. The purpose of the ESIA study was to assess the technical, social, economic, financial and environmental viability of the multipurpose dam project; evaluate the environmental and social aspects of the multipurpose dam site and prepare a Preliminary Resettlement Policy Frameworks for the dam site. The study involved consultations and data gathering activities at regional, district and community levels.

Newplan embarked on the study in January 2012. The first outcome of the study was the **Inception Report** which was submitted in March 2012 two months after the start of the study The second outcome of this study was the **Interim Report** which was also submitted in June 2012 4 months after the start of the study. The Interim Report was submitted in three volumes namely, the scoping report, the baseline report and the Preliminary Resettlement Action Plan for Bigasha.The **Scoping Report** provided information on environmental and social impact scoping results with the relevant annexes. The Scoping Report further analyzed possible project alternatives and identified any other past, existing or planned projects in the area. The **Baseline Report** provided key findings of the baseline environmental and social findings in and around the dam site. These included data on fauna and flora; fish and invertebrates; hydrology and water quality; community livelihoods; settlements and infrastructure; archaeology and culture and dam safety. The consultation and public participation process invoked was also described. The **Preliminary Resettlement Action Plan** (RAP) provided a Preliminary Resettlement Policy Framework for the Bigasha dam site.

This is the third report **(A3 Draft ESIA and RPF Report**) which is submitted 8 months after start of the study in accordance with the Terms of Reference. This report provides identified potential positive and negative environmental and social impacts of the project on the social and biophysical environment prior to, during and after infrastructure construction including those of the different project alternatives. The report then proceeds to propose measures that will enhance positive impacts of the project and those that will mitigate, minimize, reduce or eliminate negative impacts of the project. It further provides Environmental Flows, Environmental and Social Management Plan (ESMP) and the Resettlement Policy Framework

(RPF) for the Bigasha dam with relevant annexes.

2.0 Overall objective of the study

The objective of the study was to undertake an environmental and social impact assessment of the proposed Bigasha **multipurpose** dam project. It was to identify possible positive and negative impacts on the social and biophysical environment prior to, during and after infrastructure construction. The study was also to prepare an Environmental and Social Management Plan and a Resettlement Policy Framework for the dam site. The study was to coordinate closely with the Feasibility Study Consultancy of the same project

3.0 Location of the project and components

The Bigasha dam site is located in the Kagera River Basin which is found along the upper Nile Equatorial Lakes Region in a zone west and southwest of Lake Victoria between the latitudes of 0°45' and 3°55' South and longitudes of 29°15' and 30°50' East. The Kagera River basin has a total area of about 60,000 km^2 which is distributed among Burundi (22%), Rwanda (33%), Tanzania (35%) and Uganda (10%). Most of the basin lies between elevation 1,200 and 1,600 m.a.s.l. and consists largely of woody and grassland savanna. The mountainous areas in the west and north-west mark the Nile-Congo Divide which rises to an altitude of more than 2,500 m.a.s.l. The area of direct impact of the project lies within the villages of Katyazo, Nyakabingo and Kigando in Isingiro District of Western Uganda. The area of indirect impact is the area surrounding Ngarama Sub County in Bukanga County and other neighbouring areas in Isingiro District. The Bigasha dam site is located on the Bigasha River at coordinates E 266017.80, N9895130.00 (UTM WGS 1984 Zone 36S). The Bigasha valley project area is drained by two seasonal streams, the Kagingo and the Nyakabingo streams which feed into the Bigasha River. The Bigasha dam area lies close to several tourist attraction spots such as Lake Nakivale, River Kagera, River Rwizi, Nsongezi Rock Shelter, Mburo National Park, Lake Mburo, Oruchinga and Misyera which border Ngarama, Kashumba in Isingiro district. River Bigasha is a seasonal river which completely dries up during the dry season.

The project consists of the following components:

- A **12m dam** with reservoir storage of 6.41km^2 and a surface area of about 1.45km^2;
- **An Irrigation command** area of about 312Ha for a start with canals taking up about (10% - 15%) of this area for their right of way. The area extends up to River Kagera at the border with Tanzania and has a length of irrigation of about 6km;
- A **water supply** system is expected to be put in place. This will consist of a treatment plant, 2 main tanks and 13 storage tanks. It will supply about 13 villages.

A construction camp site, burrow areas for materials sources and a stone quarry will also be required

4.0 Identified Impacts

Highlights of identified positive and negative impacts, their enhancement and their mitigation measures and institutions responsible for management and mitigation of these impacts are provided below theme by theme.

4.1 Positive Impacts of the action on livelihoods and the socio-economy of the communities

a) Creation of employment opportunities and increase in income

Positive impacts will be associated with the **Preparations/Planning and Construction Phase** of the project. Workers including both skilled and unskilled are expected to be employed directly by the project which will in turn contribute to an increase in their income. Local people will be employed mainly as casual workers.

The local communities will further benefit through:

- *Increased spending of the workforce;*
- *Sale of food stuffs, milk and other basic goods to the workers;*
- *Creation of market for products;*
- *Improvement of incomes and general welfare of the local communities and their families; and*
- *Revenue from rents paid by workers.*

The magnitude of this impact is expected to be **low positive** as not everyone will benefit from this opportunity at the Preparations/Planning stage but its impact will rise at the construction phase as more people will be employed. Further, as a result of opportunities generated by the project in aquaculture, fishing and tourism, there would be a **medium-high** positive impact during operation.

b) Skills development

Those who will have the opportunity to work with the project during the construction phase, particularly the unskilled and semi-skilled, will get an opportunity for skills development. This can be enhanced through training programs for the unskilled and semi-skilled workers.

c) Gender balance

The project will improve women's livelihoods and welfare through direct and indirect employment opportunities. This will lead to greater socializing by women for example the formation of clubs which will serve as physical spaces where women can network, learn, support each other, and undertake both group and individual income earning activities. This will particularly be during construction and operational phase of the project. The magnitude of this impact is expected to be **medium positive.**

Positive impacts associated with the *Operation and Maintenance /Post Construction* stage of the project include the following;

d) Improved water supply and sanitation facilities

The construction of the dam will improve the availability of safe water coverage in the area for both domestic and animal use and the communities will benefit in both the dry and wet seasons. Given the existing water scarcity especially in the dry season and the fact that many people will benefit from water supply, the impact is expected to be **high positive.**

Enhancement measures will include the following:

- Continuous sensitization of the communities in regard to the use and maintenance of the facilities will be required at all levels;
- Regular maintenance programs should be put in place;
- Measures should be put in place to ensure that the technical personnel are well facilitated to properly carry out their roles; and
- Water user and maintenance committees should be put in place and should be well facilitated to carry out their role.

e) Provision of employment

During the Operation and Maintenance phase, employment opportunities will be available such as clearing of bushes around the dam site, maintenance of the fence and provision of security for the dam among others. This will however be limited to only a few people and thus the impact is estimated to be **low positive.**

f) Tourism potential

The proposed development of Bigasha dam will act as a tourist attraction. Several recreational and sporting centres may be constructed near the reservoir thereby generating income. This will be **during the operation and post construction phase** of the project. Although tourism is expected to be long term, the fact that there are already tourist attractions in the area such as Lake Nakivale, River Kagera, Nsongezi Rock Shelter, Mburo National Park and Lake Mburo among others qualifies the magnitude of the impact to be **medium positive.**

g) Generation of Hydropower

One of the potential uses of the proposed Bigasha multipurpose dam project is to generate hydropower which is expected to benefit the local community for lighting, water supply, agro-based industries and milk processing. This impact will be **during the operation** and is expected to be long term, and thus qualifies as **medium positive impact.**

h) Improved farming through irrigation

The communities practicing farming will benefit from the proposed project as they will be able to practice modern farming through irrigation. Currently, crop farming is mainly rain fed and there are mainly two seasons for farming. This impact will be **during the operation phase** of the project and its magnitude is expected to be **high positive**.

i) Accessibility to health services

The improved access roads will improve on accessibility to health services. This impact will be **during construction and operation phase** of the project and its magnitude is expected to be **medium positive.**

j) Improved access roads

Infrastructure such as roads linking the two sub-counties to other places will be improved. The improved roads will bring about a boost in trade and will create market opportunities for the agricultural products like bananas, animals and milk as more traders will be able to access the area. This will bring about development in the two remote sub-counties. This impact will be during the **construction and operation phase** and is expected to be **medium positive**.

Positive impacts on wild life and other fauna will include the following:

k) Post construction and operation phase

Positive impacts of the project on **wildlife and other fauna** will include the following:

- *The dam will induce more rain and better amenable micro-climate;*
- *The dam will ensure sustainable water supply;*
- *More rain and sustainable water supply will ensure better food security;*
- *Water loving animals, birds, reptiles, and insects from far and wide will be attracted; and*
- *Better sustainable water supply will bring in more fish and more aquatic organisms.*

i) Mammals

As indicated in the baseline, none of the mammal species recorded is threatened or near-threatened. Thus, the proposed project will not have significant negative impacts on the conservation and survival of these species. The impact of the project on the ecology and conservation status of mammals will, therefore, be **medium positive.**

ii) Birds

Seventy species of birds were recorded mainly non-forest species, water bird specialists and water bird non specialists. Of the species recorded, one is globally endangered namely; the Grey-crowned Crane and three are restricted range species in the East African region. The Grey Crowned Cranes require mixed wetland-grassland habitats where they nest within or on the edges of wetlands, while foraging in wetlands, nearby grasslands and croplands. Because the project will provide more aquatic environment, the impact of the project activities on water fowl and the Grey-crowned Cranes will be **high positive**.

iii) Amphibians

A total of 11 species of frogs were recorded in the Bigasha dam site area. None of the species recorded, is globally threatened. The project will provide permanent water which will be a better ecosystem for the ecology and conservation of amphibians. The impact

of the project activities on all the amphibian species will be **high positive**.

iv Dragonflies and Butterflies

Six species of dragonflies were recorded in the project site as well as fourteen species of butterflies. None of the species of dragonflies and butterflies recorded is globally threatened or near-threatened. Dragonflies and butterflies love aquatic habitats. Thus the impact of the project on the ecology and conservation of dragonflies and butterflies will be **high positive**.

v) Fish and Invertebrates

No fish were seen in the Bigasha dam site area during the survey. However, many fish species occur in the Kagera River Basin where species such as *Barbus acuticeps, Marcusenius victoriae* and *Synodontis ruanda* are endangered. With regard to what was found in the dam site, none of the invertebrate species seen are endangered or threatened.

The creation of a new reservoir in the Bigasha area will favour all water loving organisms and biota including fish, invertebrates and aquatic plants. The wetlands surrounding the new dam will also be an ideal habitat for littoral biota including fish, invertebrates and plankton. It would therefore be expected that when the Bigasha dam is built, the dam will be 'invaded' by fish species locally found within the Kagera River basin including species such as those found in the Akanyaru and Nyabarongo Rivers through migration during flooding and through purposeful physical translocation by people. There is therefore potential for viable fish production in the Bigasha dam when built.

Fisheries play an important role in ensuring food security, economic development and poverty alleviation among the local community. This will add value to the current status of capture fisheries in the Kagera River Basin where fish stocks in the majority of these lakes have been over fished. The proposed project will therefore have **high positive impacts on fish and fisheries of the Bigasha area.**

vi) Protected Area (PA)

The nearest PA to the project area is Sango Bay Forest Reserve which is an Important Bird Area. Sango Bay is important for the conservation of the papyrus endemic globally near-threatened Papyrus Gonolek *Laniarius mufumbiri*, globally Vulnerable Blue Swallow *Hirundo atrocaerulea* and the globally vulnerable African Elephant *Loxodonta africana*. However, there are settlements, cultivations and other forms of land use between Sango Bay and the Bigasha dam site. Hence, the project activities will not impact negatively on the ecology and conservation status of the Sango Bay area.

l) Aquaculture and Fisheries

Capture fisheries in general are facing increasing risks including overexploitation of natural fish stocks, use of irrational fishing gears, and pollution of the basin waters from industrial effluents, domestic sewage and agrochemicals. Introduction of aquaculture in the Bigasha dam can

therefore ensure sustainable fish production. Further, aquaculture can provide an alternative to capture fisheries in the existing lakes and rivers, hence preserving their biodiversity. The creation of the Bigasha reservoir will therefore, have **very high positive** impact on fish survival in the area. It will also have **very high positive** impact on fisheries, aquaculture as well as on food nutritional capacity of the local communities and offer opportunity for employment.

Strategies to enhance positive impacts on fauna, fish and fisheries

- *Institute a Water Use Committee to oversee fishing activities in the Bigasha dam;*
- *Formulate and enforce regulations to control access to the dam and its resources;*
- *Educate the local community about the dam and its resources;*
- *Establish and train a cadre of extension staff to guide, monitor and regulate activity and use of dam water resources in general;*
- *Provide access feeder roads to landings on the dam;*
- *Provide clean fresh water for the communities;*
- *Provide market outlets for Bigasha dam products;*
- *Provide good health and sanitation facilities for the communities living in the villages and landings along the dam shores;*
- *Formulate fishing regulations to control access to the lake and fishing ground; and*
- *Control fishing gears and methods to avoid destructive methods.*

4.2 Negative Impacts of the Project and their Mitigation

a) Hydrological impacts

The construction of the proposed dams will result in changes in the flow regime downstream of the dams. The reservoirs will store excess water during the rainy season and spillage will occur when the reservoirs are full. Thereafter the reservoir will fill with water and the inflow flood hydrographs will be modified (i.e. from inlet, storage and outlet over the spillway). The modification, which will take place, is that the peak of the inflow hydrograph will be reduced (peak attenuated) and the time base of the inflow hydrograph will be stretched such that there is time lag between the time of the peak of the outflow hydrograph and the time of the peak of the inflow hydrograph.

The amount of outflows from the dam storages will depend on both hydraulic conditions such as the height and width of the spillway and operational rules of the dam.Operational rules for the dams will take into account the various uses of water downstream of the dam. This includes water for domestic use, agricultural requirements including irrigation and water requirement for aquatic and environmental health. The most significant impacts for Bigasha dam site are:

- *The seasonal nature of the stream at which the dam is to be constructed, firm yield of water flow into the reservoir cannot be guaranteed. In some of the years the water available may not be enough to fill the reservoir.*
- *The characteristic of the catchment is that it is hilly. This characteristic makes the catchment susceptible to erosion*

which will cause siltation in the reservoir. It is also likely that the population of livestock in the area is going to increase and this will cause degradation in the catchment which will enhance erosion thus causing siltation in the reservoir.

Negative impacts associated with the ***Preparations Phase/Planning*** phase of the project will include the following:

b) Social expectations generated by disclosure of information to the Community

This stage gives higher social expectations in anticipation for jobs from the project considering the high rate of unemployment in the project area. Another potential impact at this stage is the fear generated in the mind of the public with regard to land acquisition and loss of crops through the activities. This is a **high negative** impact as it affects all the people in the community and it will continue until the project has been implemented. These can be mitigated through:

- *Dissemination of all information regarding the project and its relationship with the local community, including aspects of hiring labour and compensation; and*
- *Carrying out continuous community consultations and sensitization throughout the project cycle so that all queries and fears are answered, reduced or eliminated from the public mind.*

Negative impacts associated with the Construction Phase of the project will include the following:

c) Influx of people

There will be a temporary increase in population during the construction phase of the project as people look for work. The project will require a workforce of skilled and non-skilled personnel. In addition, businessmen may want to settle in the area and utilize the opportunity of available market to market their products. The increase in population in the area will come with associated negative consequences like increased conflicts, struggle for the limited resources, and increase in diseases like HIV/AIDS, insecurity, and increase in the price of commodities. However, population influx into the project area is temporary and the impact can be considered **medium negative**. This impact can be mitigated through the following:

- *The Developer in collaboration with the Contractor to prepare a workers recruitment plan;*
- *Local people to be given priority in employment;*
- *Local authorities shall to be strengthened to deal with the influx and the associated increase in crime, insecurity and cases of indiscipline; and*
- *Project to plan for an increase and improvement in infrastructure e.g. sanitary facilities, health facilities, and water facilities among others.*

d) Unfulfilled community expectations

All people within the project area have high expectation to get jobs when the project is implemented but jobs are limited. Lack of employment is likely to lead to dissatisfaction and frustration among the unlucky ones. This may affect the relations between the community and

the project and may affect the successful completion of the project. The impact is thus qualified as **high negative**. The following measures are suggested to mitigate these impacts:

- *Formulate clear, and well defined employment policy and transparent procedures to avoid conflicts and minimize expectations;*
- *Develop a communication strategy between the project and the stakeholders for purposes of fostering continuous communication and feedback to all parties and minimizing expectations; and*
- *Prioritize recruitment of local people for less specialized activities*

e) Increase in price of commodities

There will be an increase in the prices of basic goods like soap, sugar, salt, and paraffin among others due to their increased demand. The impact is expected to be **medium negative** as it will be short term.

f) Increase in diseases

During construction, malaria, sexually transmitted diseases (STDs) and HIV/AIDS prevalence are likely to increase due to population influx. This impact is likely to be long term as HIV impacts may be noticed after several years and will continue after the construction phase. In addition, during construction, pools of stagnant water in the excavated area are expected especially during the rainy season and may act as breeding places for mosquitoes. This impact can be qualified as **medium negative** and can be mitigated through the following:

- *The project should put in place strategies to control malaria e.g. distributing mosquito nets and sensitizing communities through health centers and NGOs;*
- *There should be a sensitization program targeting the workers and the communities regarding the spread of (STDs) and HIV/AIDS;*
- *Ngarama HC IV and Kashumba HC III should be strengthened by the project to carry out HIV/AIDS voluntary testing and counselling;*
- *HIV/AIDs awareness campaigns in schools and communities should be undertaken periodically; and*
- *Project workers should be provided with condoms.*

g) Pressure on health infrastructure and services

This impact of the project on the health infrastructure and services is expected to be **medium negative** and can be mitigated through the following:

- *The project to support Ngarama Health IV and Kashumba Health III with laboratory equipment, medicines, extension of electricity, improvement of the buildings and others to contain the health challenges to the community and the workforce;*
- *The project should plan for additional health infrastructure for its workforce to cater for the increased population; and*
- *Employment opportunities should be extended to the local people to reduce the influx of people in the area.*

h) Pressure on water and sanitation facilities

This impact is indirect, short term as it will cease after project construction and its extent is medium thus qualifying to be **medium negative.** It can be mitigated through:

- *Construction of water points at the workers' camp and construction site;*
- *The community should be provided with safe water points;*
- *The project should provide additional sanitation facilities to its workers;*
- *Bins for solid waste and garbage collection should be placed at the workers' camp to ensure that any wastes generated at the site are properly disposed of.*

i) Pressure on fuel wood

Although there will be a decrease in population after construction, the effects on the general environment of the area will be high thus the magnitude will be **medium negative.** It can be mitigated by *Continuous sensitization of the communities about the dangers of deforestation and employment should be extended to the local people to reduce the influx of people in the area.*

j) Theft of project materials

Although this impact is reversible and short term as it is likely to occur in the construction phase only, it will have a great impact on project costs and project schedule thus qualifying to be **medium negative.** It can be mitigated by

