- There will be loss of nesting, foraging and feeding grounds for birds but this is **low negative** as the birds can migrate;
- Destruction of cattle watering points and crushes for spraying cattle; This is **low negative** as these structures can be compensated and re-located;
- Destruction of banana plantations and other crops. This is **low negative** as the activity is of a short duration and the crops can be compensated;
- There will be stockpiles of earth materials and ponding due to accumulation of still water. This is **low negative** as there will be adequate restoration;
- Digging and excavation will upset the drainage pattern in the area. This is **low negative** as digging and laying of pipes will be done professionally;
- Soil erosion will increase. This is **low negative** as proper restoration works will be done;
- Damage to cultural heritage sites uncovered by accident- This is **low negative** as any artefacts will be properly taken care of if found.

Mitigation measures

- All requirements for the approval of earthworks and excavations will have to be met;
- The owners of the land and crops will be adequately compensated;
- Trees will be felled selectively;
- Wildlife including birds can migrate to neighbouring areas;
- Restoration of the land to its former state through back filling, grassing and planting trees;
- Proper drainage to be done to avoid soil erosion;
- Removal of all garbage, derelict materials and broken down machinery and materials;
- Demobilize work camps, equipment and staff, taking care to prevent adverse impact on the environment.

7.2.3 Operation and Maintenance /Post Construction stage

7.2.3.1 Socio-economic and Physico-cultural Environment

- **Population increase**

During the operation phase the population is likely to reduce as most of the workforce from outside the project area will go back to their countries or areas of origin. Only a small team of workers will be kept for the operation and maintenance of the project and few businessmen who may decide to stay in the area and tap business opportunities in the post construction phase. The maintenance team is likely to be sourced from the local community. The magnitude of the project is thus expected to be **low negative**.

Mitigation measures

- Local labour should be used for maintenance of the dam site.
- Skilled people within the area should be recruited, trained and their capacity built for the operation phase of the project.

- **Impact of HIV/AIDS and other STDs**

The impact of the sexually transmitted diseases like HIV/AIDS will continue even in the operation phase. Individuals who will have acquired the disease will face its consequences like reduction in productivity, poverty due to the constant spending on medicine among others and an overall negative impact on the welfare of the whole family. The magnitude of the impact is thus considered to be **high negative**.

Mitigation measures

- Continuous HIV/AIDS sensitization and awareness programs should be put in place at all levels and also in schools.
- Equip health centres at all levels with HIV/AIDS testing kits and HIV/AIDS Counsellors so as to be able to provide free testing and counselling services to the affected people and communities.
- Condoms should be available at all health centres and should be accessed at no cost by the communities.

- **Risk of drowning**

During this phase there is a risk of drowning by both children and adults in the reservoir. The children or adults may be enticed to swim in the reservoir and may end up drowning or may drown accidentally while passing by. 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**

Mitigation measures

- Planting of trees and other vegetation to reduce visibility and accessibility of the dam
- Sensitisation of the community of an emergency plan of action in case of a disaster
- Surveillance around the dam carried out

- **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 and will act as a breeding ground for mosquitoes and 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 water borne diseases

like cholera. This is a long term impact but will mainly affect those who leave very close or will water from the reservoir. Thus it is expected to **medium negative.**

Mitigation measures

- Sensitization of communities about the need to boil water before drinking
- Sensitize communities to constantly sleep under treated mosquito nets
- Distribute treated mosquito nets to communities surrounding the reservoir.
- Clear bushes around the reservoir periodically

- **Encroachment on the site and mishandling of artefacts**

There is a high possibility that a number of archaeological sites both in Bigasha as well as outside will be encroached upon. The projected sites for acquisition of materials such as stones and murram may lead to destruction of archaeological sites and artefacts. In terms of artefacts, some artefacts may be graded unknowingly and others may be destroyed due to limited skills by some contractors. The overall impact of the project on archaeological assets and culture therefore can be evaluated as **low negative as the sites and value of the assets is currently not known.**

Mitigation

- Contractors need to work hand in hand with Professional archaeologists so that any chance findings may be rescued and taken to the Uganda National Museum;
- Contractors should be trained in basic skills of identifying and handling of artifacts so as to avoid breakage, destruction and loss of priceless assets;
- All murram and stone/rock sites need to be first surveyed in order to ascertain the presence/absence of cultural assets in the area;
- Any valuable cultural items recovered in the absence of the concerned cultural officials must be reported; and
- The stone tool site needs rescue excavation.

7.2.3.2 Biophysical environment

The creation of a reservoir will change habitats significantly. Large sections will be entirely water of varying depths. Others will be wetlands. Hence, purely terrestrial animals like some mammals will be adversely affected; may die or they will be forced to flee.

- **Reduced flow during the rainy season**

Bigasha River is subsurface river but during the wet season, the river course gets recharged by the floods and the water resources are increased. From the hydrological assessment, it was found that there is both underground and surface water in the Bigasha catchment which benefits from this recharge. However with damming, recharge by surface flow will be stopped, reducing the water resources downstream of the dam. This is likely to result into change of biodiversity

(plants and animals) as well as affecting cultivation in the valleys of dawn stream villages of Kemikoma, Nyakibingo, Rugando, Ntenga, Katyazo and further down which usually flourish during the wet season as reported by the communities. This impact is expected to be long-term, and there is a probability that it may happen however it is mitigable. Thus the impact is expected to **medium negative**

Mitigation
During the wet season, sufficient water should be allowed to flow through the dam to be able to maintain the hydrological balance to reduce negative ecological impacts on the downstream communities. An environmental flow of 0.13m^3/s should be allowed to go through the dam in the wet season (**see hydrological report appendix 4)**

- **Cumulative impacts**

As indicated in Chapter 6 below, Bigasha River pours in a Kagera River downstream of 2 Hydropower Projects; Kikagati and Nsongezi. There is also an existing valley dam on River Kagango which enters river Bigasha upstream of the proposed dam. There is likely to be cumulative negative impacts on the hydrology of the respective Kagera section. This may not have socio-economic cumulative impacts in the area where these projects are located as they are far away from each other.

- **Impact on Climate change and Emission of Green House Gases**

The multipurpose dam at Bigasha will be vulnerable to climate change. This may include high temperatures that may result into high evaporation rates, extreme floods that may damage the dam etc. This will have wide ranging consequences for environment, natural resources, and the socio-economy of the local people. Therefore, if the dams are going to be sustainable, it will be necessary to mitigate and adapt to climate change implication.

The proposed reservoir area is presently covered with a lot of vegetation. Once the reservoir has been filled there is likely to be anaerobic decomposition produce greenhouse gases; Methane (CH_4) and Carbondioxide (CO_2) especially if the reservoir is deep. It should be noted that the Bigasha reservoir, will emit Green House Gases (GHG) during its first few years of operation but after this initial period, GHG emissions will decrease exponentially to reach levels typical of natural lakes. The impact therefore is expected to be **low to medium negative**. The removal of vegetation may turn out to be very expensive. There is a temptation of burning the vegetation instead of clearing and removing it, this also produces the greenhouse gasses thus should be avoided. Therefore, there is no need to mitigate GHG by removal of vegetation.

Mitigation measures

- Tree planting should be encouraged with in the surrounding communities and around the reservoir but not very close, to prevent leaves from falling in the reservoir. This reduces soil erosion, improve on the dam safety and mitigate floods.

- Avoid burning of vegetation
- Sensitization of Communities about climate change and grass burning

- **Dam safety related impacts and Flooding**

Poor dam design and maintenance may lead to dam breakage and therefore flooding that may lead to deaths and destruction of property. The probability that this may happen is low because the design team has put in place measures to prevent dam break and the dam is a small dam. In case of dam break, it can have far reaching impacts on the downstream communities. However, emergency plans and procedures have been developed to handle such an incidence. Although its occurrence may have far reaching consequences, the impact is mitigable and the probability of its occurrence has been minimized and thus is the magnitude of this impact is expected to be **medium negative**.

Mitigation measures

- Emergency plans and procedures have been developed and are contained in the Dam Safety Report (**APPENDIX 7: DAM SAFETY REPORT).**
- Warning signs in case of the event of the dam breaking should be put in place.
- 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.
- Sensitisation of the community of an emergency plan of action in case of a disaster should be done continuously.

- **Dragonflies and Butterflies**

Six species of Dragonflies were recorded the project site. This is just 2.5% of the 231 dragonfly species recorded in Uganda (Tushabe *et al.* 2006). Uganda is known to harbour 13 species that are globally threatened or near-threatened (Clausnitzer*, et al* 2011). 14 species of butterflies were recorded in Bigasha site. Uganda has 1,249 butterfly species recorded (Davenport 1996, Tushabe *et al.* 2006). None of the species of dragonflies and butterflies recorded is globally threatened or near-threatened (Perpetua Akite personal communication). Thus the impact of the project on the ecology and conservation of dragonflies and butterflies is **low negative.**

- **Negative Impacts on future Fisheries**

Capture fisheries production in the Kagera River basin is faced with a number of problems, including uncontrolled fishing methods and lack of proper fishing gear. Immature fish are captured leading to extinction of some species. Often local people use poisoning and dynamite, which leads into complete destruction of the lake ecosystem and extinction of fish and other related organisms from the lake. Continued dependence on one type of species also leads to their extinction and loss of biodiversity. For example, some studies carried out in Lake Ihema (Mughanda, 1989) shows species preference was mainly on *Clarias gariepinus, Haplochromus Group,* and other *Tilapia* species such as *Marcusemus victoriae, Alestes Sp., Synodontis Spp, Gnathonemus longibarbus,* and *Schilbe mystus.* Capture fisheries problems are also compounded by lack of

extension services to educate the local community on sustainable fishing methods and lack of infrastructure for fish preservation.

The following are therefore strategies suggested to enhance fish survival and fisheries in the new Bigasha dam.

Mitigation measures on Fisheries

There is therefore need to formulate fishing regulations to control access to the lake and fishing grounds as well as to control fishing gears and methods to avoid destructive methods. There will be need to educate the local community about fish, fishing methods and best seasons to fish. It will also be necessary to establish and train a cadre of extension staff to guide, monitor and regulate fishing activity and use of dam water resources in general.

Strategies to mitigate negative impacts of the Project on the Fish and Fisheries in the new Bigasha reservoir

- Institute a Water Use Committee to oversee fishing activities in the Bigasha dam;
- Formulate and enforce fishing regulations to control access to the dam and fishing grounds;
- Formulate enforce fishing regulations to control fishing gears and methods to avoid destructive methods;
- Educate the local community about fish, fishing methods and best seasons to fish;
- Establish and train a cadre of extension staff to guide, monitor and regulate fishing 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 fish handling and fish processing equipment and facilities in the landings
- Provide fish cooling and chilling facilities at the landings;
- Provide market outlets for fish from the Bigasha dam;
- Provide good health and sanitation facilities for the communities living in the villages and landings along the dam shores.

- **Negative impacts of reservoir on Protected Areas**

Uganda has an extensive system of Protected Areas (PA) with the following categories: 10 National Parks, 11 Wildlife Reserves, 12 Controlled Hunting Areas, 710 Forest Reserves and 30 Important Bird Areas (10 of which are National Parks, 3 are Wildlife reserves, 7 are Forest Reserves and 10 have no legal protection) (Caswell et al 2005).

The nearest PA to the project area is Sango Bay Forest Reserve/Important Bird Area (UG013) (Central coordinates 31° 35.00' East 0° 55.00' South), a distance of about 100 km apart. Sango Bay is important for the conservation of the papyrus endemic globally near-threatened Papyrus Gonolek *Laniarius mufumbiri*, globally Vulnerable Blue Swallow *Hirundo atrocaerulea* (intra-African

migratory species) and the globally vulnerable African Elephant *Loxodonta africana*.

The Papyrus Gonolek being a papyrus endemic, it cannot leave the papyrus swamps of the Sango bay area, thus it will not be impacted at all by the project activities. The migratory Blue Swallows are in Uganda between April to August and migrate to southern Africa to breed between September to March. There are chances that the Blue Swallows can transit through the project area but the impact of the project on the species is **low negative.** The African elephant with a very big home range 14-3,120 km² would reach the project area from Sango Bay if there were wildlife corridors or if Bigasha and Sango Bay were continuous as protected areas. Since there are settlements, cultivations and other forms of land use between Sango Bay and Bigasha, the project will not impact negatively on the ecology and conservation of the African elephant populations of Sango Bay area. Hence, its impact on the elephant population will be only **low negative.**

- **Negative impacts of reservoir inundation on the ecosystem**

When the Bigasha dam is constructed and inundated, it will flood much of the biomass including plant vegetation material in the dam site. The effect of this will be that all these materials will decompose, consume all the oxygen and produce gases like carbon dioxide, methane and other acidic gases like sulphides and nitrous oxides. De-oxygenation will of-course kill fish and other aquatic biota. The presence of toxic acidic gases will not favour aquatic life. The good news is that these putrification and decomposition phenomena in the newly flooded dam will be short lived as the water will eventually clear with ample algal growth thereby oxygenating the water column. Any residual toxic gases will be restricted to the bottom layers of the new dam. Hence aquatic life will prosper including fish and its fry. It can be concluded that in terms of fish and invertebrates and other aquatic organisms, there are no long term negative impacts of the construction of the Bigasha dam. The impact of the project on the ecosystem of the Bigasha dam area will therefore expected to be **low negative.**

Mitigation measures

In order to reduce de-oxygenation in the new reservoir and to improve its water quality, the following steps will need to be taken:

Mitigation

- Clear all vegetation and woody biomass from the reservoir prior to filling it;
- Institute and enforce good watershed management practices including afforestation, terracing, and good agricultural practices;
- Institute management committees for the overall supervision of all activities in the new Bigasha dam; and
- Control livestock access to the dam.

7.3 OVERALL IMPACT ASSESSMENT

The overall impact assessment has arrived at by combining the value of the safeguard issues (the impact zone) and the magnitude of impacts. This overall assessment for the whole project has been summarized in **Table 7-3**.

For example during construction, for the **mammals in the project area** by combining the value of the impact zone (**low**) as the mammals there are not of conservation importance, and the magnitude of impact (**medium negative**), the conclusion is that the proposed project will have **little or no impact** (-) on the mammals of the project area during construction without any mitigation measures.

