AFRICAN DEVELOPMENT BANK GROUP

MINISTRY OF WATER AND ENVIRONMENT

Farm Income Enhancement and Forest Conservation Project II (FIEFOC)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE CONSTRUCTION OF NGENGE IRRIGATION SCHEME IN NGENGE SUB-COUNTY, KWEEN DISTRICT

August, 2017

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

NON-TECHNICAL SUMMARY

The Government of Uganda, represented by the Ministry of Water and Environment (MWE) is implementing Farm Income Enhancement and Forest Conservation Project II (FIEFOC) with the overall objective of improving farm incomes, rural livelihoods, and food security and contribute to poverty reduction through sustainable natural resources management and agricultural enterprise development.

Ngenge wetland is one of the candidate sites identified by the team from MAAIF and MWE study team for a detailed study on paddy irrigation scheme development in the country. The wetland is basically formed from the Ngenge River basin system.

The entire area of Ngenge wetland is found inside Ngenge Sub-County, Kween District. It lies approximately between latitude 1°33`North and 1°31`South and Longitude 34°30`East and 34°27`West.The target irrigation scheme is located inside Ngenge sub-county, which has a total of 10 parishes and77 villages. The location of Ngenge wetland is presented in Figure 1-1 which shows the location map of the Ngenge (Project area) inside Kween district.

The principal objectives of the ESIA were to:

- Predict and evaluate all potential environmental and social impacts likely to result from the proposed project;
- Identify feasible and cost-effective mitigation measures for significant impacts identified; and
- Facilitate the preparation of an Environmental Management Plan (EMP) to guide environmental and social management of the project during implementation.

Uganda's economy was forecasted to grow at a rate of approximately 5.6% (UBOS 2014), and could maintain an upward trajectory into the near future, as oil investments and the large infrastructure programs boost construction activities. Uganda's population is estimated to be 34.9 million and is growing at roughly 3.2 per cent per year, one of the world's highest rates. Uganda has made important progress towards meeting the Millennium Development Goals (MDGs), especially with respect to income poverty, gender equality and women empowerment, reducing child mortality, ensuring environmental sustainability and developing a global partnership for development. A key challenge to accelerating progress towards middle income status and promote shared prosperity is to raise productivity in sectors where most people are employed or move people from low to higher productivity activities.

Agriculture remains a key sector of Uganda's economy. It supports the livelihoods of 73% of the households, employs about 72% of the total labour force, 77% of whom are women, and 63% are youth, mostly residing in the rural areas (MoFPED, 2015). The proportional contribution of the agricultural sector to the Gross Domestic Product (GDP) of Uganda currently stands at about 25%.The sector is also very important in terms of food security, employment, and household income. In addition, the sector provides the basis for growth in other sectors of the economy. For example, it is the main source of raw materials to Uganda's local manufacturing industries and exports to regional and international markets (MAAIF, 2013)

Despite the importance of agriculture in the economy, the sector's performance has not been impressive in recent years. The agricultural sector growth, in real terms, declined from 7.1% in 2000/01 to less than 1% in 2005/06 and 2006/07 before recovering to 2.6% in 2008/09. This growth is much below the NDP annual growth target of 5.6%, and the 6% annual growth target of the African Union's Comprehensive Africa Agriculture Development Program (CAADP).

ES 1: Agriculture production constraints

Agriculture still forms the back bone of Uganda's economy. However, growth in agriculture production is affected by a number of constraints. These include:

Degradation of Land Resources– The causes of land degradation include soil fertility depletion, population pressure on land, capital-deficient unsustainable agriculture intensification, deforestation, overgrazing, poor farming practices, climate change and variability, land tenure, and policy issues, among others. These challenges are exacerbated by the low investment in the Agriculture Sector, which has led to stagnation or very slow growth of the sector (about 1.3%). These threats are further exacerbated by low and unreliable rainfall, frequent drought and precarious water supply, seasonal fires, and endemic poverty;