- *Employing private security guards at the construction site;*
- *Collaboration of the different stake holders i.e. the developer, contractor and the community in encouraging community policing in order to identify the culprits and to ensure safety of project materials; and*
- *The contractor to put in place an internal control system to curb cases of theft of materials and to collaborate with the local security in the area.*

k) Occupational Health and Safety

Occupational health and safety will be put at risk by employment of semi-skilled and unskilled workforce who will increase chances of occurrence of occupational accidents. This has far reaching consequences and qualifies to be categorized as **medium negative** and can be mitigated by the following:

- *Training of workers in safe operating procedures;*
- *Provision of appropriate Personal Protective Equipment;*
- *Labelling of danger zones and hazardous materials;*
- *Restrictions of access to potential danger zones;*
- *Control usage of hazardous chemicals; and*
- *Instituting, enforcing and disseminating procedures to be followed when blasting.*

l) Increased traffic and its associated consequences

The magnitude of this impact is estimated to be medium negative as it will be short term mainly in the construction phase and its extent will be local. It can be mitigated through:

- *Existing access roads being widened and used wherever possible for transportation of both personnel and materials;*
- *Skilled and properly trained drivers being employed;*
- *Safe speed limits being instituted and enforced;*
- *Warning signs in busy places like trading centres being installed; and*
- *Flag men being employed by the project in order to control traffic.*

m) Conflicts

With new people coming into the area, it is likely that there will be an increase in conflicts in the area. The magnitude of the impact is expected to be **medium negative** due to the fact that it will be short term in nature since most people will go back to where they came from after construction works are complete. It can be mitigated by:

- *Giving local labour priority for employment as this will solve many of the problems associated with influx of people;*
- *Sensitization of the workers in cultural values and norms of the area; and*
- *Strengthening the local authorities in order to deal with cases of indiscipline and conflict.*

n) Loss of Land and change in land use

Implementation of the project will lead to loss of grazing land, loss of crops and loss of medicinal plants. The current land use will change permanently to become a reservoir area. The impact of loss of land will be permanent, irreversible, and direct and will affect people's livelihoods. The impact of the magnitude is thus **high negative**. It can be mitigated by:

- *Compensating the Project Affected People fairly;*
- *Providing alternative land for PAPs who have lost more than 20% of their land; and*
- *Putting in place livelihood restoration programs to ensure that PAPs livelihoods are restored.*

o) Change in land tenure and ownership

The land where the project will be constructed belongs to individuals and after land acquisition it will belong to the Government. The magnitude of the impact is therefore **medium negative** as it is permanent but will affect a small section of the population in the project area.

p) Loss of residential and other structures/Resettlement

Construction of the reservoir will displace some households. Resettlement is expected to generate mainly three types of social impacts such as, psychological stress, loss of social networks and loss of livelihoods or business opportunities. Other project components may also displace a number of people with agricultural land, residence, business and other structures. Although the impact of resettlement is long term and irreversible, it will not affect many people as the land mainly comprises of grazing and cultivation land thus the impact is qualified as **medium negative**. It can be mitigated through the following measures:

- *A Compensation and Resettlement Action Plan should be prepared in accordance with the national laws and the World Bank guidelines;*

- *All households losing any structures should be compensated fairly and adequately;*
- *In-kind compensation for the households should be considered as an option by the implementing agency;*
- *Livelihood restoration programs should be put in place to ensure that PAPs' livelihoods are restored.*

q) Increased risk of soil erosion

Due to the hilly and steep terrain, construction activities may destabilize the soil cover triggering soil erosion. It can be concluded that this impact will be **medium negative** and can be mitigated through:

- *Plan excavation and grading activities to be conducted during the dry season where possible;*
- *After construction, vegetation should be planted in areas where vegetation was removed including areas where soil spoil was previously dumped;*
- *General catchment protection through re-vegetation and tree planting to form part of the project;*
- *Loose soils should be removed from worksite;*
- *Proper drainage should be put in place along access roads, murram pits and all other cut areas to avoid water seepage into the ground making slopes vulnerable to landslides.*

r) Impact on Aesthetics

These is due to excavations and construction works, open burrow pits, soil spoil heaps at different locations and poor construction practices which all affect the beauty of the areas where such projects are located. This negative impact is expected to be significant but of **medium magnitude**. It can be mitigated through:

- *Restoration of excavated areas and other open areas and murram pits as soon as construction is completed;*
- *Restoration to include covering of pits, levelling, grassing of bare areas and planting of trees; and*
- *Tree planting in the project area should be encouraged as part of catchment protection.*

Operation and Maintenance /Post Construction stage

Negative impacts include impacts of population increase and impacts of HIV/AIDS and other STDs. These can be mitigated using methods already outlined above. Other risks and negative impacts include:

s) Impacts related to dam safety and flooding

This can be caused by poor project designs which may lead to dam breakage and therefore flooding leading to deaths and destruction of property. This impact can be mitigated and the probability of its occurrence is minimal. Hence, the magnitude of this impact is **low negative** although its occurrence may have far reaching consequences. Mitigation measures will include:

- *Put warning systems in place to alert the community and other preventive measures which have been elaborated in dam safety report attached separately*
- *Any destroyed property as a result of dam breakage should be compensated;*
- *There should be coordination of the different institutions in case such an event occurs; and*
- *Sensitization of the community of an emergency plan of action in case of a disaster should be done*

continuously.

t) Risk of drowning

There is a risk of drowning by both children and adults in the reservoir. Furthermore, domestic animals may also drown in the reservoir while trying to drink from it. Although this risk leads to loss of lives, it can be avoided and mitigated, thus the magnitude of the impact is considered to be **medium negative** and can be *mitigated through education and sensitisation of the community. Initially, guards can be stationed at critical points at critical times for example near schools, health centres, markets and fish landings where there are large numbers of people particularly children.*

u) Risk of water borne and insect-borne diseases

There will be a risk of increased water and insect-borne diseases as a result of the reservoir. The water in the reservoir will be stagnant or slow flowing and will act as a breeding ground for mosquitoes. This will increase the prevalence of malaria in the area. The water in the reservoir may also be contaminated by human activities in the vicinity of the dam, thereby leading to water borne diseases like cholera. This impact can be categorized as **medium negative**. It can be mitigated by:

- *Sensitizing the communities about the need to boil water before drinking;*
- *Sensitizing communities to constantly sleep under treated mosquito nets;*
- *Distributing treated mosquito nets to communities surrounding the reservoir; and*
- *Clearing bushes around the reservoir periodically.*

v) Negative impacts on vegetation

The construction of the Bigasha dam will undermine the naturally occurring flooding regime that has been recurring over a very long time and this will affect the ecology of the area. The dam will reduce downstream flooding. This will cause the disappearance of the ecologically important wetland plants in the floodplain below. Further, the reservoir will destroy over one km^2 of wooded grassland. The initial filling of the reservoir will flood the existing plant material, leading to the death and decomposition of the carbon-rich plants. The rotting organic matter will release large amounts of ozone depleting gases into the atmosphere. The decaying plant matter itself will settle to the non-oxygenated bottom of the reservoir, and the un-aerated decomposition will produce methane gas which has negative impacts on the ozone layer. There were no plant species of conservation importance recorded as threatened or endangered in the study area. The plants to be killed through flooding of the reservoir are found also in other parts of the valley. Thus the impact of the project on the ecology and conservation of plant species in the Bigasha dam area will be ***low negative.***

Mitigation measures

- *Clear all vegetation and woody biomass from the reservoir prior to filling it; and*
- *Institute and enforce good watershed management practices including afforestation, terracing, and good agricultural practices.*

w) Waste generation Wastes are predominantly generated during the construction and operation phases of this project through several ways for example, spillage of contaminants such as hydrocarbons, oils, concrete admixture, solvents and other chemicals, solid and domestic waste from the workers' camps.

Waste in its various forms has capacity to debilitate and derail the project by causing diseases, ill health and thereby raising morbidity and mortality amongst the work force. Hence, there is need to manage, minimize, treat and control waste at all stages of its generation to avoid its negative impacts on workers' health and safety which is essential to the success of the project The following strategy is recommended to manage waste.

Management and mitigation strategies to minimize and control wastes

The sponsor of this project namely the Government and the District Local Government will make sure that the Contractor implements procedures and strategies for managing wastes in order to guarantee the safety of the environment and workers at all times. The Contractor will undertake to establish an emergency response plan, train employees on the risks and precautions, provide employees with suitable protective equipment and ensure recycling of wastes and waste water.

The Contractor and operators of the dam when built will be required to follow recommended guidelines for waste management. They will also be required to follow set emergency procedures for safeguarding against spills. A monitoring procedure is further recommended to guarantee proper and appropriate management of wastes during construction and operation of the dam project. It is recommended that the implementation costs of the Waste Management program be absorbed into the overall construction costs of the project.

6.0 Environment and Social Management Plan (ESMP)

The purpose of the Environmental and Social Management Plan (ESMP) is to mitigate and, wherever possible, prevent adverse environmental and social impacts of a project on the communities as well as on the environment. It is also aimed at helping to maximize positive impacts of the project. The ESMP further aims at ensuring the implementation of mitigation measures whilst identifying the necessary resources and budgets required for its implementation as well as identifying responsibility schedules of various stakeholders who will be involved in its implementation. The ESMP relies heavily on identified positive and negative environmental and social impacts for its proper formulation. In the case of the Bigasha dam site project, these impacts have been identified.

A mitigation plan summarising impacts, mitigation measures, costs and responsible personnel has been provided. A monitoring plan including indicators, frequency of monitoring, responsible personnel and monitoring costs has also been discussed. Issues with significant residual impacts have been proposed for long-term monitoring.

The implementation of the Bigasha dam ESMP will require the full participation of key players and they include:

- Ministry of Water and Environment who is the Client and has the overall responsibility for environment management;
- The Consultant who will work on behalf of the Client especially during construction;
- The Contractor;
- Other stakeholders like other institutions at National Level, Isingiro District Local Government, the sub counties of Ngarama and Kashumba as well as the villages of Kagando, Nyakabingo and Katyazo. A structure for management of this dam involving the stakeholders and the private sector has been proposed with guidance from the Water Act Cap 152.

The total cost of ESMP has been estimated at United States ;Dollars Two Hundred Ninety Nine Thousand, Eight hundred Eighty (USD 299,880) excluding estimate for RAP which is in a separate report.

Conclusions and Recommendations

Once the proposed mitigation measures are implemented, then the impacts will either be eliminated or minimised. Mitigation and monitoring of the residual impacts which are significant like social expectations and unfulfilled community expectations as well as those resulting from land loss will be done on a long term impacts. The main conclusion of this Environment Impact Assessment is that there is no environmental obstacle to implementation of the project, if the proposed mitigation measures inter alia are implemented.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Nile Basin Initiative (NBI) is a collaborative effort of the Nile riparian countries which aims at developing the River Nile and its resources in an equitable and sustainable way for the benefit of the people of the Nile Basin. The NBI also aims at promoting regional peace and security. The Nile Basin Initiative has a Strategic Action Program which is composed of two complementary programs the first of which is the basin wide Shared Vision Program (SVP), whose mandate is to build confidence and capacity throughout the basin. The second program is the Subsidiary Action Program (SAP), whose objective is to initiate concrete investments in the Eastern Nile (ENSAP) and in the Nile Equatorial Lakes sub-basin (NELSAP). The Kagera Project is one of the three Trans-boundary integrated water resources management and development projects being implemented within the framework of the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) of the Nile Basin Initiative (NBI). The others include the Sio-Malaba-Malakisi and the Mara River Integrated Water Resources Management and Development Projects.

The Kagera River Basin Management Project (KRBMP) objective is to establish a sustainable framework for the joint management of the water resources of the Kagera River Basin and prepare for sustainable development investments, in order to improve the living conditions of the people and to protect the environment. The Kagera River Basin Management Project (KRBMP) has undertaken various activities to improve the planning, management and utilization of the natural resources in the basin, including the completion of the development of the Kagera River Basin Monograph and the Integrated River Basin Management and Development Strategy. On-going activities being undertaken by the project and the NELSAP include Development of the Kagera Cooperative Framework Agreement, and Rusumo Hydropower and Multipurpose Project. In addition, the riparian countries have initiated activities related to water storage and these include the Nyabarongo dams in Rwanda; the Kikagati and Nsongezi dams in Uganda; the Kakono dam in Tanzania, and the Bugesera transboundary ecosystem management and development project which will focus among other things on the development of irrigation in the area.

The Kagera River Basin Management Project (KRBMP) has therefore completed a study for identification and rapid assessment of potential small dams for the multipurpose uses of agricultural development, hydropower generation, water supply, fisheries, and other ecosystem functions. The KRBMP study identified Twenty eight (28) new dam sites were

identified and assessed including three previously identified dams in Rwanda. From this list, eleven sites were selected based on criteria including those defined by World Bank OP4.37 such as:

i) Equity (targeting one site per country),
ii) Dam height (targeting small dams as),
iii) Reservoir storage capacity and reservoir yield,
iv) Site foundation conditions,
v) Material availability,
vi) Access to proposed sites,
vii) Potential water uses,
viii) Environmental and social considerations, and
ix) Priority of each participating governments.

From the above criteria, KRBMP and the riparian countries selected four dam sites for feasibility and these were Karazi in Tanzania, Bigasha in Uganda, Buyongwe in Burundi and Taba-Gakomeye in Rwanda.

The KRBMP identified Newplan Consulting Engineers and Planners to undertake an Independent Environmental and Social Impact Assessment (ESIA) for the four identified multipurpose dam sites in December 2011. The ESIA study w to assess the technical, social, economic, financial and environmental viability of the four identified multipurpose dam projects. The ESIA was to evaluate independently the environmental and social aspects of the four priority multipurpose dam sites and prepare Resettlement Policy Frameworks for each dam site in accordance with the relevant World Bank guiding policies and procedures in full cognizance of national policies.

The ESIA study started in January 2012 after successful negotiations between the KRBMP Project Management Unit and Newplan Consulting Engineers and Planners in December 2011. The ESIA study was to run concurrently with the Feasibility study. Hence, Consultants from Newplan conducted a reconnaissance survey in January 2012 to identify key issues to be investigated further in a deeper study for the development of the multipurpose dams in the areas. The reconnaissance survey covered baseline studies on general environment assessment, hydrology, ecology, fisheries, archaeology, socio-economy, livestock and water demand. The survey results were used to prepare an Inception Report. The Inception Report was presented to key stakeholders in a regional workshop held in Bujumbura, Burundi on 7th February 2012.

Following the Client's acceptance of the Inception Report, the Consultant proceeded to undertake baseline studies which started on 20 March 2012 ending on 7th April 2012. The

study involved consultations and data gathering activities at regional and district level whilst at dam site level activities involved the following:

i. Carrying out stakeholder consultations through meetings with regional leaders, district leaders, community leaders and grass root village groups;
ii. Carrying out social surveys;
iii. Conducting training of enumerators and data recorders;
iv. Collecting baseline information and data on hydrology, fish, aquaculture, water quality characteristics, aquatic benthic invertebrates, settlements and infrastructure, archaeology and culture, livelihoods and socio-economy.

After the baseline studies, the consultant prepared the **Interim Report** which provided preliminary analysis of baseline environmental and social findings covering in particular, the following:

i) Baseline state of the environment;
ii) Identification and analysis of fauna and flora in the dam sites including fish and invertebrates;
iii) Information on the hydrology and water quality characteristics;
iv) Information on settlements and infrastructure;
v) Information on archaeology and culture; and
vi) Information on livelihoods and the socio-economy of the dam sites.

The Consultant also prepared separate reports for **Scoping** which provided information on environmental and social impact scoping results with the relevant annexes for each dam site. In particular, the following information was provided: existing policies, laws and institutions in the riparian countries, the East African Community and International Financial Institutions. The Scoping Report also provided information on Multilateral Environmental Agreements and gave a preliminary identification of impacts and possible mitigation measures. The Scoping Report further analysed possible project alternatives and identified any other past, existing or planned projects in the areas. Likewise, a separate report was prepared on **Preliminary Resettlement Action Plans (RAPs).**

1.1.1 Scope of the Study

The TOR originally required the Consultant to conduct an Environmental and Social Impact Assessment (ESIA) of the four dam sites one each for Burundi, Rwanda, Tanzania and Uganda and to prepare **Resettlement Policy Frameworks (RPFs)** for each of the dam sites. However, later, the Client suggested a change where the RPFs were dropped and the

Consultant was asked to proceed to prepare **Preliminary Resettlement Action Plans (PRAPS)** for the four dam sites, including the Bigasha site.
However, due to the multipurpose nature of the dams, the dam at Bigasha is expected to provide water for Irrigation, water supply, fisheries development. Therefore ESIA has taken into consideration the following;

- Dam and associated reservoir
- Irrigation Scheme
- Water Supply for livestock and domestic use
- Fisheries development

Hydropower development had also been proposed as a multipurpose use at Bigasha but the Draft Final Feasibility Report indicated that it was not feasible. Therefore it has not been included in the assessment.

1.2 OBJECTIVES OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

1.2.1 Overall Objective

The Terms of Reference for this study indicated that the objective of the study was to undertake an environmental and social impact assessment of the proposed four multipurpose dams. It was to identify possible positive and negative impacts on the social and biophysical environment prior to, during and after infrastructure construction. The consultancy was also to prepare Environmental and Social Management Plans (ESMPs) and Resettlement Policy Frameworks (RPFs) for each dam site. The consultancy was to coordinate closely with the Feasibility Study Consultancy of the same project which will run concurrently with the ESIA study.

1.2.2 Specific Objectives

The specific objectives of the study were:

i) To identify, analyze and evaluate the type and extent of likely positive and negative environmental and social impacts with emphasis on significant benefits and negative effects of the project on the existing biophysical and socio-economic environment and to assess the capacity of the institutions responsible for management and mitigation of these impacts;

ii) To develop Environmental and Social Management Plans (ESMPs). The ESMPs will identify mitigation measures that will address the concerns associated with the proposed projects and provide details needed to

implement the plan. The ESMPs will include the costs of the mitigation measures and monitoring requirements; a capacity building plan of the defined key stakeholders in the ESMP and the RPF will be also included.

iii) To elaborate and customize to the project the Resettlement Policy Frameworks (RPFs) basing on existing templates for Burundi, Rwanda, Tanzania and Uganda.