Table 7-3: Overall impact assessment of the whole project

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High	Negative Positive High Medium Low/No Med. High	
Planning /pre-construction phase			
Creation of employment	-♦-	-♦-	Small positive (+)
Social expectations due to disclosure	-♦-	-♦-	Large negative (---)
Construction Phase			
Employment & source of income	-♦-	-♦-	Medium positive (++)
Expected positive impacts on gender	-♦-	-♦-	Medium positive (++)
Skills development	-♦-	-♦-	Medium positive (++)
Improvement of access roads	-♦-	-♦-	Medium positive (++)
Influx of people	-♦-	-♦-	Medium negative (--)
Unfulfilled community expectations	-♦-	-♦-	Very Large negative (----)
Increase in price of communities	-♦-	-♦-	Medium negative (--)
Increase in disease incidence	-♦-	-♦-	Medium negative (--)
Increased pressure on health, sanitation, fuel wood and other services	-♦-	-♦-	Medium negative (--)

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High	Negative High Medium Low/No Med. Positive High	
Increased need for fuel	-♦-	-♦-	Medium negative (--)
Increased insecurity	-♦-	-♦-	Medium negative (--)
Increased Traffic	-♦-	-♦-	Medium negative (--)
Occupational Health and Safety	-♦-	-♦-	Medium negative (--)
Increased conflicts	-♦-	-♦-	Medium negative (--)
Loss of land & land use	-♦-	-♦-	Large negative (---)
Loss of Structures	-♦-	-♦-	Medium negative (--)
Impact on vulnerable groups	-♦-	-♦-	Medium negative (--)
Impact on Gender	-♦-	-♦-	Medium negative (--)
Increased risk of soil erosion	-♦-	-♦-	Small negative(-)
Loss of Aesthetic value	-♦-	-♦-	Medium negative(--)
Waste Generation & Management		-♦-	Medium negative(--)
Noise and vibration		-♦-	Small negative (-)
Air pollution		-♦-	Medium negative (--)
Impact on Mammals	-♦-	-♦-	Medium negative (--)
Impact on birds	-♦-	-♦-	Medium negative (--)
Impoundment and Reservoir filling			
Improved water supply	-♦-	-♦-	Large negative (+++)
Employment	-♦-	-♦-	Medium positive (++)
Improved farming	-♦-	-♦-	Large positive (+++)
Increased Potential for tourism	-♦-	-♦-	Medium positive (++)
Potential for Electricity generation	-♦-	-♦-	Small positive (+)
Potential for Archeo-tourism	-♦-	-♦-	Small positive (+)
Creation of wetlands	-♦-	-♦-	Small positive (+)
Climate change	-♦-	-♦-	Small positive (+)

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High	Negative Positive High Medium Low/No Med. High	
Increased habit for birds	-♦-	-♦-	Medium positive (+)
Increased habitats for Amphibians	-♦-	-♦-	Small positive (+)
Increased habitats for Insects	-♦-	-♦-	Medium positive (++)
Creation of habitats for fish and Aquaculture potential	-♦-	-♦-	Medium positive (++)
Climate change		-♦-	Small negative (-)
Dragon flies and Butter flies	-♦-	-♦-	small negative (-)
Future fisheries	-♦-	-♦-	Small negative (-)
Protected area	-♦-	-♦-	Small negative (-)
Ecosystem	-♦-	-♦-	Medium negative (--)

7.4 DECOMMISSIONING AND RESTORATION

Decommissioning of the construction site is generally rehabilitation by the contractor in which a decommissioning plan is provided on campsites, temporary access roads, borrow areas, quarry mines if any, crushing plant if any, material stock pile, general site rehabilitation etc.
Although Ministry of Water and Environment /NELSAP has the overall responsibility of environmental compliance, at the project level the Contractor will be responsible for decommissioning. The sections below give the decommissioning plan.

Campsites: The campsite whose location is yet to be identified will be made of temporary material mainly iron sheets, timber, metal bars and other fabricated material. In cases permanent structures are put up, it will be an agreement between the land owner or the community and the contractor so that the structures are left for the land owner /community to use. The structures could either be used as school facilities or houses for rent.

In the case where temporary structures are constructed the materials will be salvaged and either sold or taken for re-use at other sites on project completion. The water supply system could be handed over to the local authorities to be used by the neighbouring communities.
Most sanitary facilities on contractors' camps are pit latrines; in case a septic tank is used, the septic tank should be emptied with cesspool emptier and the pit backfilled.

Temporary access roads: In case some temporary access roads have been created, these will be blocked shall be rehabilitated through top soiling and grassing. In a case where campsite structures are left for the community or the land owner, the temporary access roads have to be left to continue in use.

Burrow areas and quarry mines: The burrow pits and quarry areas (where necessary) created by the project will have to be covered. This can be done by utilizing the soil spoil obtained through the widening of the road existing road to Bigasha dam site. Top soiling and planting of trees should be done.

Crushing plant if any
Decommissioning activities at the crushing plant area include: removal of all unused materials; restoration of all opened up areas through top soiling and re-vegetation; Compensation of any affected neighbours and disassembling of crusher components and removal.

Material stockpile areas
Areas that have been used for temporary storage of materials shall be levelled after materials have been used. Such areas shall be restored through grassing.

Fuel Station/bulk storage
The dam site is far away from fuelling stations which are in Isingiro town. It might be necessary

to establish a small fuel station at the camp site.
This should be de-commissioned as follows;

1. Initial soil tests for Volatile Organic Compounds (VOCs)
2. Cordoning off of site.
3. Dismantling of surface installations e.g. pipes, pumps, canopies, electrical systems etc.
4. Draining of tanks, pipes
5. Safe transportation of residual products and pipes
6. Tank exhumation by specialized contractor in presence of supervising Environmental
7. Consultant, NEMA etc.
8. Haulage of tank to appropriate storage
9. Soil and groundwater sampling and testing etc.

Decommissioning of the dam structure and reservoir at the end of its life will very much depend on the detailed design when the kind of structures to be put in place are clearing known.

7.5 RESIDUAL NEGATIVE IMPACTS-

Residual Impacts following Mitigation Measures

Upon successful implementation of the environmental and social mitigation plan to enhance or reduce the environmental and social impacts of the project, the residual negative impacts are expected **to be either** minimal or no impact except social expectation, unfulfilled community expectation and loss of land which may still have medium negative impact even after implementation of mitigation measures. Some positive impacts will also be significantly enhanced e.g. employment and source of income through multiplier effects of water supply, fish farming and associated irrigation during operation and maintenance. Therefore they are considered to be manageable and acceptable. **Table 7-4** below shows the predicted residual negative impacts with mitigation measures.

Table 7-4: Residual Impacts

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High |.....|.....|	Negative Positive High Medium Low/No Med. High |.....|.....|.....|.....|.....|	
Planning /pre-construction phase			
Creation of employment	-♦-	-♦-	Small positive (+)
Social expectations due to disclosure	-♦-	-♦-	Medium negative (--)
Construction Phase			

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High	Negative Positive High Medium Low/No Med. High	
Employment & source of income	-◆-	-◆-	Medium positive (++)
Expected positive impacts on gender	-◆-	-◆-	Medium positive (++)
Skills development	-◆-	-◆-	Medium positive (++)
Improvement of access roads	-◆-	-◆-	Medium positive (++)
Influx of people	-◆-	-◆-	Small negative (-)
Unfulfilled community expectations	-◆-	-◆-	Medium negative (--)
Increase in price of communities	-◆-	-◆-	small negative (-)
Increase in disease incidence	-◆-	-◆-	Small negative (-)
Increased pressure on health, sanitation, fuel wood and other services	-◆-	-◆-	Small negative (-)
Increased need for fuel	-◆-	-◆-	Small negative (-)
Increased insecurity	-◆-	-◆-	Small negative (-)
Increased Traffic	-◆-	-◆-	Small negative (-)
Occupational Health and Safety	-◆-	-◆-	Small negative (-)
Increased conflicts	-◆-	-◆-	Small negative (-)
Loss of land & land use	-◆-	-◆-	Medium negative (--)
Loss of Structures	-◆-	-◆-	small negative (-)
Impact on vulnerable groups	-◆-	-◆-	small negative (-)
Impact on Gender	-◆-	-◆-	Small negative (-)
Increased risk of soil erosion	-◆-	-◆-	Minimal or no impact (0)
Loss of Aesthetic value	-◆-	-◆-	Small negative(-)
Waste Generation & Management		-◆-	Small negative(-)
Noise and vibration		-◆-	Minimal or no impact (0)

Study	**Degree Value/vulnerability**	**Degree of impacts**	**Overall impact Assessment (without mitigation measures)**
Scale	Low/Med/High	Negative Positive High Medium Low/No Med. High	
Air pollution		-♦-	Small negative (-)
Impact on Mammals	-♦-	-♦-	Small negative (-)
Impact on birds	-♦-	-♦-	Small negative (-)
Impoundment and Reservoir filling			
Improved water supply	-♦-	-♦-	Large negative (+++)
Employment	-♦-	-♦-	Large positive (+++)
Improved farming	-♦-	-♦-	Large positive (+++)
Increased Potential for tourism	-♦-	-♦-	Medium positive (++)
Potential for Electricity generation	-♦-	-♦-	Small positive (+)
Potential for Archeo-tourism	-♦-	-♦-	Small positive (+)
Creation of wetlands	-♦-	-♦-	Small positive (+)
Climate change	-♦-	-♦-	Small positive (+)
Increased habit for birds	-♦-	-♦-	Medium positive (+)
Increased habitats for Amphibians	-♦-	-♦-	Small positive (+)
Increased habitats for Insects	-♦-	-♦-	Medium positive (++)
Creation of habitats for fish and Aquaculture potential	-♦-	-♦-	Medium positive (++)
Climate change		-♦-	Small negative (-)
Dragon flies and Butter flies	-♦-	-♦-	small negative (-)
Future fisheries	-♦-	-♦-	Small negative (-)
Protected area	-♦-	-♦-	Minimal or no impact (0)
Ecosystem	-♦-	-♦-	Small negative (-)

8 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 INTRODUCTION

8.1.1 Purpose of 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. The impacts and mitigation measures have already been discussed in **Chapter** 7 and summarised under section for Mitigation measures in **Table 8-1** together with estimated costs and responsible persons; these form part of the ESMP. ESMP also aimed at helping to maximize positive impacts of the project. The ESMP further aims to ensure 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 Contractor will be provided with a copy of the ESMP.

8.1.2 Objectives

The ESMP objectives are to ensure:

i) that the activities of the project are carried out following all legal requirements of the Republic of Uganda as well as regional (EAC) regulations and guidelines including those of the world Bank and those of other funding partners;
ii) that the health, safety and wellbeing of workers and people living in the neighbourhood are taken good care of;
iii) that the environment and ecosystems of the project area and its neighbourhood are not harmed but are conserved in every way;
iv) that mitigation measures, corrective and compensation measures are taken quickly whenever needed;
v) that stakeholders are properly identified at Government, district, local, community and agency level to handle appropriate responsibilities during and after implementation of the project;
vi) that there is free flow of information to all stakeholders of the project to enable informed decision making and implementation of projects activities in a timely and coordinated manner;
vii) that the Resettlement Action Plan (RAP) is properly implemented.

8.1.3 Structure of the ESMP

The proposed ESMP has the following sections.

i) Key responsibilities and management structures
ii) Mitigation Plan and Costs;
iii) Environmental and Social Monitoring Plan and costs;

iv) Implementation Schedule and Budget for the Environmental and Social Monitoring Plan.
v) Reporting

8.2 KEY RESPONSIBILITIES

8.2.1 NELSAP /Ministry of Water and Environment

Being the overall coordinator and supervisor of all the ministries responsible for the water sector, it is presumed that Ministry of Water and Environment (MWE)/NELSAP will take the overall responsibility for the development of Bigasha Multipurpose dam project. Although the Contractor will have the primary roles in delivering on the measures set out in the ESMP, MWE will have the ultimate responsibility for ensuring that measures to mitigate any negative impacts are delivered. In this respect, MWE will review and approve Contractor plans for delivery of the actions contained in the ESMP and subsequently during project implementation, will review Contractor performance through monitoring, audits and inspection.

During preparation, Construction and operation of the Bigasha Dam project, Environmental Management Specialist (EMS) (who will be part of the Consultant's Team) will be responsible for ensuring that the overall objectives of the environmental and social mitigation measures are met, while a Community Liaison Officer (CLO) will be responsible for overall achievement of socio-economic objectives and engagement with stakeholders. The CLO will work closely with the MWE Sociologist while EMS will work closely with MWE's Environmental Specialist. The Water Users Association or any other committees set up to represent the community will work with the Contractors Environment Manager, the EMS, the CLO and Contractors Liaison Officer.

When working on site, the EMS and CLO will report to the Site Engineer (part of the Consultant's Team) who has the power to stop the work at any time should the actions established in the ESMP or otherwise required are not adhered to. Monthly reports shall be submitted to the Client by the Consultant and these will include detailed environment, social and Occupational Health Safety (OHS) issues. EMS will also prepare Annual Monitoring reports on behalf of MWI to be submitted to NEMA.

8.2.2 The Contractor

During site preparation, installation and operation and decommissioning the Contractor will be responsible for ensuring compliance with all relevant legislation (highlighted in **Section 3.0** of this report) as well as adherence to all environmental and socio-economic mitigation measures specified in the ESMP. The Contractor is also responsible under the contract for managing the potential Environmental, socio-economic, safety and health impacts of all contract activities

whether these are undertaken by themselves or by their sub-contractors.

Regarding Occupational Health and Safety, the Contractor will have in place an OHS Policy and the OHS Guidelines that comply with OHS Act of 2007. The Contractor also has to have in place guidelines that comply with Public health Act Cap 242 and Act No. 40 of 2006 HIV & AIDS prevention and Control as well as all the relevant legislation already indicated in the earlier section.

The contractor will also be expected to demonstrate commitment to the ESMP included in Environment and Social Impact Statement (ESIS) at all levels in the contractor's management structure. The Contractor will also be required to prepare a standalone ESMP as a tool to assist in planning of Environment and Social management activities to be implemented alongside construction activities. The Contractor is further required to have in place individuals responsible for overall environment management (including community liaison) and, safety and health management. The Contractor's community liaison team will be required to work with Consultant's CLO to implement the stakeholder engagement plan. The Contractor will be required to undertake regular environmental and socioeconomic Inspections and provide reports to MWE's EMS and CLO to monitor and evaluate performance against the measures and objectives established in the ESMP. Detailed monthly reports including detailed environment and social issues shall be submitted to the Consultant.

8.2.3 Stakeholder Involvement

MWE should continue to engage with the stakeholders throughout the project cycle. The implementation of the Bigasha Dam Environmental and Social Monitoring Plan (ESMP) will require the full participation of key players from a number of ministries and other stakeholders.

A system should be established with the stakeholders to ensure that stakeholders receive information on the progress of work and its implications, employment and others. The stakeholders who will be involved in the project were identified at scoping level and more discussion in institutional framework is in section 3.3. Stakeholders include different government departments both at national and local levels, NGOs and the communities. They include institutions like NEMA, Directorate of Water Development (DWD) particularly department of Water for Production, Directorate of Water Resources Management (DWRM), Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Department of Disaster Preparedness, National Water and Sewerage Corporation; Isingiro District Local Government, the sub counties of Ngarama and Kashumba as well as the villages of Kigando, Nyakabingo and Katyazo, etc. The Water User Association will form part of the stakeholders. Grievance Redress Committee which will participate in handling grievances during RAP implementation will also form part of the stakeholders. Grievance Redress Committee structure shall be fully established when Resettlement Action Plan (RAP) and has been completed and the actual affected people are known as they form part of this structure. Grievances shall be handled through the structure that

will be established by the project and the existing Local Council system as has been discussed in Preliminary RAP.

8.2.4 Project Management and Committees

8.2.4.1 Water User Committees and Associations

Water Act CAP 152 section 50 provides for Water User Committee. A group of individuals or households may form a Water User Group that can plan and manage a point water source. Administrative organ of Water User Group is Water User Committee. For the case of Bigasha, it is proposed that each "use" forms a committee. This would imply that we have an Irrigation Committee, Livestock Committee, Aquaculture committee, Water supply for domestic Committee and Hydropower Committee if necessary.

Section 50(2) stipulates that such a committee may collect revenue from persons using water supply system for maintenance of the system and set tariffs to be approved by the Director. In this case it is Director responsible for Irrigation, Livestock and Fisheries, Hydropower and NWSC. These water user groups will for a Water User Association since this dam will be serving more than one water user group as indicated in section 50(3). So one Water User Association will be formed for the Bigasha multipurpose dam project. The Association may collect revenue from persons using water supply system for maintenance of the system and set tariffs to be approved by the Director of Directorate of Water Development. Local authorities will participate in the organisation of Water User Associations with the assistance of directorates under which the Water User Groups fall.
These WUAs would be applicable for operation and maintenance. For construction phase, the central government and local government would be responsible for monitoring and supervision.

However from stakeholders' consultation, Water User Committee approach in Uganda has proved to fail on all dams in place so far. The current policy being promoted is the private operator approach and is being piloted on one of the dams in the country. It is therefore suggested that the private operator approach be used for water supply (for domestic use) but maintain the water user committee approach for the other uses like irrigation etc.