Limited Agricultural Technology Development - Uganda's agriculture is dominated by smallholder subsistence farmers and characterized by low productivity, use of rudimentary tools (hand hoes and pangas), limited use of productivity enhancement inputs (e.g. improved seeds, fertilizers and herbicides), high post-harvest losses (up to 30%) and limited mechanization;

Poor delivery and adoption of agricultural technologies–The agricultural advisory services delivery systems in Uganda are inappropriate thus limiting adoption of agricultural technologies. The number of technical staff is also inadequate with limited capacity to deliver extension services at district and sub-county levels. The situation is even worsened by delayed release of funds and the rigid procurement processes;

Pests and diseases – These significantly contribute to productivity losses and their control can tremendously improve agricultural production, and enable agricultural produce access international markets;

Other constraints are; marketing gaps, limited mechanization and limited irrigation technologies.

It is against the above stipulated constraints that the Farm Income Enhancement and Forest Conservation project was framed to boost agricultural productivity and enhance food security through sustainable natural resources management and agricultural enterprises development.

ES.2: Irrigation Potential in Uganda

The total potential irrigable area, according to FAO (2001), is estimated at 202,000 ha of which fewer than 14,418 ha are currently under formal irrigation and 67,000 ha are under informal irrigation, particularly for rice production. Water use for small–scale irrigation schemes is estimated at 10,000m3/ha/year, while that used by government large–scale irrigation and commercial irrigation schemes is estimated at 12,000m3/ha/year. Water use in partial irrigation of sugarcane is estimated at 500 mm/year (approximately 5,000m3/ha/year).

Current water requirement and irrigated area are indicated in table 1.1below. This table reveals that the country has not reached anywhere near its irrigation potential of 202,000 ha which is equivalent to 2.02 billion m3 of water per year with a water application rate of 10,000 m3/ha. Consequently, this is far below the annually renewable water resource of 40 billion m3.

Table ES 1: Uganda's current water requirement for irrigation in relation to land size

Current Water Requirements for Irrigation			
Type of Irrigation	Area (Ha)	Relative water use (m3	Total water requirement (106/m3/year)

		/ha/year)	
Small–scale irrigation technologies	300	10,000	3.00
Government Irrigation schemes	2,036	12,000	24.43
Commercial	5,282	12,000	63.38
Commercial supplemental irrigation	6,800	5,000	34.00
Total	14,418	39000	124.01

ES.3: Significance of irrigation Development

Irrigation farming has been practiced in Uganda since the 1940s. The majority of farms are located not too far from lakes, rivers and fringes of swamps which makes them suitable for irrigation. The majority of the formal irrigation developments were launched by the government with the aim of increasing agricultural production in various parts of the country and these included: Mubuku irrigation settlement scheme with gravity irrigation and water intakes from Sebwe and Mubuku rivers, Kiige scheme in the Kamuli District, Labori and Odina schemes, Ongom scheme in the Lira District, Atera irrigation scheme and among others. All these already established irrigation schemes in the country support different varieties of crop production thus boosting the agriculture economy.

It is important to note that improved irrigation farming can mitigate climate change risk; facilitate the concentration of support services and obviate the perceived risks of diversified or intensified farming. It is estimated that Uganda's spatial potential for improved irrigation vary from 170,000 ha to over 560,000, whereas the total potential arable area is 4,400,000 ha (2013 MAAIF). The proposed Ngenge irrigation scheme has similarly a high irrigation potential of about 880 ha due to the presence of ngenge river catchment running through it from the slopes of Mt. Elgon down to the lower plains of Ngenge and Kiriki sub-counties until it joins Kelim River and finally reached to Lake Opeta.

ES.4: Purpose of the Assessment

The National Environment Act, 1995 lists projects for which EIA is mandatory in the third schedule. The proposed irrigation project is listed in category 8. Agriculture, including: —

(a) Large-scale agriculture;

(b) Use of new pesticides; and

(d) Use of fertilizers.