1.3 ENVIRONMENTAL ASSESSMENT METHODOLOGIES

1.3.1 Scoping

The guidelines for Environmental Impact Assessment in Uganda, 1998 require scoping report as the initial step in the Environmental Impact Study with the purpose of determining the scope of work to be undertaken in assessing the likely Environmental Impacts of the proposed project and to develop Terms of Reference (ToR) for submission to National Environment Management Authority (NEMA).

Operational Policies (OP 4.01) Environment Management emphasizes public disclosure. Section 14 & 15 of these procedures require public scoping, consultation and disclosure for category 'A and B' projects. At Bigasha project site, there are a few settlements (about 4) and there is no infrastructure that will be affected by the project, however substantial amount of land with some bananas will be affected. The project at Bigasha has therefore been categorized as "B" project because it has less adverse impacts on the community and the general environment than would be in category A.

Borrowers are required to first consult the affected public immediately after screening and before
'Terms of Reference' for the environmental assessment are finalized. A summary of the proposed project's objectives, functions and potential impacts are expected to be provided at this stage. Therefore a scoping report has been carried out for this site. The **Terms of Reference were also developed, submitted to NEMA, approved and are attached in Appendix 1.**

This involved identification of potentially significant environmental impacts and/ or eliminating of insignificant impacts. It is applied to all activities that require full Environmental Impact Study. Scoping methodology is outlined below;

i. A review of the proposed project and available documents in the region that are related to this project

ii. Consultations with stakeholders at National level, NELSAP–TAC Members, NELSAP Staff, Local authorities, technical teams in Isingiro District and other stakeholders like the community members to identify potential impacts
iii. A biophysical assessment of the project area by technical specialists to further identify the impacts.
iv. A Draft Scoping Report was produced and presented to stakeholders in a Workshop.

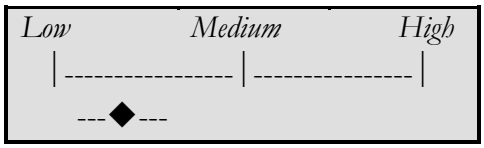
1.3.2 Impact Assessment Methodology

The method for assessment of impacts was adapted from the methods recommended by Hydro-Québec (1990), the World Bank (1991) and by the Canadian Environmental Assessment Agency (2000). These methods assess the Intensity, Extent, and Duration of the anticipated positive or negative impacts of the project and determine the environmental and social value of the components. The three components are then grouped together under one indicator, the Significance of the impact. This indicator provides an overall assessment of the anticipated impacts on a given environmental or social component. The assessment of impacts was based on a three step procedure which makes impact assessment conclusive and its recommendations objective and easier to conceptualize, follow and trace back if desired. The core of the procedure was to combine the 'value' (step 1) of the affected environment and the 'magnitude of impacts' (step 2) to obtain the 'overall impact assessment' (step 3).

Step 1: Baseline data was collected using different methodologies as follows:

i) Review of existing information;
ii) Onsite assessments –this involved site visits to` observe what exists in the area covering physical, biological and social –cultural issues;
iii) Focus group discussions;
iv) Public/stakeholder consultations – process is highlighted in this report;
v) Social surveys by use of questionnaires.

Baseline environmental and social conditions was described in detail and valued on a continuous scale from 'low value' to 'high value', which was assigned to the impact zones and the characteristics thereof. This value is related to international, national or local guidelines, standards and evaluations. Values were assigned to elements of the biological environment such as flora and vegetation, aquatic ecosystem etc. The human environment aspects will be taken to have "high value" due to their intrinsic value in addition to others. These are presented below diagrammatically.



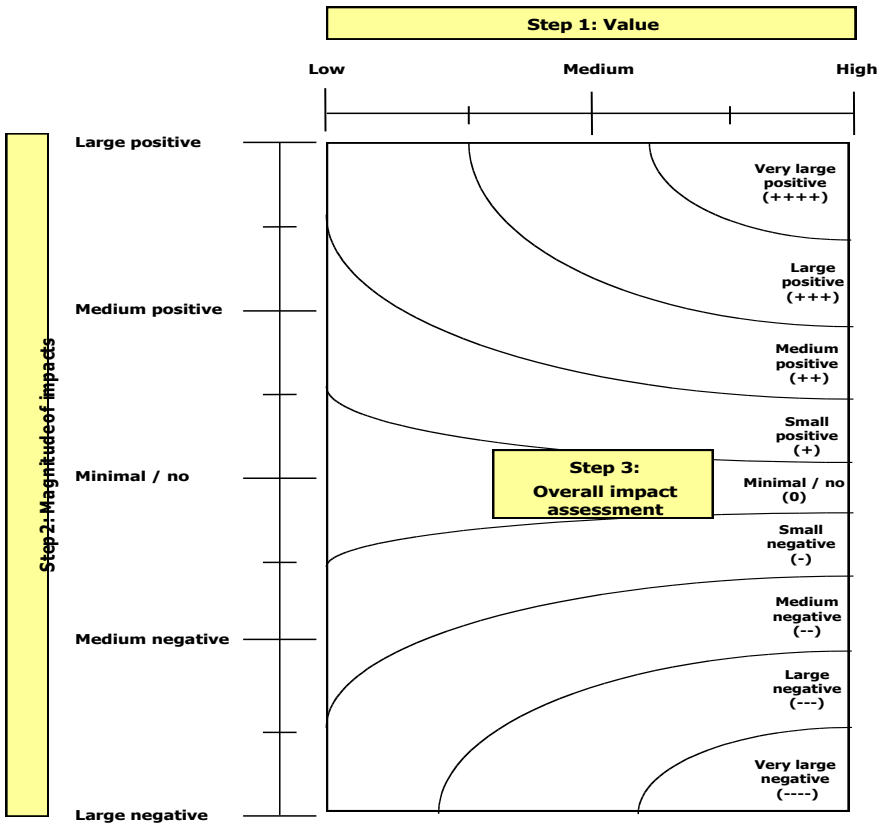
Step 2:

The second step was to describe and evaluate the magnitude of potential project impacts, measured in terms of their **extent in time and space (long term/short-term), the vulnerability of the environments affected, the reversibility (permanent or temporary) of the impacts and the probability that the impacts will occur.** The magnitude of impacts was evaluated on a scale from 'high negative' to 'high positive' as shown below.

Phase	Magnitude of Impacts
	High neg. Medium neg. Low/ Low pos. Medium pos. High pos.
Planning	------ ▲ ------
Construction	------ ▲ ------
Operation	

Step 3:

The third and final step was combining 'value' (Step 1) and 'magnitude of impacts' (Step 2) to obtain the 'overall impact assessment' (Step 3). This assessment evaluated the importance of an impact on a scale ranging from 'very large negative'; 'medium negative'; 'low negative' to 'very large positive'; 'medium positive' or 'low positive'.



1.3.3 Specific Methodologies

1.3.3.1 Socio-Economic Environment

Several methods were used for collection and analysis of baseline socio-economic data. These included the following.

Review of Available Documents

The Consultant reviewed several documents vital for the project. These included among others, Uganda Demographic and Health Survey (UDHS), 2002 Housing and Population Census, Isingiro District Report, Isingiro District Five Year Development Plan (2011-2016), Kashumba and Ngarama Sub-counties Five Year Development Plans (2011-2016) and Higher Local Government Statistical Abstract, Isingiro District (2009) among others.

Stakeholder Consultations

Stakeholder consultation is expected to be a continuous activity during the duration of the

study. The Consultant used both snow-ball and purposive methods in identifying the relevant stakeholders. Stakeholders consulted included officers at national level and local authorities, CBOs in the project area and potential project affected populations among others. The methods for consultation, information sharing and gathering was highly participatory in nature. Stakeholder consultations were carried out through in-depth interviews (key informants' discussions), focus group discussions and community meetings.

Household surveys

An interviewer-administered questionnaire was developed with both open ended and close ended questions for gathering information on socio-economic conditions of the people in the area. Research Assistants with the knowledge of the local language were trained and deployed.

Maps from UBOS showing the Sub-Counties and Villages in the project area were used to select the villages to be included in the study. The GIS Specialist superimposed the dam to the given UBOS map. The maps guided the Consultant in choosing the villages to be included in the household survey. A 30% sample of the households in the directly affected villages was randomly selected for inclusion in the interviews. The sample size was determined based on the number of households in a village as provided by the village LC I Chairpersons. Consequently a total of 113 households were included in the household survey. Household survey tool is attached in **Appendix. 2**

Observations

Observation was applied for purposes of identifying apparent contradictions or confirming stated responses.

Data Analysis

The data collected will be analyzed using the Statistical Package for Social Scientists (SPSS) and MS-Excel packages. Analysis of quantitative data generated through questionnaires was done using two computer analytical packages known as SPSS and MS-Excel. Using SPSS package, it was possible to cross-tabulate variables and generate the relevant tables and graphs while using MS-Excel helped mainly in generating information like average incomes.

Analysis of qualitative data generated through key informants' interviews was done using thematic procedure and content analysis. Using the thematic procedure, data was summarized into merging themes. The themes were analyzed and interpreted according to survey variables. Content analysis was used to analyze data that was not frequently reported but had profound implications for the survey variables.

Data quality control

All enumerators for the household interviews were trained on the survey methodology, use of the data collection instruments and question interpretation. The purpose was to ensure that all enumerators use the same methods of questioning and recording of responses. In addition, the Consultant edited a sample of the questionnaires during fieldwork after which feedback was given to the enumerators and necessary corrections and clarifications made.

Methodology for analyzing issues of gender and vulnerable groups

Like any other society in Africa, there are vulnerable and marginalized groups in the project area. These usually include the elderly, female headed households, widows, people with disabilities and the very poor among others. These groups normally face a number of problems such as heavy workload, oppression, low participation in decision making, lack of ownership of resources, social discrimination, low incomes and high levels of illiteracy among others. The Consultant analyzed the issues of gender and vulnerable groups based on a number of methods and these included analysis of data disaggregated by gender and group type form Uganda Census Reports, Uganda Survey Reports, District and Sub County Development Plans and data from household interviews.

Archaeology

Archaeological and culture assessment studies employed the following methods:

Desktop survey

Literature review of the project and other similar development in the country as well as studies on archaeology, palaeontology, and socio-cultural aspect of the region in question.

Site Survey

Field personnel applied spot-check across the study area and guided surveys based on information gathered from the local leaders. The method of data collection included; observations, recording, photographing, and documenting all identified cultural materials, and other environmental features likely to be impacted on either positively or negatively by the project.

Ethno-archaeological study

Meetings and interviews with stakeholders and the local people will be a major source of information about the impact of the project on the current socio-cultural lives of the people living in and around the area.

Pottery analysis
Pottery is very important and has been used in categorizing sites in timeframe and identifying the people who occupied the area in question in terms of activities or tribal. Like farming communities always make pots in different shapes from cattle keepers.

Interviews and focus group discussions
Local leaders and elders were talked to about the historical and cultural practices of the people in the project area. Such consultative meetings took place at offices and in the farming fields.

Surface collection
Some finds were collected during the foot survey. Most of the finds were briefly analyzed and photographed.

1.3.3.2 Plants and Vegetation

Demarcation of plots
Inventories of demarcated plots have been widely used in floristic sampling and ecological studies in the recent years (Poulsen, 1997). However, the results of species richness depend on the size, shape and number of the plots used, and the choice of the parameters depends on the scope of the study. Circular plots of 20m radii were used in this survey.

Plots were laid every 200m along the river as the area has been heavily cultivated. Data of trees, climbers, and herbaceous plants were recorded. Trees and shrubs of less than 10 cm diameter at breast height (Dbh) were recorded from each plot nested in the bigger plot. These plots for the samplings were 10m radius. Those trees that were greater than 10cm (Dbh) were recorded in diameter classes of 10 cm –20 cm, 20cm-30cm, 30cm-40cm, 40cm-50cm and greater than 50cm in a radius of 20m. Lianas were recorded by the presences absence mechanism in the same plot as the saplings of 10m radius. Herbs were also recorded by their presence in a nested plot of radius of 2 meters. The data have been used to show the relative distribution and diversity of the species within the sectors.

Opportunistic records
Although the plots were able to give fairly good data on distribution and abundance they were not able to exclusively give the total number of species in entire area. To achieve as complete a list as possible an opportunistic record was taken to account for species that were missed out in the plots within the reservoir area to obtain a better measure of species richness.

Voucher Specimens
Some of the species that could not be identified were photographed for further confirmation identification at Makerere University.

Materials
The materials that were used during the ecological survey included: Global Positioning System (GPS) Garmin Map 7, field notebook, and a digital camera.

1.3.3.3 Wildlife

The extent to which development affects the living things in their natural environment must be assessed to ensure sustainability. It is not however possible to consider the effect of development on all the living organisms. In this particular study, the impact of the project on plants, butterflies and dragonflies, birds, amphibians, mammals and aquatic biodiversity which act as indicators of all the other biodiversity were assessed. Butterflies respond quickly to environmental changes and there is now considerable data on how particular species contend with alterations in land-use, and thus may play a valuable role in ecological monitoring (Daily and Ehrlich, 1995). The compilation of species lists may be used both qualitatively and quantitatively, to comment on a habitat (its condition and vegetation) and to identify conservation and monitoring needs. Increasingly, therefore, butterflies are being used as tools in ecological monitoring strategies (Pollard and Yates, 1993; Sparrow *et al.,* 1994). Dragonflies spend most of their lives as larvae in water and therefore depend on availability of pure water. Different species have varied habitat preferences, making them very useful indicator species. Birds are very important in conservation and environmental impact assessments because they are good indicators of general biodiversity. Areas rich in birds have been found to also be rich in other biodiversity. Birds can be categorised according to habitat. The habitat categories include forest specialists (FF), forest edge species (F), forest visitors (f), species restricted to wetlands/open waters (water bird specialists) (W), water bird non-specialist-often found near water (w) and grassland species (G) (Caswell, *et al* 2005, Bennun *et al* 1996).

Ecologically, amphibians are important; they are mostly predators, acting as primary and secondary carnivores. Their prey consists mostly of insects, some of which are pests to crops or disease vectors. They are also inter-linked in food chains, often acting as food for other vertebrates, such as birds, snakes and sometimes man. Amphibians are known to be an easily recognizable taxon in given habitats; and populations are sometimes specialized within a narrow habitat. Factors that have made amphibians to be recognized, nowadays, as good indicators of habitat change.

Many mammal species are specialised in their habitat requirements. Specialised habitats include forest, woodlands, grassland and swamps. Many mammal species are hunted for meat by the local community; others are pests to crops and livestock while others are important in ecotourism.

Transect count
Transect count was used to study the birds present in the project area and all birds seen along this transect or heard were recorded.

Trapping
30 Snap traps were used to trap rodents around the study area while Amphibians were trapped by hand from 1900-2100 hrs. Sweep netting was used to trap used to trap butterflies and dragon flies.

1.4 PUBLIC DISCLOSURE

EIA Guidelines for Uganda require public involvement to be an on-going process throughout the study. It is required before the study, during the study and after the study. A draft scoping report prepared for the project is expected to be presented and discussed with the stakeholders so that their views can be incorporated before the final scoping report is prepared. The draft scoping report was therefore presented to the stakeholders in a workshop on 8thJune 2012 and their views were incorporated. Once the Environment and Social Impact Statement (ESIS) is ready NELSAP will submit it to NEMA for review and approval. When the review is completed by NEMA, EIS shall be a public a public document and may be inspected at any reasonable time by any person. Within two (2) weeks from date of receipt of this Report, NEMA shall (if it finds it necessary), publicize receipt of the EIS, identify the concerned region and stakeholders, the places for inspection of the EIS, shall also make copies or summaries of the statement available for public inspection. NEMA shall also send copies of the EIS within 14 days from the date on which it was received to other relevant agencies and experts for comments. Public comments and/or objections shall be submitted to NEMA within 3 weeks of the publication of the Notice.
These form part of ESIA.

Furthermore, according to World Bank Environmental Assessment (OP/BP 4.01) January 1999, revised in 2011, Bigasha dam project has been categorised as B project (see Chapter 3, Requirements of International Financial Institutions). The disclosure requirements are that EA reports will have to be accessible to local affected groups (in the local language) in their country

1.5 STRUCTURE OF THE REPORT

This report has the following chapters as outlined below:

Chapter 1- INTRODUCTION - provides a description of the background of the project, The objectives, the methodologies used in the assessment, public disclosure and report structure.

Chapter 2 – PROJECT DESCRIPTION - describes the project location, the area of influence, the project design and activities.

Chapter3 – POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK- presents an overview of the legal and institutional framework under which this ESIA has been conducted including national, regional, requirements of financial institutions and Multilateral Agreements.

Chapter 4 - CONSIDERATION OF ALTERNATIVES - presentation of the project alternatives that have been considered in the ESIA taking into account technical, economic, environmental and social considerations.

Chapter 5 – PUBLIC CONSULTATIONS - provides an overview of public disclosure and consultation activities undertaken in connection with the EIA study process. The major concerns raised are dealt with in the Environmental and Social Management Plan.

Chapter 6 – DESCRIPTION OF THE EXISTING ENVIRONMENT - describes physical and chemical environments including geology and soils, hydrology, water quality and climate of the proposed project site; presents the current flora and fauna in the project area and provides an overview of socio economic characteristics of the project area.

Chapter 7 – EVALUATION OF POTENTIAL IMPACTS AND MITIGATION MEASURES –and describes the potential positive and negative environmental and social impacts according to their magnitude and presents the anticipated overall of impacts of the project. It also lists the measures to be taken to mitigate or compensate the environmental impacts during the various stages of the project phases.

Chapter 8 – ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP) - Guidelines to be adopted in environmental monitoring

and management of the project are presented in this chapter.

Chapter 9– CONCLUSION AND RECOMMENDATIONS – gives concluding remarks, recommendations on the way forward of the project.

2 PROJECT DESCRIPTION

2.1 GENERAL DESCRIPTION:

The project consists of a multipurpose dam with its associated reservoir, irrigation system and water supply. **Figure 2-1** shows the project layout out excluding Water supply. Detailed description of **the dam and reservoir are discussed in Section 2.1.1** below.

Irrigation command area is expected to cover about 312Ha for a start with canals taking up about (10% -15%) for right of way). The area extends up to River Kagera at the border with Tanzania and length of irrigation is about 6km. According to the feasibility report, the irrigation area will be mainly used for growing of maize, beans and vegetables. The area was not found suitable for rice growing. Furthermore banana growing was not recommended as they it requires a lot of water.

Water supply
A water supply system is expected to be put in place. It consists of a treatment plant, 2 main tanks and 13 storage tanks. It will supply about 13 villages covering. The treatment system will be at the intake, the main tanks will be located at Ngarama and Kashumba while storage tanks will be in each benefiting village (**Figure 2-2**). The water will be pumped to the 2 main tanks and will flow by gravity to the storage tanks. There is also a possibility of supply Isingiro Town if necessary.