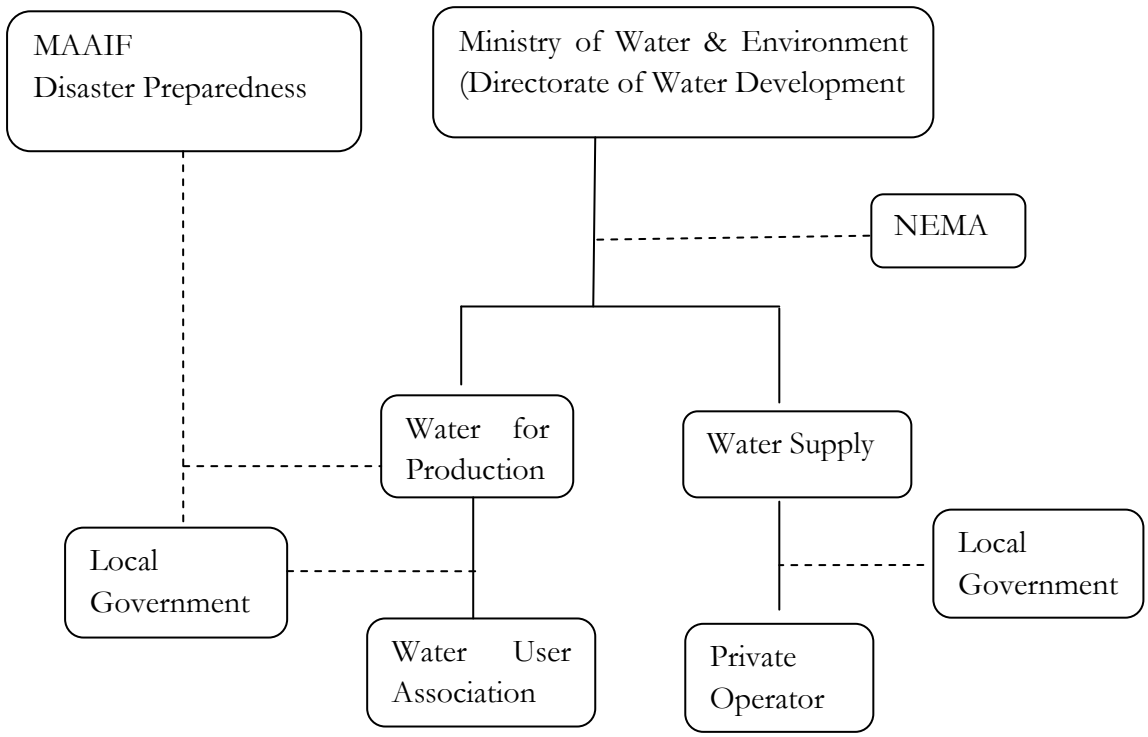

Figure 8-1 Key Stakeholders participation Structure for Bigasha Dam Project

8.3 MITIGATION PLAN

Table 8-1 below gives a summary of both positive and negative environmental and social impacts of the proposed project; proposals for enhancement of positive impacts; proposals for mitigation of negative impacts; estimated costs of enhancement and mitigation and the responsibility centre for each activity.

Table 8-1: Summary of environmental and social Impact of the proposed project in the Bigasha dam area and proposals for the mitigation

Potential Positive Impact	Enhancement measures	Cost Description /unit	Total Cost (USD)	Responsibility
Site preparation, Construction and Dam Operation Phase				
Creation of employment opportunities and increase in incomes	• Sensitization of communities and information dissemination on the existing job opportunities in the project. • Priority should be given to sourcing local labour from the project area. • Community sensitization on the importance and need to protect cultural assets • Training local residents in site protection strategies and handling of valuable cultural assets • Construction of transport and communication networks to the site in order to attract tourists to the site	a) Meetings for Ministry staff, District staff, Sub-county staff during construction b) Training of Sub-county staff, communities; One year after construction and during dam operation c) Training of dam operators, regular and casual workers; d) Stationery and communication	a) 10,000; b) 5,000.	Ministry of Water and Environment (MWE); Consultant and Contractor; Isingiro Local Government; Kashumba and Ngarama sub-counties
Skills development and Gender balance	• Contractor to put as an agenda to upgrade to another level for the unskilled and semi-skilled workers	Part of contractors cost		Contractor, MWE/Consultant & Isingiro District

Potential Positive Impact	Enhancement measures	Cost Description /unit	Total Cost (USD)	Responsibility
Improved water supply and sanitation facilities	• Continuous sensitization of the communities in regard to 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. • Water user and maintenance committees should be put in place and should be well facilitated to do their role.	Included in sensitisation cost Isingiro District Local Government include cost in Annual Budget		MWE/ Isingiro Local Government/Kashumba and Ngarama sub-counties
	• Continuous sensitizations about fish farming • Potential fish farmers should be provided with fish stocks • Training and capacity building in fish farming methodologies.	Amount to include fish procurement and training	20,000	Ministry of Fisheries/Isingiro Local Government/ Kashumba and Ngarama sub-counties
Construction phase	• Sharing of the benefits that accrue from the heritage sites with the concerned community • Construction of recreational centres at the cultural heritage sites	Sensitization meetings; Construction of centers; training materials	5,000	Ministry of Culture and Community Development, Isingiro District Local Got
Operation and Maintenance phase				

Potential Positive Impact	Enhancement measures	Cost Description /unit	Total Cost (USD)	Responsibility
Creation of employment opportunities and increase in income	• Sensitization of communities and information dissemination on the existing job opportunities in the project. • Priority should be given to sourcing local labour from the project area.	Continuance costs	Already catered for under sensitisation	MWE/ Consultant and Contractor; Isingiro Local Government; Kashumba and Ngarama sub-counties
Skills development and Gender balance	• Training programs for the unskilled and semi-skilled workers	Will be included in the Contractor's budget	Already indicated above	Contractor
Improved water supply and sanitation facilities	• Continuous sensitization of the communities in regard to 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. • Water user and maintenance committees should be put in place and should be well facilitated to do their role.			
Improvement in capture fisheries, aquaculture and better incomes	• Continuous sensitizations about fish farming • Potential fish farmers should be provided with fish stocks • Training and capacity building in fish farming methodologies.	Amount to include fish procurement and training	20,000	
Creation of tourism potential	• Construction of hotels, restaurants and recreation amenities	Working with the private sector	Funded privately	
Decommissioning				

Potential Positive Impact	Enhancement measures	Cost Description /unit	Total Cost (USD)	Responsibility
Influx of tourists	• The local communities should be motivated from time to time through sharing the proceeds that may arise from the use of cultural assets		-	Ministry of Culture and Community Development, and Ministry of Wildlife and Tourism, Isingiro District Local Govt

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Preconstruction phase/Planning				
Social expectations generated by disclosure and information to the community.	• Provide all information regarding the project including aspects of sharing of proceeds from the use of cultural heritage resources • Community sensitization on quarterly basis through public archaeology	Sensitization meetings;	5,000	Consultant and Ministry of Culture and Community Development
Site preparation and Construction				

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Encroachment on the potential cultural heritage sites and mishandling of artifacts	• Contractors need to work hand in hand with professional archaeologists so that any chance findings may be rescued and taken to the Uganda National Museum • Contractors should also be trained in basic skills of handling artifacts so as to avoid breakage, destruction, and loss of priceless assets • All murram and stone/rock quarry sites need to be first surveyed by archaeologists in order ascertain the intensity of the cultural assets in the place • Any valuable cultural item got in absence of the concerned cultural officials must be reported	Part of contractors budget		Contractor, MWE/Consultant, Isingiro District Local Govt., Consultant.
Construction phase				
Influx of people	• prepare workers recruitment plan prioritising local people • Local authorities shall need to be strengthened to deal with the increased cases of indiscipline. • Project should plan for an increase in infrastructure e.g. sanitary facilities, health facilities, and water facilities among others.	To be included in Contractors' budget		Contactor, MWE/ Consultant/Isingiro district/Local Leaders

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Unfulfilled community expectations	• Clear, precise and well defined employment policy and transparent recruitment procedures • Develop a communication strategy between the project and the rest of the stakeholders • Recruitment of local people for the less specialized activities, wherever possible • Encourage sub-contractors and suppliers to prioritize employment of locals wherever possible • Enhancement of community infrastructure should be considered	-	-	Ministry of Water and Environment/Consultant/Developer/Isingiro Local Government
Increase in diseases	• Distributing mosquito nets and sensitization of communities especially the affected villages of Kagando, Nyakabingo and Katyazo. • Sensitization program targeting the workers and the communities regarding the spread of Sexually Transmitted Diseases (STD) including HIV/AIDS • Ngarama HC IV and Kashumba HC III should be strengthened by project to carry out HIV/AIDS voluntary testing and counselling. • HIV/AIDs awareness campaigns in schools and communities should be undertaken periodically. • Project workers should be provided with condoms	Distribute 3000 mosquito nets to about 600 households, (3 nets per household) each nets at UGX 8,000= Boost 2 health centers with testing kits, source of energy and other requirements Awareness programs	9,600 20,000 Awareness already provided for.	Developer/Ministry of Health/Consultant/NGOs/ Isingiro Local Government/ Contractor

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Pressure on health infrastructure and services	• Where possible the project should support Ngarama Health IV and Kashumba Health III which are nearer to the project with the identified challenges like laboratory equipment and medicine, extension of electricity, improvement of the buildings and others to contain the health challenges for both the community and the workforce. • The project should plan for additional health infrastructure for its workforce to cater for the increased population. • Employment opportunities should be extended to the local people to reduce on the influx of people in the area.	Support to health centres has already been budgeted for. Contractor to provide some facilities for their workers to provide first line treatment. This should be included in his budget.	-	MWE/Ministry of Health/ NGOs/ Isingiro Local Government/ Contractor
Pressure on water and sanitation facilities	• Adequate water facilities should be constructed e.g. at the workers' camp and construction site. The community should also be provided with safe water. • 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. • The local people should be priority for job opportunities.			Developer/ Contractor

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Pressure on wood fuel leading to deforestation of trees	• Continuous sensitization of the communities about the dangers of deforestation should be carried out. • Employment opportunities should be extended to the local people to reduce on the influx of people in the area.		5,000	District Environmental Office, Contractor
Theft of project materials	• Employ private security guards at each construction site • The developer, contractor should collaborate with the community and encourage community policing in order to identify the culprits and to ensure safety of project materials. • The Contractor should put in place an internal control system to curb cases of theft of materials. • Collaborate with the local security in the area	Contractor's budget		Contractor/ Isingiro Local Government/ Local Communities
Occupational Health and Safety:	• Training of workers in safe operating procedures • Provision of appropriate Personal Protective Equipment • Labelling of danger zones and hazardous materials • Restrictions/control of access to potential danger zones or usage of hazardous chemicals • Instituting, enforcing and disseminating procedures to be followed when blasting	Cost to purchase personnel protective equipment to be included in cost under health and safety by the contractor		Developer/ Consultant/ Contractor
Community Health and Safety	• Together with local authorities, enforce restrictions on unnecessary entry into the project site or even the protected zone	Contractor's budget		MWE/ Consultant/ Contractor/ Local authorities

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Loss of Land and change in land use	• Project Affected people should be fairly compensated. • Provide alternative land for PAPs who have lost more than 20% of their land • Livelihood restoration programs should be put in place to ensure that PAPs livelihoods are restored	RAP budget		Developer/ Consultant/ Isingiro Local Government
Loss of residential and other structures/Resettlement	• All households losing their structures should be compensated fairly and adequately. • In kind compensation for the households should be considered as option by the implementing agency. • Livelihood restoration programs should be put in place to ensure that PAPs livelihoods are restored	RAP budget		Ministry of Water and Environment/Developer/Consultant/NGOs
Increased traffic and its associated consequences	• Existing access roads should be widened and used wherever possible for transportation of both personnel and materials. • Skilled and properly trained drivers should be employed. • Safe speed limits should be instituted and enforced. • Warning signs in busy places like trading centres should be installed. • Flag men should be employed by the project in order to control traffic	Contractor's budget	-	Contractor/Consultant/Developer/Traffic Police

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Impact on vulnerable groups	• The affected households should be compensated fairly and adequately. • Livelihood restoration strategies should be extended to the vulnerable groups and their income levels monitored closely during the implementation process. • Vulnerable households should be considered for employment opportunities	RAP budget	-	Ministry of Water and Environment/Developer/Consultant/NGOs
Impact on gender	• Jobs should be equitably distributed to both women and men as long as one has the qualification rather than basing on gender to allocate jobs. • Information dissemination about dangers of HIV/AIDS to the community should be done all throughout the period of the project. The messages should be passed on using the locally understood language for better understanding. • The parents should advice their girls against indulging in any kind of relationships with the workers.	Already catered for under sensitisation and gender	-	MWE, NGOS, Consultant
Waste generation	• Top soil used for levelling and rehabilitation • Sanitation areas be provided at the camp sites • Waste management hierarchy (3 or 4Rs) should be considered. Waste sorted, dustbins provided at strategic places etc.	Cost to be included as part of contractors cost	-	Contractor, MWE/ Consultant, DEO

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Impacts resulting from Camp site establishment	• Consult with local communities • Restoration of the area to original state • Control noise • Demobilise camp equipment • Management of oils, grease and solid waste • Put proper drainage	Rehabilitation cost included in the cost below. Other items to form part of contractors budget	-	Contractor, MWE/ Consultant

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Environmental impacts of quarries, borrow pits and overburden disposal sites Stockpiles of rock and earth materials	●Obtain NEMA clearance to operate quarries, borrow pits and overburden disposal sites; ●Operate quarries, borrow pits and stockpiling areas during daytime hours; ●Blast at pre-determined times and alert the local community; ● Locate mobile crushing facilities as far away from inhabited areas; • Separate environmental assessment be carried out for the quarry • Compensate owners of land temporarily • Carry out survey on all structures before quarrying activity • Institute speed limit for vehicles ferrying aggregates • Consult with people to avoid quarry where there are cultural sites • Restore land to its former state • Demobilize equipment and staff carefully to prevent environmental damage	Cost included as part of contractors budget. Rehabilitation; Assume there will be 1 large burrow pit. For a large borrow pit, Two weeks leveling (Dossier), 2 weeks grassing & 1month watering (watering tank) are needed. (14*1,500,000)+ (20 acres *30,000) + (800,000 *20) = **UGX 37,300,000** Cost of rehabilitating the stone quarries will be estimated after their environmental assessments have been carried out.	**14,920**	Contract , MWE/Consultant, DEO

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Erosion and sedimentation	●Minimize disturbed areas; ●Install sediments traps to prevent the transport of sediment into Watercourses; ●Implement slope stabilization measures;	Grassing and tree planting of affected areas	8,000	
Disturbance of flora and fauna.	●Minimize disturbed areas; ●Mark out work area boundaries;	-	-	Contractor
Ponding or accumulation of still water	●Minimize disturbed areas; ●Minimize ponding; ●Ensure adequate drainage of worksites;	Included as part of contractors costs		Contractor /Consultant
Disturbance of people living nearby (noise, vibration, dust)	●Minimize disturbed areas; ●Minimize noise, vibration and dust emissions to meet national standards; ●Locate mobile crushing facilities as far away from inhabited areas; Avoid construction at night	Included as part of contractors costs		MWE/Consultant, Contractor
Accidental discovery of cultural heritage sites.	●Recover any cultural artifacts; ●Inform the Ministry of Culture immediately; ●Preserve the site with markers.	Included as part of contractors costs		MWE/Consultant, Contractor, Department of monuments
	•			
Post Construction/ Operation and Maintenance				

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Increase in population	• Local labour should be used for maintenance of the dam site like de-silting • Skilled people within the area should be recruited, trained and their capacity built for the operation phase of the project			MWE/Contractor
Impact of HIV/AIDS and other STDs	• Continuous HIV/AIDS sensitization and awareness programs at all levels and also in schools. • Equip health centers at all levels with HIV/AIDS testing kits and HIV/AIDS Counsellors so as to be able to provide free testing and counselling services to the communities • Condoms should be available at all health centers and should be accessed at no cost by the communities.	Cost already included for awareness campaigns		MWE/Ministry of Health/Isingiro Local Government
Flooding and Dam safety	• There should be Early warning signs to the community in case of disaster • 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. • Sensitization of the community of an emergency plan of action in case of a disaster should be done continuously.	The budget has just been estimated at this cost but there should be an emergency fund at the national level (under Disaster preparedness) in case the problem goes to a disaster level.	**10,000** annually	MWE/ Ministry of Disaster Preparedness/ Isingiro district in charge of disaster
Reduced flow during the wet season after impoundment	Environmental flow of 0.13.l/s should be allowed to go through the dam to maintain ecological balance in the downstream valley		No cost	MoWE, Consultant & Contractor

Potential Negative Impacts	Mitigation	Cost Description /unit	Total Cost (USD)	Responsibility
Increase of soil erosion and Sedimentation of the reservoir	**Watershed /Catchment protection programmes** should be put in place like tree planting and promotion of good cultivation practices.	Cost has been estimate at 20,000	20,000	MWE/ Consultant, NFA, Isingiro district and sub-county
Impacts of the Irrigation	▪ Compensation for land (31.2Ha) to be used for canals, watering points, bananas and other crops ▪ Support to health centres to be able to handle diseases ▪ Removal of soil spoil dug out from canal & deposit to sites discussed with district environment officer ▪ Put proper drainage in place ▪ Involve communities to identify cultural sensitive areas	Included as part of RAP Assistance already provided for above Include as part of contractors cost Already planned for		MWE/Consultant, Contractor, DEO, DDHS

Total cost for the Implementation of the mitigation measures excluding compensation and resettlement has been estimated at USD 151,920.

8.4 ENVIRONMENTAL AND SOCIAL MONITORING AND MANAGEMENT PLAN

Table 8-2: Environment and Social Monitoring and Management Plan

Potential Impact	Mitigation Measures/Enhancement	Planning	Construction	Operation & Maintenance	Environmental Monitoring Indicators	Frequency of Monitoring	Responsibility
Social expectations generated by disclosure and information to the community	-Sensitisation of communities -Continuous community consultation	√	√		No of community meetings held and the information disseminated Attendance lists	Monthly	Contractor's Environmental Manager (CEM) MWE/ Consultant(Community Development Officer-CDO)
Influx of people	-Prepare recruitment plan that prioritises the local people -Strengthen local authorities (sub-counties) to handle cases of indiscipline - Project to improve services like water supply, health etc.		√		- No. of local people recruited -Information about recruitment placed on strategic places -Support to services provided	Monthly	Contractor, MWE/ Consultant Local Authorities, CDO
Increase in disease incidents e.g., malaria, HIV/AIDS	-Provide mosquito nets to communities in villages of Kigando, Nyakabingo and Katyazo -Sensitise workers & communities about				- No of households provided with mosquito nets -No. of sensitisation	Monthly	MWE/ Consultant, Director District Heath Services (DDHS/Health Centres)

	STDs like HIV -Conduct AIDS awareness campaigns among schools & community				meetings & awareness campaigns		
Unfulfilled community expectations	-Have clear and well defined employment policy -Develop communication strategy between project and stakeholders -Prioritize employment of locals -Enhancement of community infrastructure		√		-Employment & communication strategy in place -No. of locals employed	-Beginning of construction - Monthly	Contractor, MWE/ Consultant, Local Authorities (CDO)
Pressure on health infrastructure and services	-Project should support the health centres in terms of laboratory equipment and power supply -Plan for additional health infrastructure -Employment opportunities should be extended to local people		√		- Laboratory equipment provided	-Quarterly	Contractor, MWE/ Consultant Local Authorities, DDHS
Pressure on water and sanitation facilities	-Adequate water facilities should be constructed -Provide additional sanitation facilities i.e. bins for solid waste and garbage collection		√		- Water source put in place in the community & one in the Campsite	-Beginning of Construction -Monthly	Contractor, MWE/ Consultant Local Authorities (Water Officer)
Pressure on fuel wood	-Continuous sensitisation about dangers of deforestation and tree planting (		√		-No of tree seedlings given out and planted	-Quarterly	MWE /Consultant, Local Authorities (Forestry Officer)
Insecurity	-Employ private security guards at each construction site -Put in place an internal control system to curb cases of theft		√		-Reports on security	-Monthly	Contractor, Local Authorities (District Security Officer) etc.

	-Collaborate with local security and the community						
Occupational Health and Safety	-Training workers in safe operating procedures -Provision of appropriate Personal Protective Equipment -Labelling and marking of danger zones and hazardous materials -Control access to potential danger zones and institute ,enforce and disseminate procedures to be followed when lasting		√		- No of accidents	-Daily	Contractor, Consultant, District Environnent Officer (DEO)
Community Health and Safety	-Enforce restrictions on unnecessary entry into the project site - -Sensitisation of the communities and workers		√		-		Contractor, Consultant, Local Authorities, DEO
Increased traffic and its associated consequences	-Widen existing access roads -Use skilled and properly trained drivers -Institute safe speed limits and install warning signs in busy places		√		-No. of accidents	Daily	Contractor, Consultant, Local Authorities, DEO
Conflicts	-Give local labour priority for employment -Strengthen local authorities to deal with indisciplined cases		√		- No. of local people employed -Reports on conflicts	Monthly	Contractor, Local authorities
Loss of Land, change of tenure and land use	-PAPs should be fairly compensated -Provide alternative land for PAPs who have lost more than 20% of land -Put in place livelihood restoration programs		√		- Payment Vouchers - Land provided in kind	-Before Construction commences	MWE/ Consultant, Local Authorities (CDO, District Land officer)

Loss of residential and other structures/Resettlement	-A comprehensive Compensation and Resettlement Action Plan is required -Option of in-kind compensation for households should be considered by the implementing agency		√		-Compensation payment Vouchers -No. of households relocated	Before construction commences	MWE/ Consultant, Local Authorities (CDO, District Land officer)
Impact on vulnerable groups	-Consider vulnerable households for employment opportunities -Affected households should be compensated fairly and adequately		√		-No. of vulnerable people employed	-Monthly	MWE/ Consultant, Local Authorities (CDO, DEO)
Impact on gender	-Equally distribute jobs to both men and women depending on qualification -Sensitise community about dangers of HIV/AIDS. -Counselling of young girls to avoid sexual relationships		√		-No of men and women employed - Reports on sensitisation and counselling activities provided	-Monthly	MWE/ Consultant, Local Authorities (CDO, DEO, Health Centres)
Increased Risk to Soil erosion	-Excavation and grading activities to be conducted during dry season where possible -Vegetation to be planted after construction where it was removed -Remove loose soils from worksite -Ensure proper drainage along access roads, murram pits and all other cut areas		√		- No loose soils left at the site -Proper drainage in place	Monthly	Contractor, MWE/ Consultant, DEO
Impact on Aesthetics	-Restoration of excavated areas and other open as soon as construction is complete -Encourage tree planting in the area -Improve the visual impact on landscape by keeping a neat and tidy construction		√		- seedlings given out & area planted	Monthly	Contractor, MWE/ Consultant, DEO

Solid Waste Generation (including spoil material and Stripped Vegetation)	-Top soil to be kept and be used in gardens -Construct pit latrines at the camp site -Consult owners of areas identified with borrow pits -Encourage waste management hierarchy i.e. reduce, reuse, recycle and recover rubbish		√	√	-Sorting of waste being done	Daily	Contracter, Consultant
Oil spill and subsequent contamination of soil	-Place drums in areas in case of spillage -Put in place an oil interceptor -Keep good records of major spillages to enable proper monitoring		√		- Oil interceptor in place at work shop and strategic areas -Storage areas well paved -Records in place	At the start of construction Daily	Contracter, Consultant
Negative Impacts of noise and vibrations	-Formulation of a Grievance Management plan within the environmental and social plan to handle complaints on noise -Limiting the speed of construction vehicles and regulate them on when to travel		√		-Noise levels met the national standards -Complaints from the community	Daily	Contracter & MWE/ Consultant
Negative Impacts of Air pollution	-Put in place a dust control management plan -Regular maintenance of equipment -Provision of dust respirators to workers -Watering of roads being used for ferrying of materials that go through trading centers		√		-dust levels being controlled -Record of equipment maintenance	Daily Monthly	Contracter & MWE/ Consultant
Loss of vegetation	-Limit vegetation clearing and re-vegetation should be encouraged -Project should set aside some funds for tree planting through CBOs.		√		- Record of Seedlings given out -Area re-vegetated	Monthly	Contracter & MWE/ Consultant, DEO

Population increase/ Influx of people	-Use local labour for dam site maintenance -Recruit and train skilled people to build their capacity for the operational phase		√		-No. of local people employed	Monthly	Contracter & MWE/ Consultant, CDO
Impact of HIV/AIDS and other STDs	-Continuous HIV/AIDS sensitisation and awareness programs -HIV counselling and Testing campaigns -Avail condoms for community members		√	√	-No of people tested and started on treatment -No. of awareness meetings -No. of condoms distributed	Monthly	Contracter & MWE/ Consultant, DEO, DDHS
Risk of drowning	-Surveillance around the dam carried out -Sensitisation of community on dangers of the reservoir and emergency plans			√	- Surveillance team in place and facilitated -Record of information disseminated	Monthly	Local authorities, DEO,
Risk of water borne and insect-borne diseases	-Sensitisation of communities about boiling water for drinking and sleeping under mosquito nets -Distribute treated mosquito nets to communities and clear bushes around the reservoir		√	√	-Sensitisation meetings -No of mosquito nets distributed	Monthly	Contracter & MWE/ Consultant, DEO, DDHS
Encroachment on the site and mishandling of artifacts	-Contractor to work with professional archaeologists to rescue any chance findings -Contractor to be trained in basic skills of identifying and handling of artifacts -Survey to be done on all murram and stone/rock sites		√		-Surveys carried out on material source areas, -Workers trained	Start of the contraction	Contracter & MWE/ Consultant, DEO, département of antiquities

Reduced flow during the rainy season	-Sufficient water should be allowed to flow through the dam during the wet season		√		-changes in the ecological system down stream	quarterly	Contracter & MWE/ Consultant, DEO,
Dam safety related impacts and Flooding	-Emergency plans and procedures have been developed -Put warning system in case dam breaks -Compensate any destroyed property -Coordination of different institutions in case such event occurs -			√	-Emergency plans and procedures in place -Warning system in place - Affected property compensated		MWE , Department of disaster preparedness & local authorities
Negative Impacts on future Fisheries	-Institute a water use committee to oversee fishing activities -Formulate and enforce fishing regulations to control access to the dam and fishing grounds -Educate community about fish, fishing methods and seasons of fishing -Provide good health and sanitation facilities for the communities			√	- Water User Committee for fisheries activities in place and facilitation arrangements in place -Reports of Advocacy meetings carried out - Proper sanitation in place	quarterly	MWE, DEO, District Fisheries Officer, local authorities
Negative impacts of reservoir inundation on the ecosystem	-Institute and enforce good water shed management practices i.e. afforestation ,terracing and good agricultural practices			√	-Good management water practices in place	Quarterly	MWE/ Consultant, DEO, Forestry Officer, local authorities

8.4.1 Budget for Environmental Monitoring

Table 8-3: Estimated Budget for Implementation of Environment and Social Management Plan (ESMP)

a) Fees /allowance					
Staff /Monitors	**No.of staff**	**Days of work per month**	**Total Days for year**	**Unit cost (USD)**	**Total Cost (USD)**
1. Environment Management Specialist (EMS)	1	10	120	300	36000
2. Community Liaison Officer (CLO)	1	20	240	150	36000
3. Site Environmental Officer (SEO)	1	20	240	150	36000
4. District Environmental Officers (DEO) & other Officials	2	2	24	70	1680
Total					**109,680.00**
b) Reimbursible					
Item	**No of trips**	**Unit cost per trip (USD)**			**Total**
Transport	12	500			6000
Perdiem EMS	12	280			3360
Perdiem SEO	4	280			1120
Perdiem CLO	4	280			1120
Water quality	8	1,500			12000
Miscilleneous					1000
Total					**24,600.00**
2. Liability Period					
a) Fees /allowances					
Staff	**No.of staff**	**Days of work/yr**	**Total days**	**Cost /day**	**Total cost**
EMS	1	5	30	300	9000
Total					**9,000.00**
Reimbursable					
Item	**No. of trips/time**	**Cost per trip**			**Total**
Transport	6	500			3000
Perdiem	6	280			1680
Total					**4,680.00**
Total fees					118680
Total Reimbursible					29280
Grand Total					**147,960.00**
The cost of environmental monitoring is estimated at USD147,960					

According to Draft Final feasibility study report construction will take about 7Months but we have allowed a period of 1 year. Consultant/Environment Management Specialist (EMS) Community Liaison Officer (CLO), Contractors' Senior Environment Officer (SEO) as well as Environment Officer and other stakeholders whenever necessary will participate in monitoring. Therefore this is the core staff the monitoring budget has taken into consideration.

8.4.2 Total Budget for Environment and Social Management Plan (ESMP)

The total budget for ESMP will consist of the budget for Mitigation plan and that of Environment Monitoring Plan. Mitigation plan cost was estimated at 151,920 while that of monitoring plan has been estimated at USD 147,960. Therefore a budget of USD 299,880 has been estimated for the ESMP for Bigasha Multipurpose Project excluding RAP costs which are detailed in Preliminary RAP report.

8.5 REPORTING

Monthly progress report accompanied by environmental monitoring reports that include illustrations and records shall be prepared by the Consultant (EMS) and submitted to MWE for purposes of review of environmental management performance of the Contractor. Annual reports containing all data obtained during the environmental monitoring throughout the year shall be submitted to NEMA by MWE up to end of construction period. According the Environment Impact Assessment Regulations, 1998, annual audits are required. Therefore an annual Audit reports shall be submitted to NEMA by MWE. Otherwise quarterly monitoring reports shall be submitted to the District Environment Officer for Isingiro during construction stage for them to monitor compliance. During operation and Maintenance MWE is expected to continue following up on environmental issues especially maintenance.

9 CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSIONS

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.

9.2 RECOMMENDATIONS

9.2.1 Institutional Cooperation

A number of institutions will be involved in this project in all phases as was indicated in stakeholder identification. In order to enhance implementation of the proposed mitigation measures there is need for collaboration between Ministry of Water and Environment, NELSAP and relevant Districts Departments including water, production, community development, health and others. It is imperative that clear roles and responsibilities for the different institutions be streamlined before construction activities start.

9.2.2 Sensitization

Continuous sensitization should be done during project Construction, Operation and Maintenance phase. Key issues for emphasis during sensitization include but not limited to; Health and safety, HIV /AIDS, opportunities, Compensation issues, Grievance Procedures, gender issues and others

9.2.3 Employment Opportunities

The active work force has not yet been estimated but what is clear is that there will be both skilled and non-skilled/casual labourers. It is recommended that workers should be recruited from the local communities, especially in non-skilled positions, whenever possible. Employing local people will not only benefit the communities but also eliminate or reduce the costs of providing housing and logistics. Local people should be given priority and proper consideration should be made to ensure that some manual work being' flag women' is given to women as well as work in the traditionally female areas of cooking and market activities.

9.2.4 Cultural and Archaeological aspects

During consultation and field surveys, there were no archaeological resources identified in the Bigasha area although plenty of these are found in other areas of Isingiro like at Nsongezi in Kikagati sub-county. However it is recommended that the department at Uganda Museum be

involved in the activities like being invited to address the contractors before start of contraction so that chance finds are not ignored. Once these are found, the museum officials should be informed and the finds delivered to the museum

9.2.5 Planning and Co-ordination with Local Authorities

Throughout all phases of the project, local authorities should be informed of the decisions taken by the Ministry of Water and Environment and consulted whenever possible. This will ensure good cooperation with the communities and avoid misunderstandings. A committee with representatives from the Districts, Lower local Governments and Communities has already been proposed and should be established in order to ease communication during construction.