The use of the Bigasha dam to produce hydropower was not found feasible by the Feasibility Consultant; therefore it has not been discussed in detail in this ESIA report.

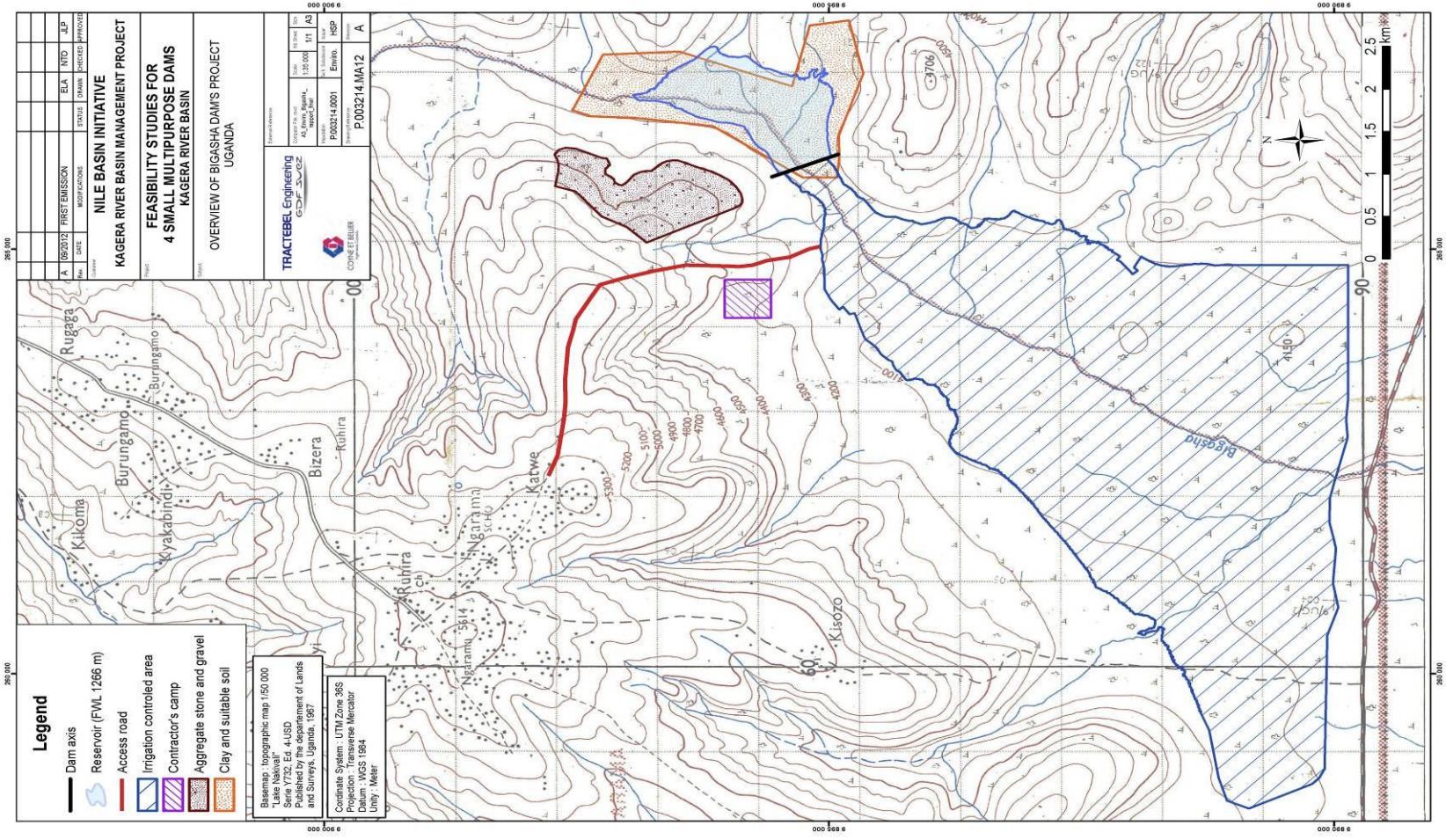


Figure 2-1: Bigasha Multipurpose Dam Project Layout

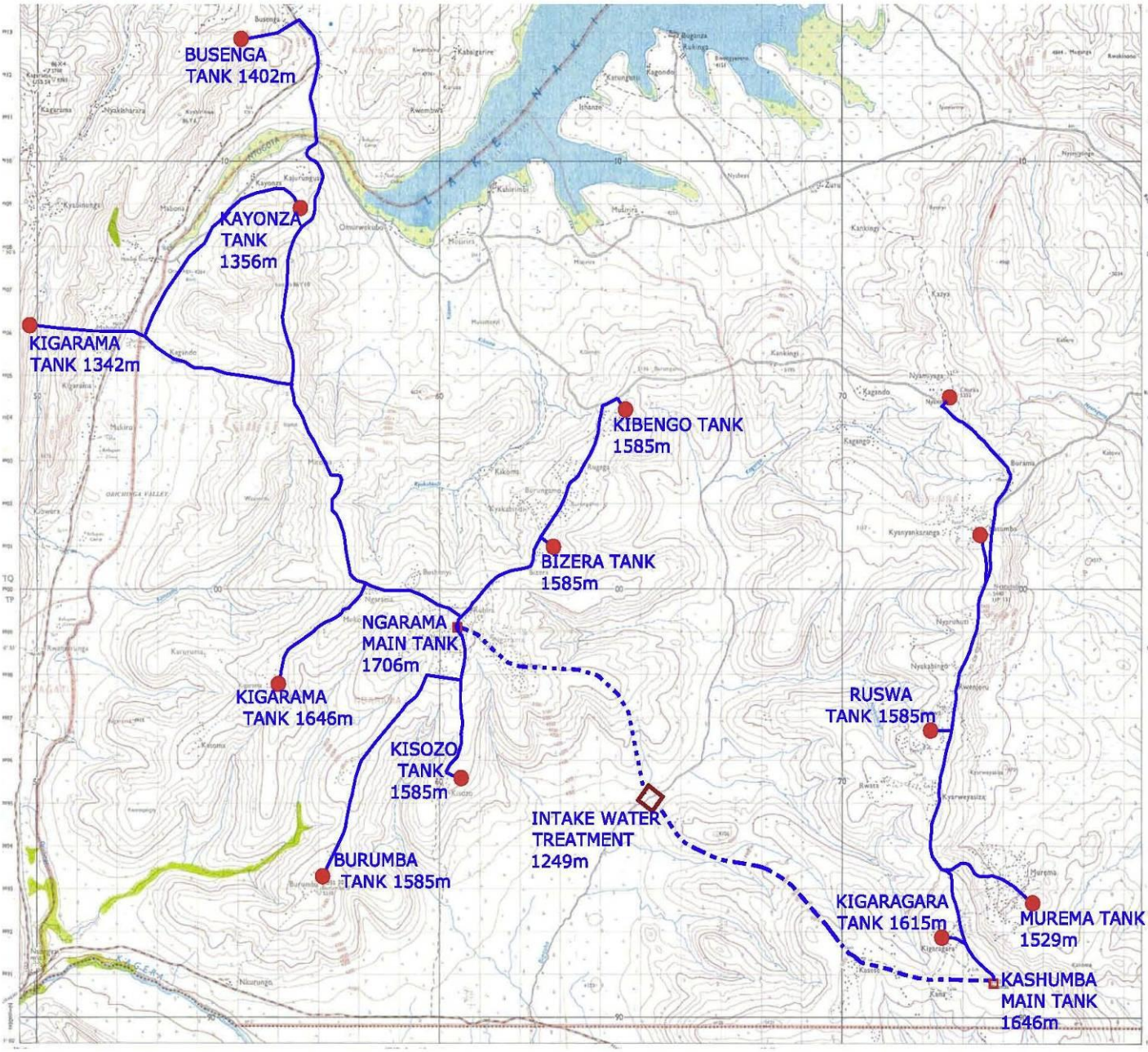


Figure 2-2: Bigasha Proposed Water supply

2.1.1 Dam Location

The Bigasha dam site is located in the Kagera River Basin which is found along the upper Nile Equatorial Lakes Region in a zone west and southwest of Lake Victoria between the latitudes of 0°45' and 3°55' South and longitudes of 29°15' and 30°50' East **(Figure 2-3).** The Kagera River basin covers the territories of Burundi, Rwanda, Uganda and Tanzania. The Kagera Basin has a total area of about 60,000 km^2 which is distributed among Burundi (22%), Rwanda (33%), Tanzania (35%) and Uganda (10%).

Most of the basin lies between elevation 1,200 and 1,600 m.a.s.l. and consists largely of woody and grassland savanna. The mountainous areas in the west and north-west, mark the Nile-Congo Divide which rise to altitudes of more than 2,500 m.a.s.l.

The Kagera Basin drains the headwaters of the White Nile, and is a sub-basin of the Nile Basin. The Kagera is the largest river flowing into Lake Victoria where it contributes about 34% of the total river inflow. The river rises from the western highlands of Burundi and Rwanda where it is fed by three main tributaries: the Nyabarongo River, the Akanyaru River and the Ruvubu River which rise on the Congo-Nile Divide. Its main tributaries are the Ruvuvu River, which drains an area of about 12,300 km² in central and northern Burundi, and the Nyabarongo River, which drains about 16,000 km² in west central and eastern Rwanda. The Nyabarongo discharges into Lake Rugwero in south-eastern Rwanda on the border with Burundi. Below Lake Rugwero the river is known as the Kagera, and it marks the southern border of Rwanda with Burundi and Tanzania to the confluence of the Ruvuvu. At the border of Uganda and Tanzania, Kagera River is joined on the left bank by the Kagitumba River, which drains 5,200 km² of north-eastern Rwanda and Southern Uganda. The main tributaries in the lower reach are the Mwisa and Ngono Rivers, which drain 2,000 km² and 3,200 km² respectively of the Kagera Region in Tanzania on the right bank of the Kagera River.

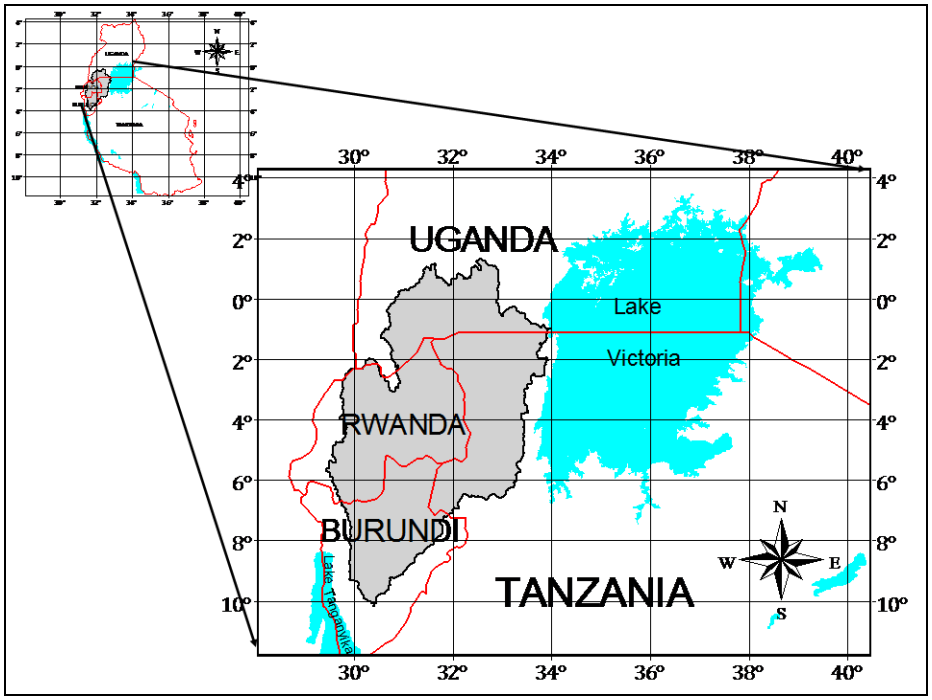


Figure 2-3: Location map of the Kagera River Basin in the Upper Equatorial Lakes Region of the Nile.

Rainfall over most of the eastern half of the Kagera Basin is less than 1,000 mm but this increases to over 1,800 mm in the western half, where most of the runoff is generated. Although the western half is partially forested, much of the basin has become intensively cultivated resulting in erosion and sediment loading of rivers in the high rainfall areas. The basin is characterized by low productive peasant agriculture, insufficient water for household use and grazing and endemic poverty. There is continuing land degradation, deforestation and loss of soil fertility and soil erosion caused by population pressure and primitive farming methods in the basin.Wetlands are exploited and degraded, and there are unplanned migrations across borders by pastoralists with their cattle, causing friction in the border zones. The dense population settlements, coupled with intensive and improper land management practices in the Kagera River catchment has resulted in heavy pollution loads and siltation of tributary rivers. The water quantity and quality available for various uses in the Kagera Basin is gradually dwindling and the water resources situation is stressed in some parts of the basin. There is a strong correlation between economic performance and water availability as a result of limited water storage infrastructure. Using the Falkenmark Water Stress Indicator, two of the four Kagera Basin riparian countries, i.e. Rwanda and Burundi, have a per capita water availability of 800 and 500 m^3/capita/year respectively; which is far below the recommended threshold value of 1,700 m^3/capita/year. According to the Kagera Basin Monograph (2008) where water supply is below 1,700 m^3/capita/year, water stress appears regularly; below 1,000 m^3/capita/year water scarcity limits economic development and human health and well-being; and below 500 m^3 /capita/ year water availability is a main constraint to life. The World Water Vision 2000, prepared by the International Water Management Institute (IWMI), classified all the four Kagera Basin Riparian countries as suffering from economic water scarcity. According to the IWMI, economic water

scarcity means that countries have sufficient water resources to meet their needs but will have to increase water supplies through additional storage, conveyance, and regulation systems by 25% or more to meet their needs in 2025. The Kagera River Basin countries face financial and capacity constraints in meeting their water needs. This situation is expected to get worse as the population increases. The annual population growth rate in the Kagera Basin is currently estimated at 2.7% per annum (Kagera Basin Monograph, 2008). This situation is further expected to get worse due to impacts of climate change and as demands of different water use sectors out-match the existing supply. Water related conflicts are on the increase and will pose serious security risks in the catchments if the underlying issues are not adequately addressed. To address these challenges, there is a need to implement structural and non-structural approaches to improve water security through creation of water storage in the basin and promoting water demand management to minimize wastage of the scarce water resources among other resources. The proposed Bigasha multipurpose dam in Uganda is intended to address serious water scarcity problems being experienced now in the Bigasha valley and this is likely to get worse in the future.

The Bigasha dam site itself in Uganda is located on River Bigasha at coordinates E 266017.80 N9895130.00 (UTM WGS 1984 Zone 36S or longitude 30.8933°E and latitude 0.9473°S **(Figure 2-4)** It is located in Ngarama Sub county, Bukanga County, Isingiro District in Uganda. The site is located in a sub-tropical climate region evidenced by short grasses and scattered shrubs characteristic of dry savannah vegetation **(Plate 2-1).** The Bigasha riverbed is underlain by phylittes and quartzites with a dominant sedimentary lithology of alluvial deposits. Soils within the valley are commonly ferrasols with a characteristic red-brown colour. The river flows North-South but at the proposed dam site it changes direction slightly to Southwest. The area to be inundated by the proposed reservoir is relatively un-inhabited. The main economic activities downstream of the proposed dam are livestock rearing, cultivation of maize and beans on the hillsides. Most communities trek 2 – 5 km to access potable water from a few boreholes and unprotected wells. There is no access to electric power.

The Bigasha valley project area is drained by two seasonal streams, the Kagingo and the Nyakabingo streams which feed into the Bigasha River below. River Bigasha is a seasonal river which completely dries up during the dry season. There is little crop farming but there is still limited cutting of trees for improvement of cattle pastures.

Figure 2-4: Map of Kagera River Basin showing the Bigasha dam site and three other dam sites selected in Rwanda, Burundi and Tanzania.

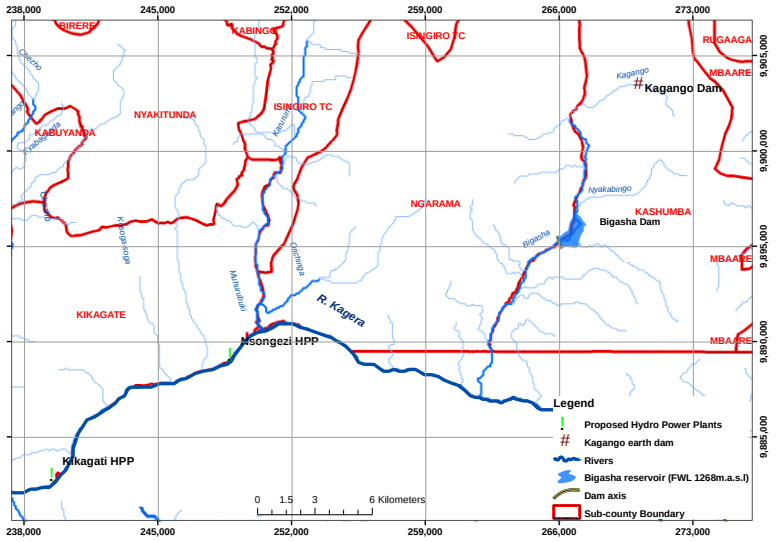


Figure 2-5: Location of Bigasha dam site showing Bigasha river and its tributaries; Kagango and Nyakabingo.

The land at the proposed dam site is currently used mainly for cattle grazing **(Plate 2-2)** and the area is water stressed. There are few banana plantations were also observed on the slopes of the mountains. The hills on the catchment are moderately steep. There is ample grass cover and forestation in the catchment. The hillsides are generally covered with grass and scattered

indigenous trees. Settlements occur on the slopes of the mountains a few kilometers away from the dam site.

Plate 2-1: Bigasha valley Dam site dominated by wooded – grassland and ant-hills; Note the rock outcrop in the foreground

Plate 2-2: Bigasha dam site with cattle grazing amongst the scattered Acacia bushes.

The Bigasha dam is expected to be earth fill with a height of 12 m. It will have a storage capacity of 6.41 million m^3 and reservoir surface area at FWL 1.45 km^2. The dam site area is sparsely inhabited. The features of the Bigasha dam are shown in **Table 2-1.** The dam is expected to provide water for domestic use, hydropower, livestock, and irrigation, fisheries, aquaculture and flood control. According to feasibility report**, the design life of the project is 25 years**. The dam characteristics are given below.