9.2.6 Resettlement Action Plan (RAP) and Property Valuation

During this ESIA study, a preliminary RAP was being prepared alongside and indicative property likely to be affected and types of Assets in the affected area. This is in line with Annex A of the Involuntary Resettlement Policy of African Development Bank. A RAP detailing individual affected persons, sizes of land and other individual property, grievance procedures, eligibility and criteria, payment mechanism and others will need to be carried out in the next phase of this study. Actual valuation of property and crops is to be affected should be done before construction. During construction, if any damage that was not envisaged is experienced, the valuation of such should be done. This will ensure that the process of compensation is prompt and fair.

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APPENDICES

APPENDIX 1: TERMS OF REFERENCE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED MULTIPURPOSE DAM AT BIGASHA, ISINGIRO DISTRICT, UGANDA IN KAGERA RIVER BASIN

DRAFT TERMS OF REFERENCE

1.0 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 NBI's Strategic Action Program is composed of two complementary programs which include the basin wide Shared Vision Program (SVP), whose objective is to build confidence and capacity throughout the basin, and the Subsidiary Action Programs (SAPs), which initiate concrete investments in the Eastern Nile and in the Nile Equatorial Lakes sub-basins (NELSAP).

The NELSAP implements three river basin projects, among which the Kagera River Basin Management Project (KRBMP) is one of them. 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) is implemented under the NELSAP program of NBI. Its main 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 which is intended to improve the socio-economic conditions of the people and to protect the environment. 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 study identified 28 new dam sites and made preliminary assessment of 3 previously identified dams from the Rwanda Irrigation master plan. From this "long list" of 31 sites, 11 sites were selected basing on the criteria of: (i) Equity (targeting one site per country), (ii) Dam height (targeting small dams as defined by World Bank OP4.37), and (iii) Reservoir storage capacity and reservoir yield. For these 11 selected sites (3 in Uganda, 3 in Rwanda, 3 in Burundi and 2 in Tanzania). Other criteria

were also developed to rank the 11 visited sites, and these included: (iv) site foundation conditions, (v) material availability, (vi) access to proposed sites, (vii) potential water uses, (viii) environmental and social considerations, and (ix) Government priority or site preference. From the above criteria, four dam sites were selected for feasibility study, with one site per country. From the above criteria, four dam sites were selected for feasibility and these were Taba-Gakomeye in Rwanda, Buyongwe in Burundi, Karazi in Tanzania and Bigasha in Uganda.

Further, the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) of NBI received additional grant from the World Bank Nile Basin Trust Fund (WB NBTF) to undertake an Independent Environmental and Social Impact Assessment (ESIA) for the four identified multipurpose dam sites of which Bigasha is one. Thus, Newplan Consulting Engineers and Planners of Crusader House, Plot 3 Portal Avenue, P.O. Box 7544 Kampala was awarded the contract to undertake this study in December 2011.

The present Terms of Reference are addressing Bigasha dam site in Uganda.

The ESIA study will assess the technical, social, economic, financial and environmental viability of the multipurpose dam. The ESIA will run concurrently with the abovementioned feasibility study but will independently evaluate the environmental and social aspects of the multipurpose dam site. The ESIA will be done in accordance with the relevant World Bank's guiding Policy Frameworks and procedures in full cognizance of national policies.

A scoping study has been carried out to which these TORs are an appendix.

During scoping, several key environmental issues were identified after site reconnaissance, holding consultations with stakeholders of the project and reviewing various literature related to the project. Similarly, expert opinion was sought on various key issues identified as requiring specialized knowledge.

The purpose of Terms of Reference (TOR) therefore, is to provide formal guidance to the Developer and dam Design Consultants on the range of issues that must be addressed in the dam development process. They also form a basis for subsequent review process. In these ToR, strategies for addressing issues identified during scoping have been incorporated to make the study focused.

1.2 Objectives of the Environmental and Social Impact Assessment

1.2.1 *Overall Objective*

The objective of the study is to undertake an environmental and social impact assessment of the proposed dam. It will identify possible positive and negative impacts on the social, physical cultural and biophysical environment prior to, during and after infrastructure construction. Hence, the ESIA study is aimed at improving the environmental design of the multipurpose dam

through elimination/minimizing negative impacts and enhancing the positive impacts of the dams. Environmental and Social Management Plans (ESMPs) will also be prepared.

1.3 PROJECT DESCRIPTION

According to White (1983), Bigasha site project in Uganda lie in the Lake Victoria Basin Biome. The proposed Bigasha dam site is located in Kigando village, Ngarama Sub-county and Nyakabingo and, Katyazo of Kashumba sub-county in Isingiro District (see **Figure 0-1** and **Error! Reference source not found.**).

The proposed dam will be 14m high, maximum reservoir surface area of about 1.79km^2, and storage capacity of about 9.62Mm^3. It is located on River Bigasha, a sub-surface river (around the project site) which flows into River Kagera at the border of Uganda with Tanzania.

The dam site area is sparsely inhabited **(Plate 0-1)**. Existing activity is mainly livestock rearing and peasant agriculture. The dam is expected to provide water for domestic use, hydropower, livestock, and irrigation, fisheries, aquaculture and flood control.

Plate 0-1: The valley of Bigasha Dam site with hardly any human habitation

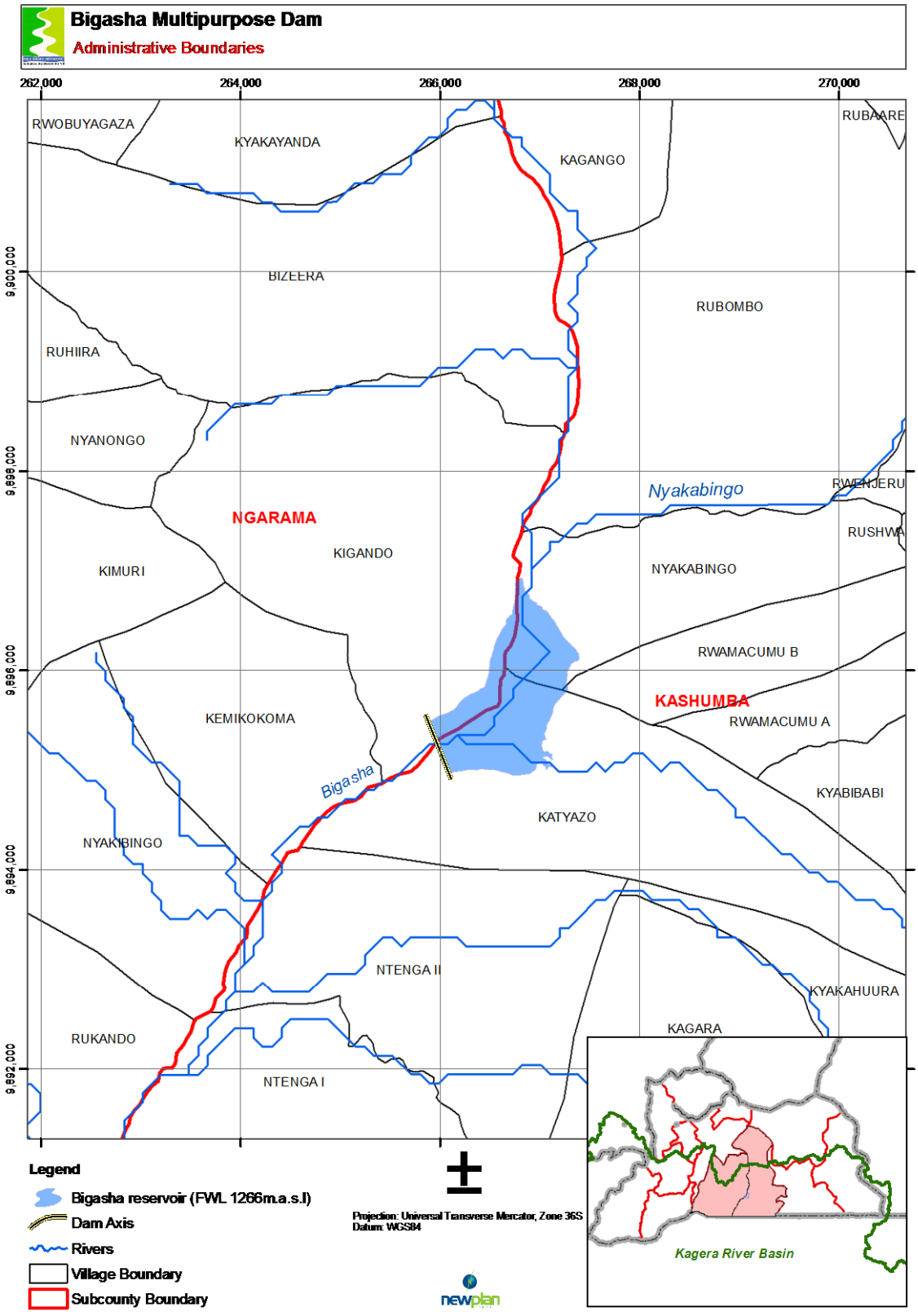


Figure 0-1: Map showing villages in which proposed Bigasha Dam is located

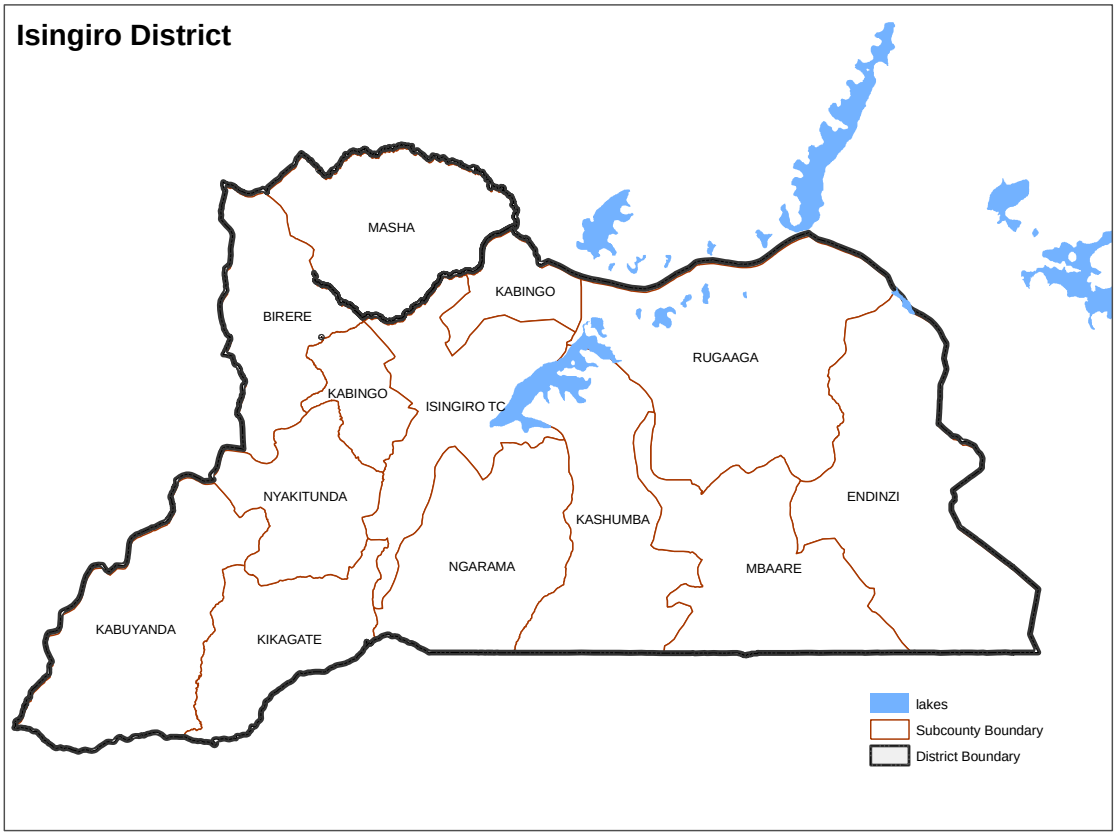


Figure 2: Isingiro Map showing subcounties in which Bigasha dam is located.

1.4 SCOPE OF THE ENVIRONNENTAL IMPACT ASSESSMENT

1.4.1 Project Description

Provide the following information: location of project sites, general layout and extent of facilities at the project site; pre-construction activities; construction activities (land clearing, land grading, worker camps, if any), facilities and services; operation and maintenance activities (water management, monitoring of flows and groundwater, etc.), management of risks, including health and safety; life expectancy for major components.

1.4.2 Description of the Existing Environment

Assemble and evaluate baseline data on environmental characteristics of the area, site of dam(s), inundation, and biological features (habitats and rare species), and the socio-cultural environment including agriculture.

Specifically, the consultancy will collect and assess environmental data on:

a) Physical environment:

Geomorphology and geology: Evaluation of the potential influence of the Projects on the geomorphology, geology and quality and stability of the soils of the area of the project and surrounding areas and vice-versa. Evaluation of possible impacts that the proposed facilities and operations will have on the geology and soils.

Hydrology

Evaluation of groundwater/surface water interactions and recharge and any potential environmental impact on these from the proposed dam;

Implications of the planned project on the water demand in both the up and downstream areas and in terms of domestic, livestock needs, industrial and wider regional considerations.

Evaluation of possible impacts that the proposed facilities and operations will have on surface water and groundwater environments. Hydro census and chemical sampling, recording the following parameters:

- GPS locations of boreholes, springs, wetlands, and surface water bodies;
- Surface water flow patterns and identify downstream users;
- Borehole depths and yields;
- Spring location and yields; and
- Field quality parameters, including electrical conductivity, temperature and pH measurements.

Undertake preliminary assessment of appropriate *environmental flow*, if any, which will be necessary during reservoir filling and operation in order to maintain the ecological, hydrologic and related socio-economic services of the rivers downstream of the dams.

A detailed Hydrology report including Hydrological Assessment, hydro census and Environmental flow will be attached as an appendix to this study:

b) Biological environment

Habitats: An evaluation of environmental impact of the project up and downstream on woodland and wetland conservation, river and habitat of conservation importance.

Species An evaluation of environmental impact on terrestrial and aquatic flora and fauna and species conservation. The main focus of the faunal assessment will be on assessing the availability and status characteristics of habitat that support animal assemblages and endangered species.

Renewable natural resources: An evaluation of environmental impact up and downstream on land use

that supports livelihoods including croplands, fuel woods, medicinal plants, wild games, livestock, beekeeping and fishing.
Process; An evaluation of environmental impact on the up and downstream processes of food chains, movement of terrestrial and aquatic species, insect borne diseases and aquatic weeds.

Potential Upstream Impacts; A detailed habitat assessment of the proposed area to be inundated must be conducted in order to:

i) Identify and sample existing floristic and faunal attributes within the proposed area, with specific reference to species diversity, endangered species and sensitive environmental features and attributes;
ii) Consider the effect of potential impacts on floristic communities and faunal assemblages;
iii) Describe floral communities and faunal assemblages;
iv) Combine separate floristic and faunal results to present an ecological overview of the proposed development;
v) Consider the potential impact of the proposed investments on the ecological environment;
vi) Highlight areas of particular concern;
vii) Provide recommendations in terms of
    - possible realignments of the proposed investments and
    - mitigation of potential impacts during and subsequent to the construction and operational phase;

Potential Downstream Impacts: Baseline condition of the riverine and aquatic habitats, flora and fauna downstream of the proposed project should be considered in terms of the situation in similar natural catchments without the presence of a dam to help assess what might be appropriate environmental flows from the reservoir. Relevant maps must be compiled to highlight sensitive environments.

The results should be subjected to the same Impact Evaluation Procedure in order to evaluate the significance of impacts on the ecological environment. Based on this specific recommendations must be made in order to limit the impact of the proposed interventions on the ecological environment to a minimum.

c) Socio-cultural environment

The consultancy will develop a detailed socio-economic assessment, as part of the overall ESIA that identifies social impacts and provides recommendations to mitigate these impacts. The study shall consider gender and vulnerable group issues throughout the ESIA process and present key findings and recommendations with regard to these issues in the final report. The final report should include gender disaggregated beneficiary data in the baseline, and quantitative performance indicators to measure and track gender participation in the monitoring plan.

The socio-economic baseline assessment should include the following components:

i) maps delineating different areas of impact, both upstream and downstream, identifying zones of land use, and the different livelihoods that these land uses support.
ii) description of land types and land uses in the area of impact. (e.g., what kind of farming system (s) are in operation - dry land farming, irrigation agriculture, what are the main food crops /cash crops?); gender and livelihoods assessment;
iii) description of the community structures: official leadership structures and other institutions that are important to the community. Description of the main NGOs active in the area and their activities;
iv) description of the population/demographics of the area of impact. Accurate statistics are often hard to come by, but local leaders, district and health officials, local NGOs can often provide this information;
v) description of the primary social services in the area of impact: including quality of services delivery – especially water, sanitation and waste management, health services, and schools; and
vi) description of important cultural, historical, archaeological sites in the area of impact and assess which compensation measures can be adopted by communities for the relocation of these sites.
vii) description of existing social values of the areas that may be affected by the project including effects at both footprint and indirectly affected areas/locations.

1.4.3 Assessment of Potential Environmental and Socio-economic impacts

The study shall:

a) Identify and assess the various positive and negative socio-economic impacts of the proposed projects on each of the different groups of people (including differentiated impacts for men and women) and the economic activities described in the baseline;

b) Propose feasible and cost-effective mitigation measures and strategies to minimize, avoid or compensate adverse environmental and socio-economic impacts as well as recommend development measures and strategies to enhance beneficial impacts, including monitoring plans for their implementation;

c) Develop an Environmental and Social Management Plan (ESMP) with procedures, plans and costs to ensure that the mitigation measures and monitoring requirements approved during the environmental compliance review will be carried out in subsequent stages of the project.

Specifically the ESMP shall include: (i) recommendations of feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels; (ii) estimated magnitude of impacts and costs of mitigation measures; (iii) consideration for compensation to affected parties

for the impacts that cannot be mitigated; (iv) set of "best practices" measures to be followed in order to avoid some of the impacts during construction and operation phase of the project; (v) identification of the institutional needs to implement environmental and social recommendations including a review of the capacities of the relevant institutions; (vi) steps to strengthen and expand these institutions to ensure that effective environmental and social management and monitoring will take place; (vii) description of the detailed arrangements required for monitoring the implementation of the mitigation measures and the impacts of the project during the construction and operation; and (viii) proposed work programs, budget estimations, schedules, responsibilities for implementation and other necessary support services to implement the ESMPs (ix) a Dam Safety Plan as per OP 4.37 or recommendations for its preparation;

A report containing Hazard and Risk assessment and, an outline of Emergency Management Procedures shall be attached as an appendix to ESIA report.

d) Conduct public consultations with a range of stakeholders on issues of the project. These will include holding consultative meetings with the parties concerned (affected population or their representatives; local, regional, and national authorities; representatives of the scientific community; national environmental management authorities, NGOs; etc.,) in accordance with the requirements of the government of Uganda as well as with the World Bank safeguard policies and procedures. The consultancy is responsible for: providing information on the project to all concerned and affected parties, consulting with the parties on a regular basis throughout preparation of the ESIAs, providing an opportunity for public review and comment of the draft ESIAs, and preparing a Public Consultation Report for submittal to the environmental regulatory authorities. The consultative process should be guided by a plan and should identify key/target stakeholders, how the consultation will be conducted and involvement of the public in the study process.

1.5 REPORTING

A Draft Environment and Social Impact Statement (ESIA) shall be prepared and submitted to Client and World Bank for review and comments.

Once comments are incorporated, Final ESIA shall be submitted to the Client for subsequent transmission to National Environment Management Authority NEMA.

1.6 KEY PERSONNEL

The Environmental and Social Impact Assessment Studies (ESIA) will be carried out by experienced personnel who are Certified and Registered with National Environment Management Authority (NEMA) as stipulated in National Environment Act Cap 153. These will be assisted by other specialists as indicated below;

Registered Environmental Practitioners

Name of Staff	Position
Mr. Robert Ndyabarema	Team leader
Jovah Ndyabarema	Ecologist (Flora & Fauna)
Jane Mugano	Sociologist
Dismas Ongwen	Archaeologist
David Nkuutu	Botanist

Other Specialists

Name of Staff	Position
Prof. John Okedi	Senior Aquatic Ecologist
Dr. Eric Sande	Ecologist
Mr. Moses Dakasi	Sociologist
Dr. Henry Ntale	Senior Hydrologist
Mrs. Samalie Akongo	Hydrologist
Mr. Stig Arne	Dam Safety Specialist
M/s Sarah Nabeta	Support Dam Safety Specialist

APPENDIX 2: TOOL USED IN SOCIO-ECONOMIC SURVEYS

i) Social-Economic Tool for Uganda

My name is_____
I am here on behalf of the **Nile Basin Initiative/Nile Equatorial Lakes Subsidiary Action Program (NBI/NELSAP).** This is an organization formed to develop 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.

We would therefore like to ask you some questions of which the responses will help in the planning, construction and operation phases of the project. The information you will give will be treated with utmost confidentiality.

Socio-Economic Survey Tool

Serial No. ----------

SECTION 1: Locational Details

Country----------District----------

Sub County----------Parish----------

Village ----------

Name of interviewer----------

Date of interview----------

Start time ----------

End Time----------

Duration of the interview----------

SECTION 2: Demographic Details (*Include all household members starting with the Household head)*

1. Name (use Xtian name only)	2. Sex	3. Age	4. Relationship to HH	5. Educ	6. Marital Status	7. Tribe	8. Religion	9.Income earner (Y/N)	10.Main source of livelihood (occupation)	11. 2nd source Livelihood (occupation)	12. Total Income	13. Illnesses (last 6 months)

Code for sex 1-Male 2- Female

Code for relationship with HH head: 1-Household head 2-Wife 3-son 4-Daughter 5-Granchild 6-Sister 7- Brother 8-Nephew/Niece 9-no blood relation 10-Other relations (specify)

Code for education 1-None 2-Primary 3-Secondary 4-Tertiary 5-University 6-Other (specify)

Code for marital status 1-Married monogamous 2-Married polygamous 3-Single 4-Widowed 5-Divorced 6-Cohabiting 7-Other (specify)

Code for religion 1-Protestant 2-Catholic 3-Seventh Day Adventist 4-Moslem 5-No belief 6-Traditional 7-Other

Code for income earner 1-Yes 2-No

Code for source of livelihood 1-Peasant farmer 2-Commercial farmer 3-Civil servant 4-Trader 5-Service provision (e.g. salon, hotel, transport) 6- Casual laborer 7--Other (specify)

14. Is there any member of the household who is disabled? 1 Yes 2 No

15. If yes, what is the type of disability?
    - Physical lameness 1
    - Blind 2
    - Mental 3
    - Other (specify) 4

16. What was the cause of the disability?
    ……

17. Are there orphaned children in your household? 1 Yes 2 No

18. If yes, what was the cause of death of their parents?
    ……

If farming is a source of income answer questions 19-24

19. Type of farming (Multiple answers acceptable)
    - Crop farming 1
    - Animal husbandry 2
    - Mixed farming 3
    - Fish farming 4
    - Tree cropping 5
    - Hunting 6
    - Others (Specify) 7

20. Type of crops grown
    Cash crops……
    Food crops……

21. If you rear animals, what type of animals do you rear? (Multiple responses possible)
    - Sheep 1 Number……
    - Goats 2 Number……..
    - Cattle 3 Number……
    - Pigs 4 Number……..
    - Poultry 5 Number…….
    - Other (specify other animals) 6 Number…….

22. Do you sell some of the crops you grow?
    - Yes 1
    - No 2

23. Do you sell some of the animals?
    - Yes 1
    - No 2

24. If you do fish farming, do you sell some of the fish caught?
    - Yes 1
    - No 2

If yes to questions 22-24, answer questions 25-27 below

25. Where do you sell your products?
    Crops .....
    Animals.....
    Fish .....

26. What is the distance to the main marketing point for your products?
    Less than 500ms 1
    500-1km 2
    Above 1km 3

27. What problems do you encounter when marketing your commodities?
    .....
    .....

SECTION 3: LAND OWNERSHIP AND TENURE

28. Do you own land?
    Yes 1
    No 2

29. Under what tenure system is your land? (Only one answer)
    Customary 1
    Leasehold 2
    Freehold 3
    Communal 4
    Other (specify) 5

30. Do you own land elsewhere?
    Yes 1
    No 2

31. Average land size owned (in acres).....

SECTION 4: HOUSING

32. Type of the residential house
    Permanent 1
    Semi permanent 2
    Temporary 3

33. Ownership of the residential house
    Self owned 1
    Rent 2
    Others (specify) 3

SECTION 5: ASSETS OWNED

34. Assets owned by the household (Multiple answers acceptable)

Radio	1
TV	2
Bicycle	3
Motorcycle	4
Car	5
Cell phone	6
Land	7
House	8
Animals (cattle, pigs, goats, sheep, poultry)	9
Others (Specify)	10

SECTION 6: EXPENDITURE

35. What items/services take up most of your expenditure? Please **rank** them in order of highest expenditure by assigning them numbers from 1-9.

Item	Rank
Food	
Transport	
Medical bills	
Clothing	
Rent	
Energy	
Water bills	
School fees	
Other (specify)	

36. On average how much do you spend on the following items/services every month?

Item	Amount (month)
Food	
Transport	
Medical bills	
Clothing	
Rent	
Energy	
Water bills	
School fees	
Other (specify)	

SECTION 7: SOURCE OF ENERGY AND FUEL

37. What kind of fuel do you use for cooking at home? (Multiple responses)

Firewood	1
Charcoal	2
Paraffin/Kerosene	3
Electricity	4
Gas	5
Solar	6
Biogas	7
Others	8

38. What kind of fuel do you use for lighting at home? (Multiple responses)

Firewood	1
Charcoal	2
Paraffin/Kerosene	3
Electricity	4
Gas	5
Solar	6
Biogas	7
Others	8

SECTION 8: ACCESS TO INFORMATION

39. How do you access information about different aspects? (Multiple answers acceptable)

Radio	1
TV	2
Newspapers	3
Community meetings	4
Village public speakers	5
Telephones	6
Place of worship	7
Neighbor	8
Internet (email)	9
Other (specify)	10

SECTION 9: FOOD SECURITY

40. In the last 12 months, are there days when your household did not have lunch or supper or did not eat to satisfaction because of lack of enough food?

Yes	1
No	2

41. If yes, what were the reasons for the food shortage (not being enough)? (Multiple answers acceptable)

Land not enough for food production	1
The yield was poor due to poor weather, pest, dieses, soil fertility, rodents, other animals	2
Poor seeds used in planting	3
Sold most of the produce	4
Did not plant enough	5
The crops were destroyed due to too much rain/flooding	6
Other reason (specify)	7

SECTION 10: EDUCATION

42. Is there any member of your of household who is of school going age but does not go to school?
    Yes 1
    No 2

43. If yes, why isn't he/she in school? .....

44. What is the distance to the nearest primary school?
    Less than 500ms 1
    500-1km 2
    1-3kms 3
    Above 3kms 4

45. What is the distance to the nearest Secondary school?
    Less than 500ms 1
    500-1km 2
    1-3kms 3
    Above 3kms 4

46. Has any member of this household received any other training (skills)?
    Yes 1
    No 2

47. If yes, specify .....

48. Do you know how to read and write in the following languages?

Official language	Yes	1	No	2
Any local language	Yes	1	No	2

SECTION 11: HEALTH

49. Which nearest health centre do you go to in case of an emergency?
    .....

50. Which referral hospital do you mainly use?
    .....

51. What is the distance to the nearest health Center?
    Less than 500m 1
    500-1km 2
    1km- 3kms 3
    3-5kms 4
    6km+ 5

52. What is the distance to the nearest referral health unit?
    Less than 500m 1
    500-1km 2
    1km- 3kms 3
    3-5kms 4
    6km+ 5

53. What do you think of the services offered by the nearest health center?

Very good	1
Good	2
Average	3
Poor	4

54. Give reasons for your answer above

.....
.....

55. Have you heard of HIV/AIDS?

Yes	1
No	2

56. What are the major causes of HIV/AIDS?

.....
.....

SECTION 12: WATER SUPPLY

57. What is the main source of water for your household?

Public boreholes	1
Privately owned boreholes	2
Rain Water harvesting	3
Protected Spring/well	4
Unprotected Spring/well	5
River, Lake, stream, swamp	6
Valley Tank/Earth dam	7
Stand post	8
Others (specify)	9

58. Apart from domestic use, what else do you use the water for?

Brick making	1
Watering animals	2
Fish farming	3
Agricultural use / Irrigation	4
Local beer brewing	5
Other (Specify)	6

59. How sufficient is this water?

Throughout the year	1
Insufficient during dry season	2
Insufficient throughout the year	3
Others (specify)	4

60. What is the distance from your home to the water source?

Less than 500m	1
500-1km	2
1km- 3kms	3
Above 3kms	4

61. How much time per day do you spend fetching water on a single trip?

Less than 30 minutes	1
30 minutes to 1 hour	2
1 to 2 hours	3
More than 2 hours	4

62. How many jerry cans of water do you use per day?
Domestic .....
Other uses .....

63. What problems do you encounter with the water source? (multiple responses accepted)

Too steep	1
Expensive	2
It dries up	3
Long distance	4
None	5
Others (Specify)	6

64. What do you think of the quality of water delivered?

Taste:	1 Good	2 Average	3 Poor
Smell:	1 Good	2 Average	3 Poor
Color:	1 Good	2 Average	3 Poor
Hardness:	1 Good	2 average	3 Poor

SECTION 13: SANITATION

65. Do you have a toilet/latrine?

Yes	1
No	2

66. What type of latrine does your household use?

Traditional pit latrine	1
Flush toilet	2
VIP	3
Ecosan	4
Shallow pits	5
Others (specify)	6