Table 2-1: Dam site features for the Bigasha dam site, Uganda

Coordinates of dam (Longitude, Latitude)	E 266017.80 N9895130.00 (UTM WGS 1984 Zone 36S)
Dam height (m)	12
Storage capacity (Mm^3)	6.41
Reservoir length (km)	2.37 at MWL
Reservoir width (km)	1.14 at MWL
Reservoir surface area at FSL (km^2)	1.45
Reservoir surface area at MWL (km^2)	1.64
Contributing catchment area (km^2)	101.06
Catchment sediment yield (Tons/km^2/yr)	637

2.2 AREA OF INFLUENCE

This is defined as the area that will be affected by the project development. The zones in this area have been defined based on the intensity of the impacts. These were identified under the Direct Impact Zone (DIZ) and Indirect Impact Area (INDIZ.)The DIZ is an area that will have

a direct impact from the project activities. The key DIZ areas include : the dam location, the reservoir area, irrigation & water supply areas, areas that will be affected by the creation of access road, material sources like burrow pits and quarry (where necessary), the camp sites (temporary), the downstream areas that normally receive storm water in the wet season and soil disposal sites. The DIZ is mostly in the villages of Katyazo, Nyakabingo and Kigando.

The INDIZ refers to areas that are surrounding the project area that may not be directly affected by the project, but may be influenced by human activities anticipated after the project has commenced. These areas include: the surrounding villages that are not directly affected and downstream villages

2.3 TECHNICAL DESIGN OF DAM

2.3.1 Civil works

Foundation

Grass, trees, excessively plastic soil and any deleterious material will be removed from the dam footprint. Then a cut-off wall will be constructed to a depth of about 15m. Shortcrete, dental concrete and slush grout will be applied where necessary.

Outlet works

This will consist of;

Intake trash screen, upstream pressure conduit, Agate shaft of 3m by 2m with 600mm thick reinforced concrete walls. Gate house will be 5m in diameter and 2.5m high with a 200 mm thick reinforced concrete roof, downstream pressure conduit and stilling basin.

Spill Way

Spill Way Ogee of 7.0m long, Spill Chute, Stilling Basin will have a concrete of 50m long and Return channel with lateral walls of 2.0 - 2.5m high.

2.3.2 Camp sites and Workshops

The camps and workshops are expected to be constructed. The proposed campsite location(s) are shown in **figure 2-1**. The campsites will consist of water supply structures, housing for workers, sanitation facilities and access roads. The Contractor will provide their own water either by constructing bore holes or getting water from the nearby sources.

Fuel and other lubricating oils will need to be stored at the work/campsite as there is no fuel pumping station near Bigasha.

Significant amounts of wastes are expected to be generated from the areas that are designated as workshops. More solid waste will be generated from the campsite together with the workshop area and this will include; plastic containers and bags, medical waste, domestic waste like food remains, peelings etc. , metal cuttings, wood, metallic tins and containers. From the workshop

area waste like; Liquid waste- fuels and oils used for machines in the workshop area, waste water and Sewage from sanitation areas will be produced. About 100 people will need to be accommodated and transported within the project area and a camp site of 700m^2 is expected to be put up to accommodate the workers and some activities.

2.4 PLANNED ACTIVITIES

The project activities include those during the pre-construction, construction and operational phases of the proposed Bigasha dam project. Each activity has potential impacts on the environment.

2.4.1 Pre - Construction Stage

Setting out (Demarcation of project area) and Site clearing (including dam axis and access roads)

i) Surveying: The proposed project area (dam site and reservoir) have been surveyed using aerial survey and detail surveys to mark off the project area on ground shall also be carried out.
ii) Clearing: the removal of all vegetation from dam axis
iii) Access road construction: this will involve the construction of the various roads required to access the area, construction camps, material sources etc.

Transport of Material to Site and sources

Road transport: materials sourced outside of the project area will be transported to the construction site by road. The existing Ngarama sub-county - Bigasha and other access roads will be utilised as a means of delivering these materials to site, with potential impacts on the transport infrastructure and road users in the area. Clay will be sourced from just around the reservoir and also aggregates will be from with the project area as indicated in project layout.

Establishment of Construction Camps

Construction of temporary camp: this will be established by the contractor, and involve clearing of the vegetation, fencing of the camps and the construction of houses, workshops, store-rooms and vehicle parking areas. The camp will be electrified and ablution and potable water provided. According to the project layout (figure 2-1) the campsite will be established within the project area. The camp will be 700m2 but the detailed design has not been determined yet. An Environmental Management Plan (EMP) has been compiled as part of the EIA, which will describe parameters to be considered.

2.4.2 Construction Phase

Construction equipment

A number of equipment will be required during this phase; they include 2 Bulldozers, 2 cement trucks, 2 Compactors, 1 Grader, 2 Hydraulic shovel, 5 Trucks and 2 Wheel loaders.

Borrow pit and Quarry Establishment

Designated borrow pit areas will be identified once detailed design work has been carried out on the proposed project. The establishment of borrow pits will be done in consultation with the District Environment Officer and the Community in accordance with the Mining Act 9/203. NEMA requires that a stand-alone Environmental Assessment be carried out for the Quarries and murram sources. A source of aggregate material shown in the project layout is assumed to be a quarry site. It is close to the dam site. However other material sources like murram are not yet identified

Site Cleaning and Rehabilitation

Site cleaning and rehabilitation involves removal of structures of the camp site, waste material generated during construction, regressing and replanting of the exposed areas. All waste material must be removed from site and disposed of appropriately once construction is complete. If the location of some of the structures was agreed upon with the local authorities and the communities, some structures can be left to benefit the farmers or be used as community school etc.

2.4.3 Operation and maintenance

This activity includes de-silting of the reservoir, clearing around the reservoir and maintenance of access roads to the reservoir. More details to be provided by the Design Team.

3 REVIEW OF RELEVANT EXISTING LAWS AND POLICIES

3.1 POLICIES

3.1.1 The National Environment Management Policy

The National Environment Management Policy for Uganda seeks to meet the following objectives:

a) Enhance the health and quality of life of all people in Uganda and promote long-term, sustainable socio-economic development through sound environmental and natural resource management and use;
b) Integrate environmental concerns in all development policies, planning and activities at national, district and local levels, with full participation of the people;
c) Conserve, preserve and restore ecosystems and maintain ecological processes and life support systems, especially conservation of national biological diversity;
d) Optimize resource use and achieve a sustainable level of resource consumption;
e) Raise public awareness to understand and appreciate linkages between environment and development; and
f) Ensure individual and community participation in environmental improvement activities.

3.1.2 National Water Policy, 1999

The overall policy objective for water resources management in Uganda is to manage and develop 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 of the present and future generations with the full participation of all stakeholders.

The National Water policy promotes the principle of integrated water resources management as a means for ensuring sustainable management and utilization of Uganda's water resources. The objectives of the water policy are to:

(i) Manage and develop 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 of the present and future generations with full participation of all stakeholders;
(ii) Ensure sustainable provision of safe water within easy reach and hygienic sanitation facilities, based on management responsibility and ownership by the users, to 77% of the population in rural areas and 100% of the urban population by the year 2015 with an 80-90% effective use and functionality of facilities; and
(iii) Promote development of water supply for agricultural production in order to modernize agriculture and mitigate effects of climatic variations on rain fed agriculture.

In addition to the above stated objectives, the water policy also recognizes the need for cooperation on trans-boundary water resources management issues and promotion of decentralization of water management functions.

The dam planned at Bigasha is multipurpose and thus will be in conformity with the National Water Policy.

3.1.3 The Gender Policy, 1997

The Policy recognizes women and children as the main carriers and users of water. It emphasizes the importance of gender responsiveness in terms of planning, implementation and management of water and sanitation initiatives. The Policy stipulates its overall objective as to mainstream gender concerns in the national development process in order to improve the social, legal/civic, political, economic and cultural conditions of the people of Uganda and women in particular.

The Policy specific objectives are:

(i) To ensure the participation of both women and men in all stages of the development and planning process and,

(ii) To promote equal access to and control over economically significant resources and benefits

The Government based on the National Gender Policy developed the Water Sector Gender Strategy in January 2003 with the purpose of providing stakeholders with operational guidelines on how gender principles will be mainstreamed within the water sector and its goal is to develop empowering approaches that will enhance gender equity, participation and access and control to resources in the water sector and thus reduction of poverty.

This policy has a bearing on the project in terms of the requirements to safeguard the interests of those who would want to participate in the project as well as those of the female headed households that are likely to be among the Project Affected Peoples (PAP).

3.1.4 The National AIDS Policy (2004)

This provides overall policy framework for national HIV/AIDS response. The National Policy on HIV/AIDS recognises special groups, which include migrant workers. The Policy recommends the need to identify strategies to address migrant workers in view of the challenges posed by mobility and vulnerability to HIV. This is in line with the Constitution of the Republic of Uganda, 1995 Article 39. This Article creates the right to a clean and healthy environment, implying that workplace safety and health (including prevention of HIV infection), is a basic right of every citizen. Under its General Objective XIV, the State is committed to fulfilling the fundamental rights of all Ugandans to, among others, social justice and economic development and shall, in particular, ensure that all developmental efforts are directed at ensuring the maximum social and cultural well-being of the people.

The workers who may come from outside the project area during construction of the dam together with the community are likely to be exposed to the environment that encourages the spread of HIV/AIDS. The strategies to fulfil the objective of this policy will need to be incorporated in the project during the planning process.

3.1.5 Clients Charter 2011-2014

This CLIENTS' CHARTER is a document presenting the Ministry of Water and Environment's mandate, vision, values, principles, key results areas and commitments with a view to improving the levels of service delivery, productivity and quality of our staff.

The charter sets out our commitment for the services we will deliver and standards that clients should expect from us. The main purpose of this charter is to improve awareness to the public of the availability, timeliness and quality of the services offered by the Ministry of Water and Environment (MWE).

One of the commitments mentioned in the Charter under Water for Production is construction of 5 earth dams to create impounding reservoirs within 3 years and one bulk water supply scheme within 2 years. The construction of Bigasha dam will create a reservoir thus partly fulfilling the commitment to create impounding reservoirs.

3.1.6 Land use policy

The overall goal for the national land use policy is to achieve sustainable and equitable socio-economic development through optimal land management and utilization. The specific goals of this policy include ensuring adequately planned land use systems that provide for orderly and sustainable urbanization, industrial and infrastructural development; adopt improved agriculture and other land use systems that will provide lasting benefits for Uganda; to reverse and alleviate adverse environmental effects at local, national, regional and global levels; to promote land use activities that ensure sustainable utilization and management of environmental, natural and cultural resources for national socio-economic development; to ensure planned, environmentally friendly, affordable and well-distributed human settlements for both rural and urban areas; and to update and harmonize all land use policies and laws and strengthen institutional capacity at all levels of the Government.

The policy has 33 policy statements ranging from making available, on regular basis, land use/land cover data which is of sufficient detail and effectively disaggregated to enhancing implementation of regional and international conventions and other protocols to which Uganda is (or will be) a signatory and in compliance with national laws, policies regulations and guidelines.

The need for an integrated approach towards land use planning is highlighted. The coordination of activities of all stakeholders in land use planning is emphasized. In particular the involvement of land owners, community groups, women, youth and the poor in making land use related decisions that affect them is regarded as being critical in the successful implementation of the policy.

The dam at Bigasha is likely to inundate a sizeable amount of land; therefore the policy will be applicable in this project.

3.1.7 National Development Plan 2010/11-2014/15

This has a vision of transforming Uganda society from a peasant to a modern and prosperous country within 30 years. Its theme is "Growth, Employment and Socio-economic Transformation for Prosperity". In Section 6.4.1 part 401, the Government of Uganda in this plan recognizes that water is one of the vital inputs in production processes. Delivery of reliable and sufficient water to production units is a key economic infrastructural support to stimulating production, especially in the agricultural, tourism and industrial sectors. According to this plan, the major uses of water for production in the country currently include crop irrigation, fish rearing, livestock farming, industrial processing and wildlife conservation.

Putting up a multipurpose dam at Bigasha is in line with this plan.

Section 8.4.1 gives general overview of the environment in Uganda. Part 713 of this section indicates that, there has been rapid deterioration of the quantity and quality of these natural resources as a result of increased pressure from high population and economic activities. Strategies to counteract this situation are also proposed in Section 8.4.3 of this plan and include;

Strategy 1 which is to restore the forest cover to 1990 levels and Strategy 2 which is to restore wetlands, rangelands and to monitor restoration of all ecosystems.

Bigasha project area is located in a valley that is surrounded by hills that have been degraded through cultivation and over-harvesting of wood resources. Restoration of some of these areas will be very important for the sustainability of the proposed dam at Bigasha.

3.2 LEGAL FRAME WORK

3.2.1 The Constitution of the Republic of Uganda

The Constitution of the Republic of Uganda 1995 has a number of articles concerning protection of natural resources. In Article XIII: "the obligation of protecting important natural resources on behalf of the people of Uganda" is vested with the state. Article XXVII stipulates the need for sustainable management of land, air and water resources, Article 237 on Land ownership provides that Land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure systems provided for in this Constitution. Article 242 highlights land use in which Government may, under laws made by Parliament and policies made from time to time, regulate the use of land while Article 245 among others concerns protection and preservation of the environment from abuse, pollution and degradation as well as managing the environment for sustainable development and promoting environmental awareness.
Furthermore, article 26 on protection from deprivation of property, the Constitution gives a right to every person to own property either individually or in association with others (1). Section 2 of this article stipulates that no "person shall be compulsorily deprived of property or any interest in or right over property of any description except where the following conditions are satisfied-
a) taking of possession or acquisition in necessary for public use or in the interest of defence, public safety, public order, public morality or public health; and
b) the compulsory taking of possession or acquisition of property is made under a law which makes provision for-

i) prompt payment of fair and adequate compensation, prior to the taking of possession or acquisition of the property; and
ii) a right of access to a court of law by any person who has an interest or right over the property.

The proposed dam site at Bigasha will affect grazing land privately owned, structures and other properties. Thus this law will be triggered.

3.2.2 National Environmental Act, Cap 153

The National Environment Act, Cap 153 contains provisions for environmental management and protection including the need to carry out Environmental Impact Assessment (EIA) studies in connection with some categories of projects that are likely to have significant impacts on the environment as contained in its Third Schedule.

Dam projects are listed under this category in the Third Schedule (Section 4a) and are therefore required to be preceded by EIA.
It is a requirement under this act that construction sites be restored to their original state and the authority may issue an environmental restoration order in matters relating to management of environment and natural resources (Section 67).

3.2.3 Environmental Impact Assessment Regulations, 1998

The National Environment Management Authority (NEMA) issued Environmental Impact Assessment (EIA) Regulations, S.I. No. 13/1998 for conduct of EIAs, which are now part of the Environmental Legislation of Uganda. The actual implementation of the EIA process remains a function of the relevant line ministries and departments, the private sector, NGOs and the general public. Part I-V of the EIA Regulations describes the process of preparing Environmental Impact Statement. This process has therefore been followed in the preparation of the EIA for the proposed construction of a dam at Bigasha. When the Environmental impact statement has been submitted, considered by the Executive Director and approved, a **certificate of approval** will be issued to the developer (section 26(c)).

Furthermore, Regulation 31 provides for self-auditing and Section 1 stipulates that the developer is responsible for compliance to the measures provided in the Environmental Impact Statement (EIS). Section 2 of the same regulations requires that an initial audit be carried out within not less than 12 months after commencement and the audit shall be carried out by qualified persons approved by the Executive Director for the purpose. An audit report shall be prepared and submitted to the Executive Director.

3.2.4 The National Environment (Waste Management) Regulations 1999

These regulations apply to all categories of hazardous and non-hazardous waste, storage and disposal of hazardous waste and their movement into and out of Uganda and to all waste disposal facilities, landfills, and sanitary fills and to incinerators.

The regulations also describe issues such as sorting and disposal of domestic waste, cleaner production methods, application for licenses for transportation and storage of waste, packaging of waste and powers of environmental inspectors, among others. Construction of a dam is likely to generate waste of different types like soil spoil, used oils, metallic containers and other waste from camp site; handling of these wastes has to follow the regulations. Hazardous waste such as used oil should be stored in specially designed facilities for that purpose and licensed by NEMA. Transportation of such waste should also be licensed by NEMA.

3.2.5 The National Environment Regulation S.I No. 2/2000

Wetlands, River Banks and lakeshores Management

This regulation provides that a person who intends to use the river in ways indicated in Section 23 (1) of these regulations which includes placing a structure over or under the river bank or lake or drill or any other disturbance, will be required to apply for a permit to the Executive Director in "Form A" set out in the First Schedule to these regulations. NEMA may grant the permit in "Form B" set out in the First Schedule to these regulations after consultation with the lead agency. Once a reservoir has been put in place, its banks will be protected by this Law. Therefore this Law will be applicable during reservoir operation.

3.2.6 The Local Government Act, 1995

This Act provides the legal foundation of the Government Policy on decentralization and devolution of functions, powers, and services to Local Governments. Under this Act, district and lower local councils are given the responsibility of managing their natural resources including environment at the Local Government level. Natural Resources Committee is responsible for environmental issues at the district.

Thus, Local Governments in Isingiro, Ngarama and Kashumba Sub-counties have been involved in scoping and will be involved in actual EIA studies as well as in issues of land acquisition, compensation and environmental monitoring and compliance in this project.

3.2.7 Land Act, Cap 227

This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Government or developer is to compensate any person who suffers damage as a result of a project development. The Law provides the legal basis for Land Tribunals that deal with land acquisition cases and land disputes in Uganda. Land acquisition is expected especially for the area that will be inundated by the reservoir.

Section 70 of this act stipulates that all rights in the water of any natural spring, river, stream, watercourse, pond, or lake on or underground shall be reserved to the Government and no such water shall be abstracted, dammed, diverted or polluted or interfered with directly or indirectly except if permission has been granted by Minister for Water or Natural Resources.

The dam construction at Bigasha is proposed in the watercourse of a seasonal river and thus this Act will be applicable.

The Land Act provides for the tenure, ownership, and management of land and dispute resolution. Subject to Article 237 of the Constitution, all land in Uganda is vested in the citizens of Uganda and is owned in accordance with the customary, freehold, mailo and leasehold land tenure systems. The land law provides security of tenure to customary and bonafide occupants which is likely to strengthen their interests in conserving the land as a resource. Section 30 defines lawful and bonafide[1] occupancy and use of land which may be registered (freehold, mailo, lease or sub-lease).

Under the Land Act, all owners and occupiers of land are to manage it in accordance with National Forestry and Tree Planting Act Cap 8/2003, Mining Act Cap 9/2003, National Environment Act, the Water Act Cap 152, Uganda Wildlife Act Cap 200, the Town and Country Planning Act and any other relevant law.

It creates a series of land administration institutions (Section 47-74) consisting of Uganda Land Commission (ULC), District Land Boards (DLB), Parish Land Committees (PLC) and Land Tribunals. Section 42 (7a-e) states the procedures for any compulsory acquisition of land by the Land Commission while Acquisition of land by Government or Local authority for public use is provided for under Section 43.