67. If you do not have a toilet, where do you go?

Neighbor	1
Public toilet	2
Bush	3
Others (specify)	4

68. What are the reasons that inhibit you from owning a latrine?
.....

69. If a toilet was constructed in your area, would you use it?

Yes	1
No	2

70. If no, give reasons
……

71. How does your household dispose of the solid wastes? (Multiple responses acceptable)

Open dumps	1
Burning	2
Shallow pits	3
Scatter in gardens	4
Others (specify)	5

72. Are there any public garbage disposal areas in designated by the local authorities or the government?

Yes	1
No	2

SECTION 14: GENDER ISSUES

73. Does your wife own land?

Yes	1
No	2

74. Is your wife allowed to make decisions on issues regarding land?

Yes	1
No	2

75. What are the roles of the women in this household?

---

76. What are the roles of men in this household?

---

77. What are the roles of children in this household?
Boys ---
Girls ---

SECTION 15: EXPECTATIONS AND FEARS FROM THE PROJECT

78. What are your expectations of the project?

---

79. What are your fears in regard to the project?

---

80. Please give suggestions on how these fears can be overcome or mitigated
---

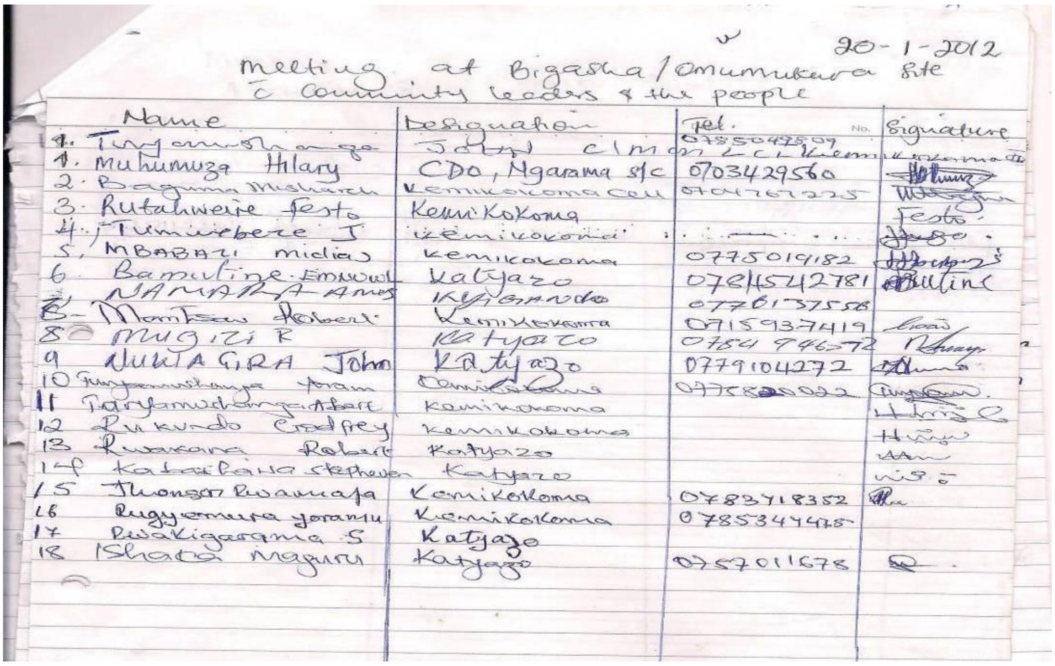
THANK YOU

APPENDIX 3: PUBLIC CONSULTATIONS

List of Persons Consulted

Name	Designation	Date
Jackson Kitamirike	NLO	6 -01-2012
Eng. Shillingi	Director, DWRM Uganda, TAC member	6 -01-2012
Dr. Callist Tindimugaya	Commissioner Water Regulator Uganda, TAC member	6 -01-2012
Mr. Alex Kwizera	Ag. Chief Administrative Officer (CAO), Isingiro	20-01-2012
Kitamirike	NLO Uganda	6 -01-2012
Innocent Nzofubusa	Isingiro District	20 -01-2012
District Environment Officer	Isingiro	20 -01-2012
Water Officer	Isingiro	20 -01-2012
Mr. Nuwamanya Boaz	Project Focal Point Isingiro	14 -01-2012
Mr. Godfrey Sengendo	Deputy Project Manager, Water Resources Kagera Basin	17 -01- 2012
Mr. Innocent Kabenga	Deputy Project Manager, Planning and Management Kagera Basin	17 -01- 2012
Habiyagemye Fabian	Inspector of schools, Isingiro District	5-04-2012
Ayorekire Fredric	District Forestry Officer	
Karugaba	Head of Production Department	5-04-2012
Batyami James	DLG	5-04-2012
Kamugasha Bosco	Health Assistant Ngarama	5-04-2012
Abaine Asaph E.K	Ag. Sub-county Chief Kashumba	5-04-2012
Bashaija Charles	Nyakabingo	5-04-2012
Kayogoza Benfance	Nyakabingo	5-04-2012
Ainembazi Godfrey	Nyakabingo	5-04-2012
Muhumuza Hilary	CDO, Ngarama	5-04-2012
David Mwesigye	Agriculture Extension .Officer	5-04-2012

List of some of the persons who attended consultation meetings



20-1-2012

Meeting at Bigasha/Omumukara site c community leaders & the people

Name	Designation	Tel. No.	Signature
1. Tugumisirize[illegible]	Jolly[illegible] C/M on LC1 Kemi[illegible]	0785049809	[illegible]
1. Muhumuza Hilary	CDO, Ngarama s/c	0703429560	[illegible]
2. Baguma Misharch	Kemikokoma Cell	0704767225	[illegible]
3. Rutahweire Festo	KemiKokoma		Festo
4. Tumwebere J	Kemikokoma		[illegible]
5. MBABAZI midias	kemikokoma	0775019182	[illegible]
6. Bamutinze Emmwel	Katyazo	0784542781	[illegible]
7. NAMARA Amos	Kyabando	0770137556	
8. Mantsa Robert	Kemikokoma	0715937419	[illegible]
8 MUGIZI R	Katyazo	0784 946572	[illegible]
9 NUKIAGIRA John	Katyazo	0779104272	[illegible]
10 Tugumisirize Yoram	Kemikokoma	07758[illegible]022	[illegible]
11 Tumwebaze Albert	Kemikokoma		[illegible]
12 Rukundo Godfrey	kemikokoma		[illegible]
13 Rwakana Robert	Katyazo		[illegible]
14 Katabaana stephen	Katyazo		[illegible]
15 Thomson Rwamuja	Kemikokoma	0783718352	[illegible]
16 Rugyemura yoramu	Kemikokoma	0785344475	
17 Rwakigarama S	Katyazo		
18 Ishaka Magum	Katyazo	0757011678	[illegible]

Attendance Lists for Community Meetings

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

ATTENDANCE LIST / FOCUS GROUP DISCUSSION / KASHUMBA S/C OFFICIALS

Country: Uganda District: Isingiro

Sub County: Kashumba

Date: 5/04/2012 Venue: Kashumba S/C Time: 4pm

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
31	MWESIGYE DAVID	M		KASHUMBA	Agricultural officer A.O	0772374622 [signature]
32	RUBSECOA ALEX	M		Kagarra	V/sec LCII	[signature] 0751875981
33	KAMUGASHA BOSCO	M		KASHUMBA	HO 0752341636	[signature]
34	ABAINE ASAPH	M		KASHUMBA	S/c/c 0782962197	[signature]
35	TUMWIJUKYE MOSES	M		KASHUMBA	AASP 0752598413	[signature]

NBI/NELSAP - Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

Community Meeting - Bigasha Dam

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Ngarama

Date: 6/04/2012 Venue: Kigando T/C Time: 10:30 am

No.	Name	Gender		Village	Designation/Occupation	Signature
		M	F			
1	Tumwebaze J	✓		Kigando	L.C.P. T.O.	
2	Bayakisa Arafuri	✓		Kigando	ndi omuhingyi	Bayakisa
3	Womara Charles	✓		Kigando	omuhingyi C/man	Womara
4	Ntambiweki George	✓		Kigando	Farmer.	
5	Rubagasira Henry	✓		Kigando	Farmer	Rubagasira
6	Byamugisha Mereth	✓		Kigando	omuhingyi	
7	NINSIIMA DOREEN		✓	Kigando	NURSE	
8	NAGABWA TEMIMAH			Kigando	omupagazi	
9	Musinguzi Francis	✓		Kigando	Omuhingyi	
10	Muluni Didas	✓		Kigando	Teacher	

NBI/NELSAP – Kagera River Basin Project

Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(2)

Community Meeting - Bigasha Dam

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Ngarama

Date: 6-4-2012 Venue: Kigando T.C Time: 10.30am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
11	Akinatwe			Kigando	Farmer	[signature]
12	Tumwijukye william	-		Kigando	omuhingi	[signature]
13	Kagiri	-		Kigando	omuhingi	[signature]
14	Rwendiire	✓		Kigado	omuhigi	[signature]
15	Akanyijuka	-		Kigada	omurisa	[signature]
16	Taremwa	-		Kiganda	farmer	[signature]
17	Mwikirire	-		Kigando	Farmer	[signature]
18	Tukwasibwe			Kingando	farm	Silvester
19	Bajekwatanisa			Kingando	Farmer	[signature]
20	Arinyo	.		Kimgando	omuhinzi	[signature]

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(3)

ATTENDANCE LIST Community Meeting - Bigasha Dam

Country..Uganda..............District .../Singiro........................

Sub County...Ngarama.........

Date:..6-4-2012...........Venue:...Kigando T/C..........Time:..10:30 am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
21	Tukamuhebwe. V.			Kigando	Teacher	[signature]
22	Katende J.	M		Kigando	Student	[signature]
23	Ramuntu Asaph	M		Kigando	Teacher	[signature]
24.	Nazuna Peter	M		Kigando	Peasant	[signature]
25	TWEGUMYE CHARLES	M		KIGANDO	DOCTOR	[signature]
26	MANIGARUHANGA Tomas	M		Kigando	Capenter	Manigaruhanga
27	ROBERT NYAMBIRWEKI	M		KIGANDO	COMP NURSE	[signature]
28	MUHANGUZI ARNOLD	M		KIGANDO	BUILDER	Muhanguzi
29	Kabuta Julius	M		Kigando	Director/Sch	[signature]
30	Mugabi Michael	M		Kigando	Capenter	[signature]

(4)

ATTENDANCE LIST Community Meeting - Bigasha Dam

Country: Uganda District: Isingiro

Sub County: Ngarama

Date: 6-4-2012 Venue: Kigando T/C Time: 10.30 am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
31	Arinditwe Apollo	M		Kigando	Driver	[signature]
32	Mwesigwa Omogda	M		Kigando	Trader	[signature]
34	Nsyamba Purinari	M		Kigando	Okubinaga	
35	B. Kamuhanda	M		Kigando	omuhingi	
36	Nuwabine A	M		Kigando	omuhingi	
37	Noel	M		Kigando	omuhingi	
38	NAMARA. Ruize	M		Kigando	omusubuzi. wencf	[signature]

MEETING- BIGASHA DAM.

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Kashumbe

Date: 06/04/2012 Venue: Katyazo T/Centre Time: 2:30pm

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
1	Nyakiganda	M		Katyazo	Farmer	Nyak
2	Norah		F	Katyazo	Peasant	Nora
3	Ndibarema G	M		Manaku	"	Geofrey
4	Manaku	M		Katyazo	"	Manaku
5	[illegible] Alex	M		Katyazo	Student	[signature]
6	Bamutine	M		Katyazo	famer	[signature]
7	Njunwa M		F	Katyazo	farmer	[signature]
8	Nuwasiima H	M		Katyazo	Farmer	[signature]
9	Varegyeya B			Katyazo	farmer	[signature]
10	Karema	B		Katyazo	farmer	[signature]

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(2)

ATTENDANCE LIST MEETING - BIGASHA DAM

Country: Uganda District: Isingiro

Sub County: Kashumba

Date: 6/4/2012 Venue: Katyazo Trading Centre Time: 2:30pm

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
11	Kagwene			Nyakabingo B	Farmer	[signature]
12	Nomara	M		Katyazo	Farmers	[signature]
13	Bishinda E.			Katyazo		
14	G. Tushabome e.	M		Katyazo	omuhingi	
15	Mshekantebirwe J.			Katyazo	Omuhingi	omurisa.
16	RumizA A			KATYAZO	omuhingi	[signature]
17	BARAKIRA J			KATYAZO Omurisa	omurisA	[signature]
18	Muganzi Robert	M		Katyazo	Bolt Dealing Peasant	[signature]
19	DAN RwikMuHama	M		KATYAZO	Vil Doctor	[signature]
20	L. Mukangizi	C		Katyazo	Omurisa	[signature]

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(1)

ATTENDANCE LIST MEETING - BIGASHA DAM

Country: Uganda District: Isingiro

Sub County: Kashumba

Date: 6/4/2012 Venue: Katyazo Trading Centre Time: 2:30pm

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
21	Karemaiv			Katyazo	Farmer	[signature]
22	Kapegyeya G	M		Katyazo	Farmer	[signature]
23	Tumwangye W.	M		Katyazo	Farm	[signature]
24	Kamukama Y	M		Rwamacumu	Farm	[signature]
25	Murungi J.			Farmer	Farmer	[signature]
26	Amos Byabatonelo	M		Rwamacumu B	General Secretary	[signature]
27	Musime George	M		[illegible]	Muhikirwa	[signature]
28	Rutamuhaya John	M		Kirinfu	Katyazo	J
29	Kyabakanya	M		Omurisa	Katyazo	
30	Bibangamba	M		Omuhingi	Katyazo	[signature]

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

MEETING - BIGASHA DAM. (4)

ATTENDANCE LIST

Country: UGANDA District: SINGIRO

Sub County: KASHUMBA

Date: 06/04/2018 Venue: Katyazo trading centre Time: 2:30 pm

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
31	Rwakana Robert	m		Katyazo	Farmer	Rwakana
32	Namara J		F	Katyazo	Farmer	Namara
33	Niyinomuem		F	Katyazo	Farmer	

NBI/NELSAP – Kagera River Basin Project

Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(1)

ATTENDANCE LIST

Country: Uganda District: Bingwo

Sub County: Kashumba

Date: 7/4/2012 Venue: Nyakabingo Time: 11:50 am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
1	Kasubwaẽ Phraim	✓		Nyakabingo	Omurisa Chair	[signature]
2	Katusbe EV.		✓	Nyakabingo	Omuhingi	[signature]
3	NURSE OMUKONZO		✓	Nyakabingo	NURSE	[signature]
4	Busigye mary		✓	Nyakabingo	Omuhingi	[signature]
5	RWAKANIMWA Robert	✓		Nyakabingo	Omurisa	[signature]
6	Byamukama Living	✓		Nyakabingo	Omuhingi Sec	[signature]
7	Basenge Ploveto	✓		Nyakabingo	Omuhingi	[signature]
8	Nyangayana. F	✓		Nyakabingo	Omuhingi	[signature]
9	Nampirima J.		✓	Nyakabingo	Omuhingi	[signature]
10	Arinitwe Sirivu	✓		Nyakabingo	Omuhingi	

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

(2)

Community meeting Bigasha Dam

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Kashumba

Date: 7/4/12 Venue: Nyakabingo TC Time: 11:50 am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
11	Rwabushande. Enock	✓		Nyakabingo	Omumisa	
12	Nkunda manueli	✓		Nyakabingo	Omumisa	
13	Kajuga Wiri	✓		Nyakabingo	omurica	
14	Turungirwa · Patrik	✓		Nyakabingo	omuhingi	
15	Turinawe Amosi	✓		Nyakabigo	Omuhingi	
16	Bona sarcpio	✓		Nyakabingo	Omuhingi	
17	Rubondo Good.	✓		nyakabingo	Omuhingi	
18	Buramata steven	✓		Nyakabingo	Omuhingi	
19	Niiwsiima Ronald	✓		Nyakambingo	Omuhingi	
20	Bakesigaki P	✓		Nyakabingo	Omuhingi	

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

Community meeting Bigasha Dam

(3)

ATTENDANCE LIST

Country: Uganda District: Kisoro

Sub County: Kashumba

Date: 7/4/2012 Venue: Nyakabingo T/c Time: 11:50AM

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
21	Tukamushaba	✓		Nyakabingo	Farming	[illegible]
22	Mbarebaki Richard	✓		Nyakabingo	Omuhingi	[illegible]
23	Mrs - Miliel - Musiime		✓	Nyakabingo	Omurise	[illegible]
24	Kirengema I	✓		Nyakabingo	Omuhingi	[illegible]
25	Kagunda J	✓		Nyakabingo	Omuhingi	[illegible]
26	[illegible] T.		✓	Nyakabingo	Omuhingi	[illegible]
27	Miss Atwine Vicent	✓		Nyakabingo	Omuhingi	
28	Sanyu B.		✓	Nyakabingo	Omuhingi	[illegible]
29	Nakate Teresa		✓	Nyakabingo	Omuhingi	[illegible]
30	Muhwezi Moses	✓		Nyakabingo	Omuhingi	[illegible]

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

ATTENDANCE LIST

Country: Uganda District: Kisoro

Sub County: Nyarama

Date: 10/04/2012 Venue: Kashenyi P/S Time: 11:50 am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
1	Mugisha Levius	M		Kemikokoma	Master K. Nursery	
2	Mutungu Joseph	M		Kemikokoma	Pupil	
3	Turyomushaga	M		Kemikokoma	C/MAH LCI	
4	Bongyereire Richard	m		Kashenyi P/S	H/Teacher	
5	Byarugaba Africano	M		Nyakibingo Cell	V/C/Man	
6	Gustine Turyarugoko	m		Kashenyi Cell	Peasant	
7	NGWRIRIF			NGWRIRIF		
8	Twinomuhangi Wency	M		Nyakibingo L.C	Engenier.	
9	Geofrey Mirembe	M		"	Peasant.	
10	Kibinga G	M		Nyakibingo	Peasant -	

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Ngarama

Date: 10/04/2012 Venue: Kashenyi P/S Time: 11:50am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
11	Nuwagaba Robert	✓		Kakirara Cell A	Chair Person LCI	Amwag
12	Rwakanuma Robert	✓		Nyakabingo 'B'	Farmer	
13	Kaniimi Richard K	✓		Nyakabingo 'B'	Farmer	K... R
14	Kasel Byaephraim	✓		Nyakabingo B	Chman	[illegible]
15	Ntonalo Yosef	✓		Ntungaa	Farmer	[illegible]
16	Muyambi Joseph	✓		Nyakabingo	Farmer	[illegible]
17	Tumukurabire Fansisko	✓		Nyakabingo	Farmer	Sfansisko
18	Tusingwire			Kemikokoma		
19	Musinguzi Alfred	✓		Nyakibingo	Farmer	musinguzi
20	Tumwebaze T		F	Kemikokoma	Farmer	T.