The Act gives valuation principles for compensation under Section 60 (1) while Section 78 requires compensation rates to be yearly approved by DLBs. The Value for customary land is the open market value, the value for buildings on land taken shall be the replacement cost in rural areas whereas 30% and 15% (of total sum assessed) disturbance allowance is to be paid if less than six months or six months' notice respectively is given for vacating the land.

[1] Land occupied and utilised for 12 years or more before the 1995 Constitution, unchallenged by the registered owner

Land dispute resolution is by land tribunals as stipulated under Section 77 (a-e) and 78 while resolution by traditional authorities is covered by Section 89. Section 90 (2) deals with the role and function of a mediator.

This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Government or developer is to compensate any person who suffers damage as a result of a project development. The Law provides the legal basis for Land Tribunals that deal with land acquisition cases and land disputes in Uganda.
It is expected that land will be required for the project and therefore land acquisition is envisaged.

3.2.8 Land Acquisition Act, 1965

This Act makes provision for the procedures and methods of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Minister responsible for land may authorize any person to enter the land, survey the land, dig or bore the subsoil or any other thing necessary for ascertaining whether the land is suitable for a public purpose. The Government or developer is to compensate any person who suffers damage as a result. The Act requires that adequate, fair and prompt compensation is paid before taking possession of land and property. Dispute arising from the compensation to be paid should be referred to the court for decision if the Land Tribunal cannot handle.

An area of about 444acres (180Ha) is expected to be inundated by the reservoir and some more land may be used temporarily during construction. This Act will therefore be triggered by this project.

3.2.9 The Access Roads Act, Cap 350

The Act seeks to ensure that a private landowner/developer who has no reasonable means of access to public highway may apply for leave to construct a road of access to a public highway. The Act establishes a mechanism of applying for an access road to public highway and a legal regime to ensure the safety of the neighbouring environment. The Act permits the owner of any land over which an access road is to be constructed to be paid compensation in respect of the use of land, the destruction of crops or trees and other property on the land. The Act also has provisions for grievance resolution between the developer and owner of land over which the access is to be constructed by applying to a Magistrate's Court for leave to construct a road of access.

Presently the proposed site at Bigasha is accessed through a very small and temporary road which will need to be expanded. Therefore this Act will be applicable.

3.2.10 Water Act, Cap 152

According to Part II (Water Resources) of Water Act, the Minister and the Director are responsible for the implementation of this Act which provides for the use, protection and management of water resources and supply, provide constitution of water and sewage authorities as well as facilitating devolution of water supply and sewerage undertakings. The objectives of the statute are, inter alia, to allow for the orderly development and use of water resources for purposes other than domestic use, such as irrigation and agriculture, in ways that would minimize harmful effects to the environment. Domestic use, as interpreted herein, includes use

for the purpose of irrigating a subsistence garden.

Part I Section 4(1) of the Act spells out the objectives which include a(ii) the coordination of all public and private activities which may influence the quality, quantity, distribution, use or management of water resources.

Part I Section 6 (1) stipulates that notwithstanding any other law to the contrary; no person shall acquire or have a right to:

a) Use any water
b) Construct or operate any works; or
c) Cause or allow any waste to come into contact whether directly or indirectly with any water, other than under the provision of this Part of the Act.

According to this Act, section 18 (1) no person is allowed to construct or operate any water works unless authorised under this act to do so. Thus Bigasha multipurpose dam **project will need to apply for the permi**t (section 18(2)).

This Act therefore will be applicable to the reservoir at Bigasha that will be created after dam construction.

3.2.11 Mining Act, 9/2003

The Uganda Geological Survey and Mines Department is responsible for the implementation of the Mining Act, 9/2003 which establishes the framework for the utilization of mineral resources in Uganda. The Commissioner in charge of mining is responsible for granting of licenses for prospecting and exploration of minerals as stipulated in Section 19, 20 and 27 of the Act. A mining license is required in order to mine any mineral. Application and granting of a mining lease is also provided for in Section 40, 41 and 42 of the same Act. Section 14 (2) provides for the health and safety of persons employed in the mine while the rights of owners or lawful occupiers of land on which the powers of the Commissioner are exercised for prospecting exploration are also preserved under Section 14 (3) of this Act .

Section 82 of the Act entitles the owner or lawful occupier of any land subject to a mineral right to claim fair and reasonable compensation from the holder of such mineral right for any disturbance of the rights of such owner or occupier, or for any damage done to the surface of any such land as a result of the mineral holder's operations.

Part XI of the Act, incorporating Sections 108 to 112, on the other hand, contains provisions relating to the protection of the environment in accordance with the requirements of the National Environment Act, Cap 153. This part, inter alia, requires the Commissioner or an authorized officer, in deciding whether to grant a mineral right, to take into account the need to conserve the natural resources in or on the land over which such mineral right is sought, and in any neighbouring or adjoining lands, requires the Commissioner to request for an Environmental Impact study as a condition for granting a mining lease. Section 110 requires that the holder of the lease submits an environmental restoration plan of the area that may be damaged or adversely affected by the operations.

Part XII of the Act, incorporating Section 113 to 121 of the Act, deals with important miscellaneous matters, such as the right of women to work or be employed underground in a mine or any operations or activities relating to or associated with mining.

Dam construction is likely to require aggregates thus stone quarry sites may be identified. Aggregates are minerals categorized as industrial minerals; therefore this Mining Act will be applicable in this project. Mining, including quarrying and opencast extraction of stone aggregates, sand and gravel are listed in Section 6 of this schedule and require compliance with the EIA process.

3.2.12 Occupational Safety and Health Act, 2006

This is a two way Act that obliges employers to protect their workers and charges the employees to take responsibility of their safety while at work. The Act concerns not only the work area but also its immediate environment.

According to Section 13 (1)a of the Occupational Safety and Health Act, it is the responsibility of an employer to take as far as reasonably practicable, all measures for the protection of his or her workers and the general public from the dangerous aspects of the employer's undertaking at his or her own cost.

Section 19 (2) further spells that it shall be the duty of an employer to ensure that Personal Protective Equipment provided under Sub-section (1) is used whenever it is required.

This Act is of relevance to this dam construction project to guarantee the safety of all the workers that will be involved in the project and even the surrounding community members of the respective communities.

3.2.13 Workers' Compensation Act 2000

The Act provides for compensation of workers for injuries suffered and scheduled diseases incurred in the course of their employment.

The Act further spells out degrees of compensation depending on the levels of incapacitation, calculation of respective earnings, medical examination and treatment of workers, agreement as to compensation by the worker, power of Court to submit question of law, determination of claims and decisions of the court concerning the treatment of medical reports as well as procedures relating to claims.

This Act is applicable to this project to deal with issues likely to accrue from accidents while at work.

3.2.14 The National Environment Regulations, S.I No. 63/2001

Management of Ozone Depleting Substances and Products

This Law was formulated in response to the Vienna Convention for Protection of Ozone Layer of which Uganda is a signatory. Details of the Convention are discussed under Section for International Agreements. According to this regulation Section 3, this Law seeks to:

a) Regulate the production, trade and use of controlled substances and products;
b) Provide system of data collection that will facilitate compliance with relevant reporting requirements under the Protocol
c) Promote the use of ozone friendly substances, products, equipment, technology and;
d) Ensure the elimination of substances and products that deplete the ozone layer.

Schedules 1 and 2 of this Law give a list of Controlled Products (Greenhouse gases) and

Controlled substances (Ozone depleting substances) and Prohibition dates respectively.

A number of construction equipment will be used during construction and these usually use CFCs and HCFCs which are ozone depleting substances and use of high efficiency equipment will reduce the amount used. Thus this Law is applicable to the construction of the dam at Bigasha.

3.2.15 Water Resources Regulations, SI No. 33/1998

Section 10 Part 1(a) of these regulations stipulates that any person who occupies land, on or adjacent to which;

- There is a motorized water pump which, whether temporarily or permanently, pumps water from a borehole or water way;
- There is a weir, dam , tank or other work capable of diverting or impounding an inflow of more than 400 cubic metres in any period of 24 hours;
- There are works for non-consumptive uses, shall register the works and the use of water with the Director.

Bigasha dam is expected to have a reservoir of 6.41 million cubic meters of water. This regulation therefore will be applicable.

Furthermore, section 16 of this regulation requires that any person who wishes to engage a driller or to contract a borehole shall apply to the **Director for a Drilling Permit**. There is a possibility for the contract to put a borehole at the campsite to provide water for the workers, thus it may be required.

3.2.16 The Historical Monument Act, Cap 46

This is an act to provide for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interests and for other matters connected therewith. Section 1 of this Act describes these terms used above. Section 8 of this Act specifies actions that are prohibited. Section 11 stipulates that any discoveries of the objects made that are considered to be of importance according to this Act shall be reported to the conservator of antiquities or district commissioner or the curator of the museum within fourteen days.

Any person who contravenes any of the conditions issued under this Act commits an offence and this attracts a fine as stipulated in Section 19 of this Act. Excavations may be carried out during dam construction, murram and rock mining activities which all may affect monuments and cultural property where they exist.

In Isingiro district where the proposed project is located, is a monument at a location where Henry Morton Stanley met the King (Omugabe) of Ankole, but this is over 15km away from the

Bigasha site. Thus properties of this nature if found will need to be protected according to the Act.

3.2.17 Petroleum Act, Cap 149

According to Section 2 of the Act, petroleum shall not be imported, unloaded, landed, transhipped, or transported except in accordance with the provisions of the rules (Section 3) under this Act. Any person who contravenes the rules specified in Section 3 commits an offence as described in Sections 4-6. Penalty for contravention of these rules is provided for in Section 9 of this Act.

During dam construction a lot of fuel and other petroleum products are likely to be required therefore bulk transport and storage in the project area is expected and this shall have to comply with the requirements of this Act.

3.2.18 The National Environment (Audit) Regulations, 2006

Regulation 3 indicates the requirement of a regular environmental Audit which is also stipulated in Regulation 31 of the Environmental Impact Assessment Regulations, S.I. No. 13/1998. This should be enforced as stipulated in Section 3 (3)c and Section 22 of the National Environment Act Cap 153. Regulation 4 requires that a person to carry out this audit should be duly certified and registered in accordance with the National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003. Furthermore, Regulation 14 provides for the manner in which the environmental inspector may carry out an enforcement audit.

Dam construction, its operation and maintenance may require regular audits.

3.2.19 The National Environment (the Control of smoking in public places) Regulations S.I, 2004

The Regulations emphasize the right to clean and healthy smoke free environment. The regulations are in line with Section 107 of the National Environment Act, Cap 153 which gives provisions of the requirements under these regulations.

Furthermore, the regulations give a list of Public places in which smoking is prohibited, and a list of Public places in which smoking is restricted. The areas where smoking is prohibited include; Offices, office buildings and work places including individual offices, public areas, corridors, lounges, eating areas, reception areas, lifts, escalators, foyers, stairwells, toilets, laundries, amenity areas. Construction sites are usually characterized by eating places at workers' camps, workshops, work sites, offices, toilets and others.

'No smoking' signages should strategically be placed at prohibited areas and areas designated as

'smoking areas' properly indicated. These regulations will therefore be applicable to this project.

3.2.20 Uganda Wildlife Act Cap 200

The Uganda Wildlife Policy formed the basis for the enactment of the Uganda Wildlife Act, Cap 200 and the establishment of the Uganda Wildlife Authority (UWA) as a mandated agency to manage all matters of wildlife in Uganda. The purpose of this Act is to promote the conservation and sustainable utilization of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use. Also, the Act puts emphasis on public participation in wildlife management.

Although there are no wildlife protected areas in the project area (Ngarama and Kashumba Sub-counties), some few wildlife animals were reported during reconnaissance. These will need protection and at the same time some may damage the dam structure, thus this Act will be relevant to this project.

3.3 INSTITUTIONAL FRAMEWORK

The construction and management of Bigasha Multipurpose Dam will bring into play various ministries, departments and agencies. The key institutions will include; Ministry of Water and Environment; Ministry of Agriculture, Fisheries and Fisheries (MAAIF), Ministry of works and Transport, Ministry of Local Government; Ministry of Health (Public Health); National Environment Management Authority (NEMA); Office of Prime Minister-Department of Disaster Preparedness and Local Governments, Directorate of Water Resources Management (DWRM), Directorate of water Development (DWD), Water for Production Department, National Water and Sewerage Corporation (NWSC), National Forestry Authority, Isingiro local government and the affected at all levels. Each of the institution mentioned has a role to play as far as dam issues are concerned and the key institutions relevant to the proposed Bigasha project are indicated below.

3.3.1 Ministry of Water and Environment

Ministry of Water and Environment is the lead Ministry responsible for ensuring sound environmental management that in turn ensures that there is sufficient water for domestic, agricultural and industrial uses. The project being studied falls under this Ministry where it has impeccable interests in the development while taking into account compliance with environmental laws and regulations. MWE has the responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management. It also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery. MWE works through Directorate of Water Resources Management (DWRM), to develop and maintain

national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permit.

3.3.2 The Directorate of Water Resources Management (DWRM)

The Directorate of Water Resources Management (DWRM) under MWE is the lead agency responsible for water resources management in Uganda. Its key functions include; among others provision of water resources related advisory services to the government, private sector and NGOs at the national and local levels; regulation of water resources through issuing water use abstraction , wastewater discharge permits, wastewater discharge, hydraulic works construction, borehole drilling and easement certificates; water resource monitoring and assessment, Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of trans boundary waters resources and peaceful cooperation with Nile Basin riparian countries. The directorate comprises three departments namely Department of Water Resources Monitoring and Assessments, Department of Water Resources Regulation and Department of Water Quality Management.

3.3.3 The Directorate of Water Development (DWD)

The Directorate of Water Development (DWD) under MWE is the lead agency responsible for coordinating and regulating all water supply and sanitation activities. It provides technical support services and capacity development to local governments and other service providers. DWD comprises three Departments; Rural Water Supply and Sanitation; Urban Water Supply and Sanitation and Water for Production. DWD will therefore be relevant to the project at Bigasha.

3.3.4 Water for production Department

Water for Production refers to development of water resources for productive use (crop irrigation, Livestock and aquaculture), rural industries, and other commercial uses. Water for production is a critical area that contributes to overall National Development Plan. The long-term objective of Water for Production is "To promote development of water supply for agricultural production in order to modernize agriculture and mitigate effects of climatic variations on rain-fed agriculture" through:

- Bulk water transfer from areas of plenty to areas of scarcity.
- Promoting water resources assessment and planning for agricultural production - Increasing the capacity of the farmers to access and use of water for crop, livestock and fisheries production.
- Promoting appropriate water harvesting technologies for irrigation and livestock development.
- Promoting the participation of the farmers and the private sector in financing and planning, development and management of irrigation and livestock water supply systems.

- Provision of technical support to line ministries and local Government. Therefore Water for Production will be responsible for development and operation of Bigasha Multipurpose dam project.

3.3.5 The National Water and Sewerage Corporation (NWSC)

NWSC is a parastatal that operates and provides water and sewerage services for 23 large urban centres across the country. NWSC's activities are aimed at expanding service coverage, improving efficiency in service delivery and increasing labour. NWSC is relevant to this project because the project will have a water supply component that may include treatment works once Bigasha dam has been constructed.

3.3.6 The National Environment Management Authority (NEMA):

NEMA responsible for the regulatory functions and activities that focus on compliance and enforcement of the existing legal and institutional frameworks on environmental management in Uganda. NEMA's mandate covers both green and brown issues of environmental management. It oversees the implementation of all environment conservation programmes and activities of the relevant agencies both at the national and local Government level.

3.3.7 The National Forestry Authority (NFA)

NFA is responsible for sustainable management of Central Forest Reserves (CFRs), supply of seed and seedlings, and provision of technical support to stakeholders in the forestry sub-sector on contract. NFA is a semi-autonomous business entity and generates most of its own revenues and finances its activities, i.e. NFA's support is contingent upon payment for its services. Any intervention proposed to plant trees to mitigation project impacts will be done under the guidance of NFA.

3.3.8 Ministry of Agriculture, Animal Industries and Fisheries (MAAIF)

MAAIF is the lead agency for water use and management for agricultural development on-farm. The on farm functions carried out by MAAIF include among others ;Policy formulation for water use for irrigation, livestock, aquaculture and other agro-based activities, carrying out nationwide assessment on water for agricultural production needs, developing standards, guidelines and specifications for water use and management "on-farm" and schemes and assist in forming Community Water User Associations, planning/budgeting for water use and management on water use on public farm and schemes respectively, technical guidance to public sector developers on water use and management, Quality assurance, water use for irrigation, livestock etc. on farms, promoting appropriate technologies on efficient water use by all categories of farmers and monitoring and support supervision on water use for irrigation and agricultural production.

MAAIF collaborates with Ministry of Water and Environment on water for production programs (irrigation and water for livestock) and fisheries. The Ministry is also responsible for

irrigation scheme that will be set up in the Bigasha Multipurpose dam project.

3.3.9 Ministry of Trade tourism and Industry

The mandate of MTTI covers water use and management of industries, commerce, wildlife and tourism. MTI has some responsibilities on conservation of water catchments in these areas. If the tourism potential from Bigasha dam project is to be developed, it will be the responsibility of this ministry with the local authorities and the community.

3.3.10 Ministry of Energy and Mineral development

The mandate of MEMD is water use and management for hydropower generation. MEMD interfaces with MWE on planning and regulation of water resources utilization for hydropower development. It is expected that the dam will also be used for power generation. Furthermore, power will be required for pumping water to the villages as they are in the hills. This ministry therefore will be relevant for this project.

3.3.11 Department of Disaster Management

The Department of Relief, Disaster Preparedness and Management in Office of the Prime Minister is the lead agency responsible for disaster preparedness and management in Uganda. It coordinates risk reduction, prevention, preparedness, mitigation and response actions in the country in consultation with other line ministries, humanitarian and development partners, Local Governments and the Private sector. The Minister responsible for relief, disaster preparedness and refugees links the Department to Cabinet which directs policy and advises the President. On day-to-day and routine matters, the Minister makes rules and regulations on the management of likely disasters and presents annual reports relating to Disaster Preparedness and Management to Cabinet. The Minister also links the Office of the Prime Minister to inter-governmental organizations, the donor community, the private sector, regional and international frameworks. With the dam in place, there is need to set up measures for its safety. However there have to be emergency plans in place to mitigate impacts of disaster that may result from the dam. Thus this department will be involved in all stages from planning to operation and will remain relevant up to end of project life.