NBI/NELSAP – Kagera River Basin Project
Environmental and Social Impact Assessment and Development of Resettlement Policy Framework for 4 proposed small Multi-Purpose Dams

ATTENDANCE LIST

Country: Uganda District: Isingiro

Sub County: Ngarama

Date: 10/04/2012 Venue: Kashenyi P/S Time: 11:50am

No.	Name	Gender M	Gender F	Village	Designation/Occupation	Signature
21	Akankwatsa Joram	M		Kashenyi	Nurse	[signature]
22	MUKIIBI RASHID	M		Kashenyi	Teacher	[signature]
23	KYOMUHANGI	M		Kemikakoma	Peasant	Kyomuhangi
24	AYUHAIRE EVARISTO	M		KAKYIRARA A	Omuhingi	Evaristo
25	Kansiime Justine		F	Kakirara A	Peasant	KJ
26	Kyorisima P		F	Kemikakoma	Peasant	K
27	Mwesigye Elikana	M		Kashenyi	Peasant	E.K.M
28	Tumwesigye Wilson	M		Kashenyi P/S	Teacher	[signature]
29	Kakara Kenneth.	M		Rukoombo	Farmer.	[signature]
30						

APPENDIX 4: WATER QUALITY TESTS RESULTS

(HYDROLOGY REPORT ATTACHED SEPARATELY)

NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY - BUGOLOBI.
P.O.BOX 7053 KAMPALA.
Tel: 257548, 341144. Fax: 256 41 255441
E-Mail: waterquality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Newplan Limited
Sample Source: Surface Water
Date Sample Received: 12-04-2012
Serial No: INV/2012/54-1
Sampled by: Client
Date of Report: 09-05-2012

Table of Analytical Results

Parameters	Units	Bigasha Dam Site Nyakabingo Stream	Bigasha Dam Site from Nyakabingo Stream	National Standards for potable water quality
WS Sample Nr	--	K5838/12/C	K5839/12/C	
pH	–	7.25	7.24	6.5 – 8.5
Electrical Conductivity	uS/cm	255	276	2500
Colour: apparent	PtCo	22	22	15
Total Dissolved Solids	mg/L	163	177	1200
Dissolved Oxygen (DO)	mg/L	4.6	4.9	Not Specified
Alkalinity: total as $CaCO_3$	mg/L	128	124	500
Hardness: total as $CaCO_3$	mg/L	168	184	500
Ammonia – N	mg/L	0.08	0.10	10.0
Orthophosphate: Reactive	mg/L	0.11	0.09	5.0
Total Phosphorus (TP)	mg/L	0.26	0.24	Not Specified
BOD_5	mg/L	8.1	5.5	Not Specified
COD	mg/L	17	19	Not Specified

Remarks:
The samples showed satisfactory physical-chemical characteristics of the sources, which was commensurate with the National Standards for potable water quality.

Lance E. Okweredе
PRINCIPAL QC OFFICER

NATIONAL WATER AND SEWERAGE CORPORATION
09 MAY 2012
THE CENTRAL LABORATORY

Christopher Kanyesigye
QUALITY CONTROL MANAGER

NB: The NWSC certificate of analysis by ... constitutes a permit to any person or undertaking to conduct business

NATIONAL WATER AND SEWERAGE CORPORATION

CENTRAL LABORATORY - BUGOLOBI
P.O.BOX 7053 KAMPALA
Tel: 257548, 341144. Fax: 256 41 255441
E-Mail: water.quality@nwsc.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Newplan Limited — **Serial No:** INV/2012/54-2

Sample Source: Surface Water — **Sampled by:** Client

Date Sample Received: 12-04-2012 — **Date of Report:** 09-05-2012

Table of Analytical Results

Parameters	Units	Karazi Tz Station 1	Karazi Tz Station 2	National Standards for potable water quality
WS Sample Nr	–	**K5840/12/C**	**K5841/12/C**	
pH	--	5.92	5.98	**6.5 – 8.5**
Electrical Conductivity	µS/cm	75	93	**2500**
Colour: apparent	PtCo	421	224	**15**
Total Dissolved Solids	mg/L	48	60	**1200**
Dissolved Oxygen (DO)	mg/L	7.0	7.6	**Not Specified**
Alkalinity: total as $CaCO_3$	mg/L	20	28	**500**
Hardness: total as $CaCO_3$	mg/L	76	60	**500**
Ammonia – N	mg/L	0.12	0.08	**10.0**
Orthophosphate: Reactive	mg/L	0.12	0.15	**5.0**
Total Phosphorus (TP)	mg/L	0.31	0.29	**Not Specified**
BOD_5	mg/L	2.1	3.9	**Not Specified**
COD	mg/L	16	13	**Not Specified**

Remarks:
The samples showed satisfactory physical-chemical characteristics of the sources, except colour was higher than the National Standards for potable water quality.

[illegible]
PRINCIPAL QC OFFICER

Christopher Kanyesigye
QUALITY CONTROL MANAGER

NB: The NWSC certificate of analysis by no [illegible] a permit to any person or undertaking to conduct business

NATIONAL WATER AND SEWERAGE CORPORATION
09 MAY 2012
THE CENTRAL LABORATORY

APPENDIX 5: LIST OF PLANTS RECORDED

Family	Identification	Lifeform	Plot
Acanthaceae	Acanthus pubescens	Shrub	general
	Asystasia gangetica	Herb	general
	Hygrophila auriculata	Herb	
	Hypoestes forskaolii	Herb	
Aloaceae	Aloe volkensii	Herb	general
Amaranthaceae	Achyranthes aspera	Herb	
	Amaranthus lividus	Herb	general
	Celosia globosa	Herb	
Anacardiaceae	Lannea barteri	Tree	
	Lannea schimperi	Tree	
	Rhus natalensis	Shrub	
Anthericaceae	Chlorophytum lancifolium	Herb	
Asparagaceae	Asparagus africanus	Liana	
	Asparagus falcatus	Liana	
Asteraceae	Acmella caulirhiza	Herb	general
	Ageratum conyzoides	Herb	general
	Berkheya spekeana	Herb	general
	Conyza sumatrensis	Herb	
	Solanecio mannii	Herb	
	Tagetes minuta	Herb	
	Vernonia amygdalina	Shrub	general
	Vernonia purpurea	Shrub	general
Cactaceae	Rhipsalis baccifera	Shrub	
Capparidaceae	Capparis erythrocarpos	Liana	
	Maerua triphylla	Shrub	general
Celastraceae	Maytenus heterophylla	Tree	general
Combretaceae	Combretum molle	Tree	general
Commelinaceae	Commelina africana	Herb	general
Cucurbitaceae	Mukia maderaspatana	Liana	
Cyperaceae	Cyperus dives	Sedge	general
	Kyllinga odorata	Sedge	
Euphorbiaceae	Acalypha bipartita	Shrub	
	Erythrococca bongensis	Shrub	
	Euphorbia candelabrum	Tree	
	Flueggea virosa	Shrub	

Family	Identification	Lifeform	Plot
	Ricinus communis	Shrub	general
Fabaceae	Erythrina abyssinica	Tree	general
	Indigofera arrecta	Shrub	general
	Indigofera simplicifolia	Shrub	general
	Indigofera spicata	Shrub	
	Vigna luteola	Herb	general
Lamiaceae	Hoslundia opposita	Shrub	
	Leonotis nepetifolia	Shrub	general
	Ocimum gratissimum	Shrub	
	Satureja simensis	Herb	
Loranthaceae	Loranthus elegantulus	Epiphyte	general
Malvaceae	Abutilon mauritianum	Shrub	
	Hibiscus fuscum	Shrub	general
	Sida rhombifolia	Shrub	
Mimosaceae	Acacia gerrardii	Tree	
	Acacia hockii	Tree	
	Acacia polyacantha	Tree	
	Acacia senegal	Tree	
	Acacia sieberiana	Tree	
	Dichrostachys cinerea	Tree	
Oleaceae	Jasminum pauciflorum	Liana	
Plantaginaceae	Plantago palmata	Herb	
Poaceae	Brachiaria decumbens	Grass	
	Chloris gayana	Grass	
	Chloris pycnothrix	Grass	
	Cynodon dactylon	Grass	
	Digitaria longiflora	Grass	general
	Leersia hexandra	Grass	
	Panicum maximum	Grass	general
			general
	Setaria kagerensis	Grass	
	Sporobolus africanus	Grass	
Polygonaceae	Polygonum salicifolium	Shrub	general
			general
	Polygonum setosulum	Shrub	general
			general
Primulaceae	Lysimachia ruehmeriana	Herb	general
Rhamnaceae	Scutia myrtina	Liana	general

Family	Identification	Lifeform	Plot
Rubiaceae	Canthium oligocarpum	Shrub	general
	Tricalysia ruandensis	Shrub	
	Vangueria apiculata	Shrub	
Sapindaceae	Haplocoelum foliolosum	Tree	
	Pappea capensis	Tree	
Solanaceae	Solanum aculeastrum	Shrub	
	Solanum incanum	Shrub	
Sterculiaceae	Dombeya burgessiae	Shrub	general
Tiliaceae	Grewia bicolor	Shrub	
	Grewia trichocarpa	Shrub	
	Triumfetta rhomboidea	Shrub	general
Verbenaceae	Clerodendrum myricoides	Liana	general
	Lantana trifolia	Shrub	general
Vitaceae	Cissus quadrangularis	Liana	
	Cyphostema bambuseti	Liana	

APPENDIX 6: LIST OF ANIMALS RECORDED

Dragon Flies

Species	Habitat preferences
Brachythemis leucosticte	Grassy pools and lake gregarious
Crocothemis erythrea	Pools, streams, lakes swamps in savanna, bush, woodland
Elatteoneura glauca	Widespread, usually riverinne, prefers damp, shady spots, bush, woodland
Palpopleura lucia	Reedy sluggish streams and pools in woodland and forest
Pseudagrion hageni	Forest, bush and woodland at well shaded streams
Tholymis tillargra	Pools, swamps in bush, woodland, forest

Birds

	Spp	Habitat	Threat
1	FAN-TAILED WIDOWBIRD *Euplectes axillaris* 1140	w	
2	AFRICAN BLACK-HEADED ORIOLE *Oriolus larvatus* 649	f	
3	AFRICAN GREEN-PIGEON *Treron calva*	F	
4	AFRICAN GREY HORNBILL *Tockus nasutus*		
5	AFRICAN MOURNING DOVE *Streptopelia decipiens*		
6	AFRICAN THRUSH *Turdus pelios*	f	
7	AFRICANGOLDEN-BREASTED BUNTING *Emberiza flaviventris*		
8	ALLEN'S GALLINULE *Porphyrio alleni*	W	
9	ANGOLA SWALLOW *Hirundo angolensis*	w	
10	ARROW-MARKED BABBLER *Turdoides jardineii*		
11	BARE-FACED GO-AWAY-BIRD *Corythaixoides personata*		R-RR
12	BLACK CRAKE *Amaurornis flavirostris*	W	
13	BLACK-HEADED GONOLEK *Laniarius erythrogaster*	f	
14	BLUE-CHEEKED BEE-EATER *Merops persicus*		
15	BLUE-NAPED MOUSEBIRD *Urocolius macrourus*		
16	BLUE-SPOTTED WOOD-DOVE *Turtur afer*	F	
17	BRONZE MANNIKIN *Lonchura cucullata*		
18	BROWN BABBLER *Turdoides plebejus*		
19	BROWN PARROT *Poicephalus meyeri*		
20	BROWN-BACKED SCRUB-ROBIN *Cercotrichas hartlaubi*	f	
21	CATTLE EGRET *Bubulcus ibis*	G	
22	COMMON BULBUL *Pycnonotus barbatus*	f	
23	CRESTED FRANCOLIN *Francolinus sephaena*		
24	DIEDERIK CUCKOO *Chrysococcyx caprius*		
25	FORK-TAILED DRONGO *Dicrurus adsimilis*	f/F	
26	GOLDEN-BACKED WEAVER *Ploceus jacksoni*	w	R-RR
27	GREY CROWNED CRANE *Balearica regulorum*	WG	G-VU

28	GREY-BACKED CAMAROPTERA *Camaroptera brachyura*	f	
29	HAMERKOP *Scopus umbretta*	w	
30	HELMETED GUINEAFOWL *Numida meleagris*	G	
31	LAUGHING DOVE *Streptopelia senegalensis*		
32	LESSER STRIPED SWALLOW *Hirundo abyssinica*		
33	LITTLE SWIFT *Apus affinis*		
34	OLIVACEOUS WARBLER *Hippolais pallid*		
35	PIED CROW *Corvus albus*		
36	PIN-TAILED WHYDAH *Vidua macroura*	G	
37	PURPLE-BANDED SUNBIRD *Cinnyris bifasciata*	f	
38	RED-BILLED FIREFINCH *Lagonosticta senegala*		
39	RED-CHEEKED CORDON-BLEU *Uraeginthus bengalus*		
40	RED-CHESTED CUCKOO *Cuculus solitaries*		
41	RED-EYED DOVE *Streptopelia semitorquata*	f	
42	RED-HEADED LOVEBIRD *Agapornis pullaria*	F	
43	RING-NECKED DOVE *Streptopelia capicola*	f	
44	SCALY-THROATED HONEYGUIDE *Indicator variegatus*	f	
45	SHORT-TOED SNAKE-EAGLE *Circaetus gallicus*		
46	SOUTHERN RED BISHOP *Euplectes orix*	G	
47	SPECKLED MOUSEBIRD *Colius striatus*		
48	SPOT-FLANKED BARBET *Tricholaema lachrymose*		R-RR
49	SULPHUR-BREASTED BUSH-SHRIKE *Malaconotus sulfureopectus*	f	
50	TAWNY EAGLE *Aquila rapax*		
51	TROPICAL BOUBOU *Laniarius aethiopicus*	f	
52	VIOLET-BACKED STARLING *Cinnyricinclus leucogaster*	f	
53	WHISTLING CISTICOLA *Cisticola lateralis*		
54	WHITE-BROWED COUCAL *Centropus superciliosus*		
55	WHITE-BROWED ROBIN-CHAT *Cossypha heuglini*	f	
56	WHITE-WINGED WIDOWBIRD *Euplectes albonotatus*	G	
57	WITE-CRESTED HELMET-SHRIKE *Prionops plumatus*	f	
58	YELLOW WAGTAIL *Motacilla flava*	wG	
59	YELLOW-BREASTED APALIS *Apalis flavida*	f	
60	YELLOW-FRONTED CANARY *Serinus mozambicus*		
61	YELLOW-THROATED GREENBUL *Chlorocichla flavicollis*	f	
62	YELLOW-THROATED LONGCLAW *Macronyx croceus*	G	
63	CHIN-SPOT BATIS *Batis molitor*	f	
64	BLACK CUCKOO-SHRIKE *Campephaga flava*	f	
65	AFRICAN WATTLED LAPWING *Vanellus senegallus*	W	
66	BLACK-HEADED HERON *Ardea melanocephala*		
67	CRESTED BARBET *Trachyphonus vaillantii*	f	