3.3.12 Isingiro District Local Governments

The system of Local Government (LG) in Uganda is based on the District as a unit under which there are Lower Local Governments and Administrative Units. In each LG there is the political (composed of elected leaders) and technical (composed of civil servants).Each LG is by law assigned powers of making local policy and regulating for the delivery of services; formulation of development plans based on locally determined priorities; receive, raise, manage and allocate revenue through approval and execution of own budgets; alter or create new boundaries; appoint statutory commissions, boards and committees for personnel, land, procurement and accountability; as well as establish or abolish offices in Public Service of a District or Urban Council.

The dam site and the reservoir are located in Isingiro district thus it will be the local government responsible for this dam.

It is important to note that major service provision responsibilities other than Water Resources Management (WRM) functions are devolved to Local governments in Uganda. All the other functions related to natural resources; environment, forestry, agriculture, land management, health and water supply are decentralized. Line ministries for such resources only provide technical supervision and advice, mentoring of Local Governments and liaison with international agencies.

In every LG, there is Technical Planning Committee (TPC) chaired by the Chief Administrative Officer (CAO) and comprised of heads of department and any other technical person co-opted by the CAO. Isingiro District has ten departments; management, Finance, Health, Education, Production, Works, Community Based Services, natural resources, planning and internal audit.

Local Governments in principle are the main providers of local service delivery including managing projects initiated by Ministries and agencies. Sector linkage between sectors and Local Government institutions is crucial for the manner in which local services are delivered. Sectors work with local governments system to enhance service delivery but also pursue sector specific strategies to enhance local level service delivery.

3.4 EAST AFRICAN INSTITUTIONS

3.4.1 The East African Community

3.4.1.1 The EAC Treaty, 1999

The objectives of the Treaty include the sustainable utilisation of natural resources; taking measures to protect the environment; sharing meteorological information; collaboration in the development of energy sources; and cooperation in environment & natural resources management. The need for joint efforts in environmental protection and conservation was realized right from the formulation of the revived East African Cooperation.

Cooperation in environment and natural resources management is stipulated in Chapter 19 of the treaty. The fact that development activities may have negative impacts on the environment leading to degradation of the environment and depletion of natural resources is recognized by Partner States as well as a clean and healthy environment being a prerequisite for sustainable development.

The States agree to take measures to foster cooperation in the joint and efficient management and sustainable utilization of natural resources within the community; and shall provide prior and timely information to each other on activities that may have significant trans-boundary impacts

and shall consult at an early stage. The development of a common environment management policy is encouraged including joint development and adoption of water resources conservation and management policies that ensure sustenance and preservation of ecosystems

The states undertake to adopt common environmental control regulations, incentives and standards; and develop capabilities and measures to undertake EIA of all development project activities and programmes.

3.4.1.2 The Protocol on Environment and Natural Resources, 2006

The Protocol is not yet in force pending the ratification of a member State (Tanzania). It governs cooperation between the Partner states in the management of the environment and natural resources over areas within their jurisdiction including trans-boundary environment and natural resources.

The Protocol provides for areas of cooperation between Partner States and specifically for cooperation in conducting EIA and environmental audits. Other areas of cooperation include the management of transboundary resources; harmonisation and adoption of common policies, laws & programmes requiring EIA; prior planning for transboundary activities & projects that may have adverse impacts. Common guidelines on EIA in shared ecosystems shall be adopted. Partner states undertake to ensure that the Regional Environment Assessment Guidelines for Shared Ecosystems of East Africa-Annex I to the protocol-are adhered to. The Annex is currently under review by the EAC and does not yet constitute part of the Protocol.

Bigasha dam is located on Bigasha seasonal river that is a tributary of Kagera River which is a transboundary river thus the protocol will not really be applicable.

3.4.1.3 Draft EAC Climate Change Policy, 2011

A *Draft EAC Climate Change Policy, 2011* has been proposed and is in the approval process. The policy was developed as a result of lack of national policies on climate change and the effects of climate change in the East African region. The proposed EAC Climate Change Strategy and Climate Change Master Plan were referred by the Sectorial Council on Environment and Natural Resources to Partner States for further input.

3.4.1.4 Transboundary Ecosystems Management Bill, 2010

A *Transboundary Ecosystems Management Bill, 2010* was proposed in the East African Legislative Assembly (EALA) as a private members' Bill but was deferred because of its ramifications on the existing legal and institutional mechanisms in place in Partner States.

3.4.2 The Lake Victoria Basin Commission (LVBC)

3.4.2.1 The Protocol for the Sustainable Development of Lake Victoria Basin, 2003

LVBC is established under the Protocol for the Sustainable Development of Lake Victoria Basin. The Protocol looks to cooperation of Partner States in conservation and sustainable utilisation on the basin resources. All LVBC programmes are aimed at promoting sustainable development in the Lake Victoria basin.

In implementing programmes particularly development projects, there may be need for EIA. Some projects are environmental mitigation measures to restore degraded environments around the lake basin. Projects that require EIA are subjected to national processes. This applies to trans-boundary projects since there is no mechanism currently available for trans-boundary EIA.

Kagera Basin where Bigasha dam falls is a sub- basin of Lake Victoria Basin and therefore this dam project will be subjected to the EIA requirements of Uganda.

3.5 REQUIREMENTS OF INTERNATIONAL FINANCIAL INSTITUTIONS

3.5.1 World Bank Safeguard Policies

The 'Environmental and Social Safeguard Policies' of the World Bank consist of Operational Policies (OP), Operational Directives (OD) and Bank Procedures (BP). Some of these policies likely to be triggered by the proposed dam construction at Bigasha are highlighted below.

Safety of Dams (OP 4.37)

Section 1 of these procedures clearly indicates that the responsibility of ensuring that appropriate measures are taken and sufficient resources provided for the safety of the dam lies with the owner irrespective of its funding sources or construction status.

Section 2 to 6 of OP 4.37 concerns the "New Dams". When the project includes the construction of a new dam for example a water storage dam for multipurpose project, it requires that the dam be designed and its construction supervised by experienced and competent professionals. It also requires that the lender makes sure that the borrower adopts and implements certain dam safety measures for the design, bid tendering, construction, operation, and maintenance of the dam and associated works (Section 2). Section 3 distinguishes between small and large dams. Section 3a stipulates that small dams are normally less that 15meters in height. Section 3b indicates that large dams are 15 meters or more in height. However if they present special design complexities-for example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials then if such dams are between 10-15meters in height are treated as large dams. Bigasha dam is a proposed new dam of 14 m high with storage capacity of about

9.81Mm^3. Therefore from OP 4.37 Section 3 (a) this is a small dam. According to Section 4 of these procedures for small dams generic dam safety measures designed by qualified engineers are usually adequate.

Environmental Assessment (OP/BP 4.01)
Section 7 requires that a range of EA instruments be used depending on the project. Section 8 categories the project according to type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. This policy emphasizes consultation and public disclosure. Section 14 requires that developer of category A and B projects consults the project-affected groups and local nongovernmental organizations (NGOs) about the project. The policy also requires that relevant material be provided in a timely manner prior to consultation and in a form and language that is understandable by groups being consulted (Section 15). Before the project can be upraised by the Bank, an EA report for such project (Category A and B) has to be disclosed to the affected persons and the public. Furthermore, the developer is required to report on compliance monitoring of the EMP.

A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats-are less adverse than those of Category A projects.

Bigasha dam project may have impacts that are likely to be site specific, few if any irreversible impacts and mitigatory measures will be easily designed. Also the dam will not cause relocation of households and replacement land for grazing will be easy to find and the habitat is not really very sensitive. Therefore Bigasha dam project can be categorized as a Category B project.

Cultural Property (OP/BP 4.11) Physical Cultural resources
These procedures assist in preserving physical cultural resources (PCR) and held in avoiding the destruction or damage. PCR includes resources of archaeological, paleontological, historical religious (including graveyards and burial sites), or other cultural significance.

Involuntary Resettlement (OP/BP 4.12)
This Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. Therefore the Bank has the following objectives on involuntary resettlement;

- To avoid involuntary resettlement and where this is not feasible, resettlement activities should be conceived and executed as sustainable development programs through meaningful consultation,
- Providing sufficient investment resources to enable the persons displaced by the project

to share in project benefits. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

Natural Habitats (OP/BP 4.04)

The policy promotes environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. The policy limits the circumstances under which projects can damage natural habitats. Specifically it prohibits projects which would lead to significant loss or degradation of any Critical Natural Habitats, while in Non-Critical Natural Habitats feasible alternatives can achieve the projects potential overall net benefits. In the Bigasha area, no Critical Natural Habitats are envisaged. However, there are other habitats that need measures to be put in place for the project's net benefit to be achieved.

World Bank guidelines on vulnerable people

The World Bank resources and toolkits for vulnerable people are relevant to this project. They describe the vulnerable as those who are most likely to fall through the cracks of regular programs and need to be protected from negative outcomes and/or allowed participation. Vulnerable people need to be given special attention to remove the barriers that stand in the way of equal participation in projects, or through special project components and targeting strategies tailored to their needs.

Groups of vulnerable people have been identified in the communities and these include; the widows, orphans, the women, etc. which will trigger this safeguard during implementation of this project.

Public Disclosure

The policy requires that;

- Category A project EA reports be disclosed at the World Bank Infoshop (English) and should be accessible to local affected groups (local language) in their country.
- Category B project reports be accessible to local affected groups (local language) in their country
- Category FI should have their Framework disclosed at the World Bank Infoshop and appropriate in-country Web site (e.g. Ministry of Water and Environment). Individual subproject disclosure requirements defined in Framework **(OP 4.01, 1999 revised in 2011).**

Being a category A project, disclosure will be as specified above for category A projects.

3.5.2 ADB Safe Guard Policies

The 'Environmental and Social Safeguard Policies' of the African Development Bank (ADB) consist of Environment Policy, Operations Manual and Guidelines, Policy on Involuntary Resettlement and Policy on Indigenous Peoples. Some of these policies are likely to be triggered by the proposed construction of Bigasha dam. Some of the Safeguards are presented below.

a) The Environment Policy

The policy is grounded in ADB's Poverty Reduction Strategy that recognizes that environmental sustainability is a prerequisite for pro-poor economic growth and efforts to reduce poverty. It is derived from ADB's Long Term Strategic Framework (2001-2015) that includes environmental sustainability as one of its crosscutting themes. The Environment Policy Addresses the following main challenges:

i) Need for environmental intervention to reduce poverty
ii) Need to mainstream environmental consideration into economic growth and development planning
iii) Need to maintain regional and global life support systems
iv) Need to work in partnership with others
v) Need to further strengthen the processes and procedures for addressing environmental concerns in ADB's own operations.

The major ADB's environment policy and operational procedures to environmental considerations into ADB's business process are described in Operational Manual (OM) F1. The procedural and substantive elements of ADB's environmental assessment requirement are described in detail in Integrated Environmental Impact Assessment Guidelines, October 2003. Furthermore, ADB has in place Environment policy (February, 2004) that brings out the need for a greater focus on pro-poor growth policies and programmes to counter unacceptable impoverishment rates; rapid progress in the inevitable integration of Africa in the globalization process; and the need for an improved governance with a clearer commitment of the majority of African governments to provide the necessary leadership for sustainable development. The Environmental policy has the following key environmental issues:

- Reversing land degradation and desertification,
- Protecting the coastal zones,
- Protecting global public goods,
- Improving public health
- Enhancing disaster management capabilities
- Promoting Sustainable Industry, Mining and Energy Resources
- Improving urban environmental management,
- Environmental governance,

- Institutional and capacity building
- Increasing awareness and, stakeholder participation

b) Involuntary Resettlement

ADB's Policy on Involuntary Resettlement was adopted and became operational in January 1996. This policy was up dated in November 2003 after incorporating in lessons learnt. The policy requires that involuntary resettlement be an integral part of project design, dealt with from the earliest stages of the project cycle. In general the policy has been developed to address involuntary physical displacement and/or loss of other economical assets of people caused by Bank-financed projects and programs. The policy is intended for the executing agencies in the borrower countries and for Bank staff involved in identifying, preparing, and appraising projects that involve involuntary resettlement.

The policy specifically aims to:

- Avoid involuntary resettlement wherever feasible
- Minimize resettlement where population displacement is unavoidable by exploring viable project options.

The policy also provides that individuals or communities in case of loss of land, means of livelihood, social support systems or way of life they should be;

- Compensated for lost assets and loss of income and livelihood
- Assisted for relocation
- Assisted so that their economic and social future will generally be at least as favourable with the project as without it
- Provided with appropriate land housing infrastructure, and other compensation, comparable to the without-project situation
- Fully informed and closely consulted on resettlement and compensation options.

The policy also specifies that lack of formal legal title to land should not stop any one from being compensated or given any other assistance. It further stipulates that appropriate assistance should be provided to poorest affected persons such as female-headed households, and other vulnerable groups such as indigenous peoples. For every project that involves physical displacement of people from homes, lands, other assets, resources or services or loss of income and livelihood, the policy requires that the government of the borrowing Country or private project sponsor (developer) submits a satisfactory Resettlement Plan with time-bound actions and budgets before loan appraisal.

About 5 structures are located within the reservoir area in Bigasha which indicates that some households will need to be resettled. Thus this policy will be triggered.

3.6 MULTILATERAL ENVIRONMENTAL AGREEMENTS

Uganda has signed and/or ratified a range of international agreements relating to the environment, both regionally and globally. The National Environment Act Cap 153 provides for the implementation of the International Conventions on Environment ratified by Uganda. The relevant conventions for the dam construction at Bigasha are discussed below.

3.6.1 Convention for the Protection of the Ozone Layer and its Montreal Protocol

This is a protocol to the Vienna Convention for the Protection of the Ozone Layer) (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature in January 1987 and was last revised in 1999 at Beijing. It has been ratified by 96 countries including Uganda. The Ozone depleting substances are Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs). The ozone shield is important because it protects plant and animal life on land from the sun's ultraviolet rays, which can cause skin cancer, cataracts, and damage to the immune system. Thinning of the ozone layer also may alter the DNA of plants and animals. They also act as greenhouse gases, with several thousand times the per-molecule greenhouse potential of carbon dioxide.

The signatory are required to;

- Recognize that worldwide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment.
- Determine to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge.
- Acknowledge that special provision is required to meet the needs of developing countries.
- Accept a series of stepped limits on CFC use and production, including:

Uganda has put a law in place to guide in the adherence to this Protocol; The National Environment (Management of Ozone Depleting Substances and Products) Regulations 2001 (see Section 4.2.16 above). Construction of Bigasha dam will require a number of equipment and these use CFCs and HCFCs thus triggering the Protocol.

3.6.2 United Nations Framework Convention on Climate Change (UNFCCC)

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The convention encouraged industrialized countries to stabilize greenhouse gases while the Kyoto protocol commits them to do so. Uganda signed the Kyoto Protocol in June 1992, ratified it September 1993 and its enforcement was March 1994. Uganda ratified the convention in March 2002 while entry into force was February 2005. As already discussed under Convention for the protection of Ozone layer and its Montreal Protocol), greenhouse gases are gases in an atmosphere that absorb and emit radiation within the thermal infrared range and greatly affect the temperature of the Earth. In Uganda, Climate Change Unit in the Ministry of Water and Environment is responsible for the implementation of the strategies to meet the Conventions requirements. Carbon dioxide is one of the main greenhouse gases and is expected to be released from construction vehicles and equipment during construction of Bigasha dam. Thus UNFCCC will be relevant to this project.

3.6.3 Rio Declaration (or Agenda 21)

The concept of public participation in development planning project is key aspect in this convention. From the most important conventions and declarations, one should note the Rio World Conference on Environment and Development in 1992 (in Brazil), followed by the Aarhus Convention in1998 (in Denmark), public participation in environmental matters became like a human right.

'Free access to information for the public and active participation in development project Processes'. Moreover, the World Commission on Dams encourages a stakeholders 'involvement to be ensured by governments in all stages of the projects starting from early planning.

3.6.4 The Convention on Biological diversity 1992 (CBD)

The CBD was one of the major outcomes of the 1992 United Nations Conference on Environment and Development – termed the "Earth Summit" – in Rio de Janeiro. The three main goals of the Convention on Biological Diversity (CBD) are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from utilization of genetic resources. The CBD calls for a much more holistic approach to biodiversity, by recognizing its ecosystem, species and genetic levels. Since Bigasha dam is on Bigasha River which feeds into R. Kagera whose surroundings are known for host a high biodiversity of plants and animals like Crocodiles and hippopotamus among others. This is exemplified by the Ramsar site far downstream in Rakai. This convention therefore will be relevant for this project.

3.6.5 The Ramsar Convention on Wetlands

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

The Ramsar Convention is the global environmental treaty that deals with a particular ecosystem but the Convention's member countries cover all geographic regions of the planet.

The convention has the mission of "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". Sango Bay-Musambwa Island-Kagera Wetland System has been added (2012) on the list of the Ramsar sites in Uganda. It is part of the Kagera wetland system and is located in Rakai far downstream of the point where R. Bigasha joins R. Kagera. Thus this convention may not be triggered by the development of Bigasha dam.

4 ANALYSIS OF ALTERNATIVES

4.1 PROPOSED DAM SITE

The dam site is located in Ngarama Sub-county in Kigando Village and in Kashumba Sub-county in Katyazo and Nyakabingo Villages, Bukanga County, in Isingiro District, Western Uganda. The proposed dam has a height of 12m with, and full supply level of 10m and maximum reservoir surface area of 1.45km^2 with a storage capacity of about 6.41 Mm3. The dam is easily accessible by road but construction materials are not readily available. Construction of the dam will create a reservoir which will inundate about 405 acres (164 Ha) of grazing land and will affect about 40 households in terms of loss of land. Relocation of households is envisaged as there are about 2 structures that may be affected by the project.

The area likely to be inundated has natural woodland of mainly Acacia species but has been modified through tree cutting for charcoal burning. Thus the vegetation is common to the whole stretch of the valley and not of major conservation concern. Some banana plantations will also be affected. There is also potential contamination of water as the area is surrounded by hills that are mainly grazing areas. Further analysis of the impacts will be carried and mitigation proposed in the Environment Impact Assessment Report. There will be a number of dam benefits like water supply, fishing and food production through irrigation, tourism once water is available in the area throughout the year. The access roads will be improved during construction and this will in turn improve health, trade, communication and others.

4.1.1 Design alternatives

In addition to the design discussed above, other different design alternatives were considered;

Alternative 1

This was the design provided in the Terms of reference. In this option the dam site is located at the same location as in the above option. It has a dam height of 9.5m, a storage capacity of 18.97km^2 and reservoir surface area of 3.63km^2. This will inundate 222acres of land but no structures would be affected. This design had not yet been optimised but what was clear was that the dam would need to be very strong, the dam length very long thus very expensive.

Alternative 2

This option had a Dam Height of 14m and full supply level at +12m with storage capacity of 9.62 million m^3 (Mm^3) Reservoir surface area of 1.793km^2. It would inundate about 444 acres of land and about 45 households would be affected in terms of loss of land. Furthermore, this option would lead to physical displacement of about 5 households.

This option would inundate more land and would require relocation of 5 households compared to 2 indicated in the proposed option. Furthermore this option would be more expensive to construct as it has a higher dam and need to be stronger to be able to contain more volume

compared to proposed option.

4.2 DO NOTHING SCENARIO

The Nile Basin is characterized by seasonal water scarcity thus water scarcity and growing food insufficiency are some of the issues facing Kagera River Basin where Bigasha proposed dam site lies. The situation is expected to get worse as the population increases and as demand by the different water use sectors out-matches the existing supply. Water related conflicts are on the increase and these cause security risks in the catchments. The Nile Basin as a whole is characterized by poverty and rapid population growth (**NELSAP, n.d).**

The people at Bigasha usually have a problem of water during the dry season. They have to travel over 10km to Kagera River or to Kagango dam upstream of Bigasha in search of water especially for animals. During such periods milk production reduces and the animals contract a number of diseases as they move from place to place. This generally affects the livelihood of the communities in the area. In the wet season the area has a lot of water which is just lost through seepage and floods. With a dam in place, the storm water in the wet season that would have been wasted will be stored and used in the dry season. A dam at Bigasha has been proposed as one of the approaches to address these challenges. This dam is expected to improve water storage in the catchment, and enhancing demand management to minimize wastage of the scarce water resources. This will address the hydrological uncertainty of the Bigasha area and the catchment a whole.

If the dam at Bigasha is not implemented, then water scarcity will continue to increase. The benefits highlighted above will be limited or lost. This is not a desirable alternative as it will generally affect human development.

5 PUBLIC CONSULTATIONS

5.1 PUBLIC PARTICIPATION PROCESS

5.1.1 Introduction

This chapter describes the process of the public consultation and public participation followed to identify the key issues and impacts of the proposed project. Views from national stakeholders, the local residents and local leaders were sought through interviews and public meetings. The feedback from these consultations has been taken into account when preparing this report. A summary of issues discussed is given below.

According to the Environmental Impact Assessment regulation 1998, Section 12, the developer is required to take necessary measures to seek views of the communities that are likely to be affected by the project and publicize the intended project, its anticipated effects and benefits in a language understood by those communities for a period of not less than 14 days. It is further required that days and times of community meetings shall be convenient for the affected persons and agreed with the local leaders. This is part of the Environment and Social Impact Assessment (ESIA) study process. To carry out public consultation stakeholders were first identified.

5.1.2 Stakeholder Identification and Composition

In order to develop an effective stakeholder involvement programme it is necessary to determine exactly who the stakeholders are, basing on the definition that a stakeholder is "any individual or group who is potentially affected by a project or can themselves affect a project". A number of stakeholders were identified and consulted during the study. A full list of the people/stakeholders consulted is presented under **Appendix 3**.

National Government Institutions/Officials

National Liaison Officer, TAC Members, Directorate of Water Resources officials (Director, Commissioner – Water Regulator)

Local government institutions/officials

- Chief Administrative Officer
- District Environmental Officer
- NBI Liaison Officer
- District Community Development Officer
- District Production Officer
- District Inspector of Schools
- Sub-county Community Development Officer
- Village Chairpersons
- Community members from 3 villages of Nyakabingo, Kagando and Katyazo

Other stakeholders

- Client- Nile Basin Initiative
- NGOs and CBOs e.g. Integrated Development Alliance for Health (IDEAH), Ngarama Instructors Association, Africare, UWESO, UNHCR, TASO, GLIA, CARITAS and others.

5.2 CONSULTATION MEETINGS AND PARTICIPATION

5.2.1 Participation Objectives

The objectives of stakeholder consultation include the following;

- To provide sufficient information to all stakeholders and interested parties that will help them to participate in the whole process of the project.
- To obtain views from stakeholders on anticipated benefits, fears, opportunities and any other concerns of the community as well as suggestions on how best to mitigate their fears in regard to the project.
- To collect all relevant information about the practices and norms in the project area within which the project will operate.

5.2.2 Public Participation Process

The process of public participation started in the month of January 2012 during the initial planning of the project (inception phase) when different categories of stakeholders were consulted at all levels. **Figure 5-1** shows some of the meetings held with stakeholders in January 2012. A regional workshop to present the inception report was held on the 7th February 2012 (**Figure 5-2**) in Burundi as Bigasha dam project is part of the Kagera River Multipurpose dams project and the issues raised are incorporated in this report. A second Regional Stakeholder Workshop to present interim report including scoping report was held on 8th June 2012 at Silver springs in Kampala. The last Regional Stakeholder Workshop to discuss Draft ESIA and Preliminary RAP also held on 26th September 2012 in Arusha (**Figure 5-3**). Stakeholders provided useful information which forms part of this report. Details of the stakeholder consultations during the inception phase are provided in the scoping report.

The process continued in the months of April when detailed studies were being carried out as shown in the sections below.

Figure 5-1: Community Leaders meeting at Bigasha, Jan 2012

Figure 5-2: Regional Workshop in Burundi, March 2012.

Figure 5-3: Workshop for presentation of Draft ESIA, Arusha (Country Discussions –Uganda (26th Sept. 2012)

A programme was drawn for meeting all the key stakeholders including community (**Table 5-1**)). The local leaders were notified of the dates and times of the meetings in advance and requested to mobilize the people in their respective areas accordingly. A total of 7 community meetings were organized for the proposed Bigasha Multipurpose dam, two of the meetings held were focused group discussions with the women and officials of Kashumba Sub-county, 1 meeting with the NGO and 4 were held with the affected communities. About 30 participants turned up for each community meeting and approximately 14% of participants were women. All the community meetings were held using the local language, Runyankore (**Attendance lists are attached in Appendix 3)**.

All the discussions were opened with a brief introduction of the project and the purpose of the ESIA explained. The team then guided the participants to obtain their views (e.g. **Figure 5-4**). Most questions from the participants were answered and some misconceptions about the project clarified. Pictures showing community meetings are shown in **Figure 5-5** and **Figure 5-6**. A 2nd Regional Stakeholder workshop to discuss scoping and baseline findings was held in Kampala on 8th June 2012. The outcomes of the workshop further informed the process.

Figure 5-4: Meeting with IDEAH Officials at Kashumba Offices

Table 5-1: Schedule of Public Consultation Meetings and Focus Group Discussions

Date	Venue	Time	Participants	Nature of the meeting
6th April 2012	Kagando Trading Center	10:00 am	Kagando Community Members	Public meeting
6th April 2012	Katyazo Trading Center	2:00 pm	Katyazo Community Members	Public meeting
7th April 2012	Nyakabingo Trading Center	10:00 am	Nyakabingo Community Members	Public meeting
7th April 2012	Nyakabingo Trading Center	1:30 pm	Nyakabingo women	Focus Group Discussion
10th April 2012	Kemikokoma Trading Center	2:00 pm	Kemikokoma Community Members	Public meeting

Figure 5-5: Meeting at Kasenyi P/S 10th April 2012

Figure 5-6: Meeting at Kagando T/C 6th April 2012

5.2.3 Issues Raised

5.2.3.1 Issues Raised by National Stakeholders

This project is of national concern as Isingiro is one of the districts that has serious water scarcity. Therefore, studies must be done carefully to make sure that a bankable document is produced.
There is need to involve stakeholders including the land owners. They indicated that district involvement in such projects is usually not budgeted so their involvement may require facilitation
Another concern was that many people may turn up claiming land in the area yet this land in Bigasha belongs to very few people. Thus need for involvement of the local council in the area who know these facts so as to reduce on compensation claims.

5.2.3.2 Issues raised by Local Government; District and Sub-County Stakeholders

Subject	**Issues Raised**
Positive issues	
Employment opportunities	The stakeholders expect the developer to give priority to the locals when it comes to recruitment. Vulnerable groups including women should be given priority for unskilled labour.

Subject	Issues Raised
Development of infrastructure	Stakeholders pointed out that infrastructures will improve such as roads, industries for processing milk and beef will be developed.
Negative issues	
Increase in prices of commodities	The stakeholders feared that of the influx of people in the area, prices of commodities will go up as result of increase in demand. Prices for *matooke*, beef and milk and other products will rise due to high demand by project workers.
Increase in HIV/AIDS	The stakeholders have a fear that HIV/AIDS might increase in the project area and also spread to the entire district as whole this resulting from the influx of people in search of employment opportunities.
Health and safety of workers	Stakeholders expect all employees to wear protective gears like safety boots and helmets to minimize on the accidents at the site
Poor health services	Stakeholders pointed out that the developer in collaboration with contractor should make arrangements with the officials of Ngarama HC IV and Kashumba HC III to forge ways of improving on the quality of services and to cater for the expected workforce.
public and private sectors should fight corruption	The stakeholders pointed out that all parties involved in the project development right from the project affected people to the government officials should desist from corruption. All cases of corruption should be reported to the authorities and those found guilty should be punished.
Flooding	Stakeholders pointed out that the dam should be well designed putting in mind that in case of any catastrophic the people living at the downstream will not be affected. This will prevent the destruction of property and loss of lives.

5.2.3.3 Issues raised by Community Members

Subject	Issues Raised
Positive issues	
Increase in water supply and availability of water for animals	Community argued that plenty of water will be available for both domestic use and animals use. The water will be reliable throughout the year and as a result, cattle keepers will no longer have to move from place to another in search of water for their animals.
Fish farming	Some members of the community argued that they would be able to undertake fish farming due to availability of water.
Irrigation farming	Some members of the community argued that water from the dam will be used to irrigate plants throughout the year
Laying bricks	Some members of the community will use the water to make bricks hence generating income
Tourist attraction	The dam will attract tourists in the area so the community will benefit through the sale locally produced products to the tourist
Development of infrastructure	Infrastructures such as roads, industries for processing milk and beef will be developed.
Negative issues	
Loss of land for grazing/cultivation	The Bahima community (cattle keepers) indicated that they will lose land for grazing animals if the proposed dam is constructed. Also the Biru community (cultivators) argued that there land for cultivation will be lost to the project. Land is their source of livelihood and if lost poverty will strike their households.
Influx of people in the area	The participants fear that the new people will bring about insecurity in the area yet the area has been peaceful. The Bahima have feared that animals and their valuables will be stolen
Increase in prices of commodities	The stakeholders feared that of the influx of people in the area, prices of commodities will go up as result of increase in demand. Prices for *matook*e, beef and milk and other products will rise due to high demand by project workers.

Subject	Issues Raised
Increase in traffic on roads	Increased traffic on the roads will bring about accidents leading to loss of peoples' lives. Noise from the machines and vehicles as well as dust will also affect people living near the road and at the site.

5.2.3.4 Issues Raised by other Stakeholders (NGO and a School)

Subject	Issues Raised
Positive issues	
Employment opportunities	Jobs are given to all irrespective people of sex priority to the locals when it comes to recruitment. Vulnerable groups including women should be given priority for unskilled labour.
Negative issues	
Increase in HIV/AIDS	The stakeholders pointed out that the project being close to the border with Tanzania there will be increase in prostitution in the area which will contribute to increase in HIV/AIDS in the district in particular the project area. Immoral behaviours like rape and defilement will also increase as result of influx of people.
Health and safety of workers	During the construction of the project, workers should be provided with protective gears like safety boots and helmets
Fight corruption	Stakeholders pointed out that developer should desist from being corrupted by government officials because this habit will fail the project. All stakeholders and the developer are encouraged to report corrupt officials.

6 BASELINE ENVIRONMENTAL AND SOCIAL FINDINGS

6.1 PHYSICO-CHEMICAL ENVIRONMENT

6.1.1 Geology and Soils

Information regarding the topography and landforms is determined from the "Landforms Map" by Nile Basin Initiative – Kagera River Basin as well as site inspection observations. Bigasha dam site is located in a valley surrounded by hills. The slopes of the catchment are fairly steep, although they are generally covered by grass and scattered natural trees. The valley is used for livestock grazing and for farming, but there is no terracing of the land. Available information on the geology of the Kagera River Basin is limited. Detailed geological maps are not available for this area. However, useful information was obtained from The Nile Basin Initiative – Kagera River Basin "Soils map" and "Lithology map". Bigasha site is located in an area with mostly superficial deposits and alluvium along the valley floor, with surrounding areas of phylites. The soils have been identified as ferrasols. Ferrasols possesses good agronomic qualities. The clay fraction consists mainly of Laoline minerals, free iron oxides, amorphous gels and sometimes small amounts of clay. These soils are known as Mulinda series, also developed on non-volcanic rock mass and their pediments. The dominant soil type is brown, gritty clay loams and sandy loams. Productivity is low to medium.

From the geophysical site investigations carried out by the Feasibility Team, it can be said that the valley soils consist of roughly 5 meters of clay and sandy clay over highly weathered sand- or siltstones. The highly weathered rock could extend down to a depth of 25 meters with a resistivity between 10 to 300 Ohms. On the banks of the river the top 10 meters consist of reddish sand, lateritic soil over massive rock.

6.1.2 Climate

The hydrology of Bigasha catchment was characterized by analyzing climatic long-term data from Mbarara meteorological station and daily rainfall data from Rwoho Forest, Gayaza and Rugaga rain gauges. All these stations are located in neighbouring catchments to the Bigasha catchment.

The area rainfall for the study area was obtained by taking the average rainfall from the three stations of Gayaza, Rugaga and Rwoho forest. **Figure 6-1** shows the precipitation over the months for Bigasha catchment. The wettest month is April while the driest month is July. The average rainfall in the area is 72.66 mm the total amount of rainfall recorded for Bigasha catchment is approximately 871.9 mm.

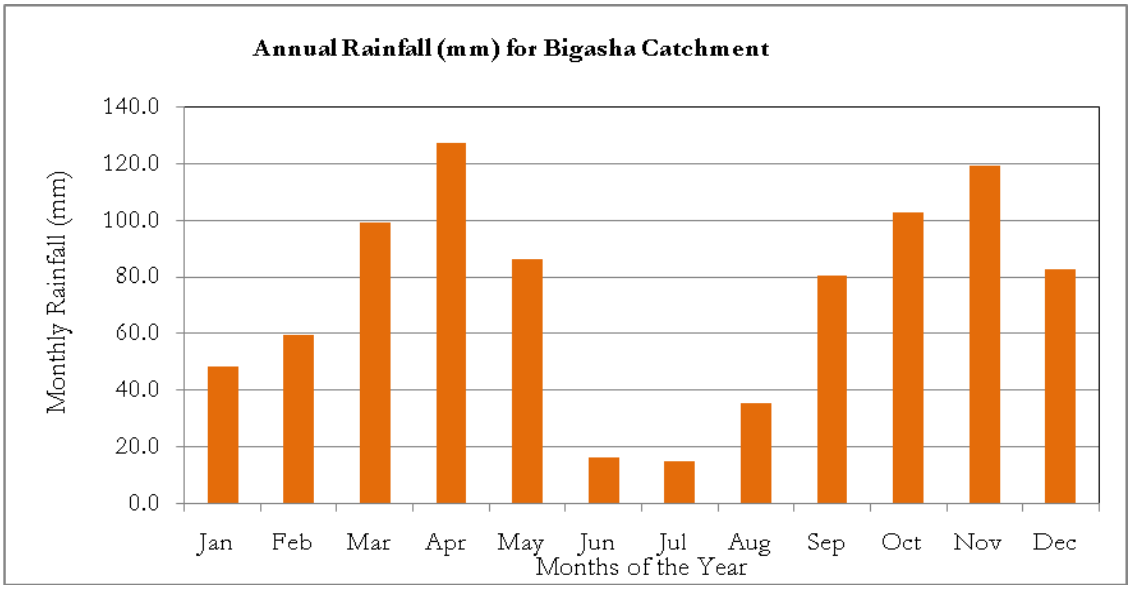


Figure 6-1: Annual Rainfall for Bigasha Catchment

Long term mean temperature records were taken from Mbarara station for a period of 39 years from 1961 to 2000. As seen in **Figure 6-2**, Bigasha boasts of cool temperature, with the coolest month of the year being December (19.9°C) while the highest temperature is recorded during February (20.9°C). The variation in mean monthly temperature ranges 0.1° - 1°C.

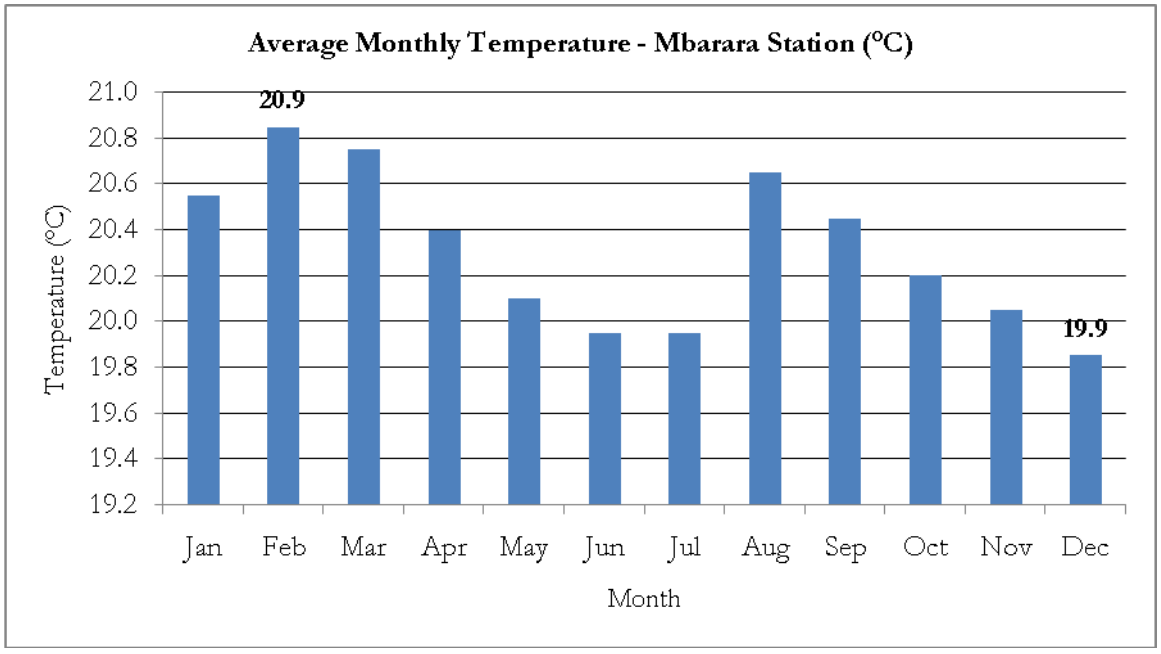


Figure 6-2: Seasonal Variation in Temperature in Bigasha

The seasonal variation of potential evaporation in Bigasha ranges from 110 mm in December to 144 mm in August as shown in **Figure 6-3**. The annual total potential evaporation is estimated