The basic purpose of the Environmental and Social Impact Assessment (ESIA) study is to identify, predict and analyse the magnitude of environmental and social impacts and propose enhancement and/or mitigation measures

for significant environmental and social effects that are likely to arise from the various activities of the proposed irrigation scheme project during site preparation and operation phases.

In compliance with the above legislation, the developer has decided to undertake the EIA prior to establishment of Ngenge irrigation scheme. This Environmental Impact Statement (EIS) has been prepared to provide a detailed and comprehensive assessment of the environmental, social, cultural and economic impacts (beneficial and adverse) of the project. The EIS also identifies mitigation measures that may be applied to effectively manage any potentially adverse impacts arising from the project.

ES.5: Policy, Legal and Institutional Framework

The policy, legal and institutional framework within which the EIA was conducted, National regulations are discussed along with relevant international agreements and conventions to which, Uganda is a party. Key legislations governing the conduct of EIA in Uganda are the National Environmental Act (Cap 153) and the Environmental Impact Assessment Regulations (1998). The National Environmental Act established the National Environment Management Authority (NEMA), and entrusts it with responsibility to ensure compliance with the EIA process in planning and execution of all projects that are or may cause adverse impacts on the environment.

BOX ES.1: Relevant policies and regulations reviewed

Policy Frame Work
The National Environment Management Policy, 1994
The Plan for Modernization of Agriculture
The National Water Policy, 1999
The National Environment (Riverbanks, Lakeshores and Wetlands) regulations, 2000
Legal framework
The Constitution of the Republic of Uganda, 1995
National Environment Act of 1995 Cap 153
The Water Act, Cap 152
The Land Act, Cap 227
The Local Government Act, 1997
The Occupational Safety and Health Act, 2006
The National Wetland Conservation and Management Policy
African Development Bank's Environmental and Social Safeguard Policies
Operational Safeguard 1: Environmental and Social Assessment.
Operational Safeguard 2: Involuntary Resettlement: Land acquisition, population displacement and compensation.
Operational Safeguard 3: Biodiversity and ecosystem services.
Operational Safeguard 4: Pollution prevention and control, hazardous and control, hazardous

materials and resource efficiency. Operational Safeguard 5: Labour conditions, health and safety. Institutional framework National Environmental Management Authority (NEMA) Ministry of Water and Environment Ministry Agriculture, Animal, Industry and Fisheries Local Administration Structures

ES.6: Project description

The proposal involves the establishment of a modern irrigation scheme that includes; construction of Intake (Main canal, protection dyke, drainage canal) workshop for agriculture machinery, a network of internal access roads and grains processing components.

ES.7: Purposed and Scope of the Environmental Impact Assessment

The National Environment Act, Cap. 153 introduced the requirement for an Environmental Impact Assessment tool into the Laws of Uganda. Section 19 (3) of the National Environment Act, Cap. 153 requires that all projects or policies that may, are likely to or will have significant impacts on the environment be subjected to EIA so that adverse impacts can be eliminated or mitigated. This EIA report describes the proposed site for the irrigation scheme, the proposed activities, location of the project area and area of land to be affected, a discussion of alternatives and a description of the potentially affected environment including specific baseline information necessary for identifying and assessing the environmental effects of the project. The study also includes an analysis of the technology and processes that shall be employed and recommendations for best practices or alternative technologies, and an evaluation of the predicted or apparent environmental effects on the Physical, Biological and Socio-cultural environment resultant from establishment of the irrigation scheme and measures for eliminating, minimizing, or mitigating adverse impacts are proposed.

ES.8: Potential environmental impacts evaluation

The study team evaluated the anticipated potential impacts of the project on the bio-physical and the socio-economic environment. The impacts were categorized as positive or negative and their level of effect on the environment were also gauged. In general the study findings indicated that the positive project impacts shall outweigh the negative impacts if the mitigation measures aimed at minimizing or eliminating the negative impacts are implemented. Below is an outline of the anticipated project impacts:-

Positive Impacts

1. Improved Water for Productive Uses;
2. Increased Agricultural Acreage and Productivity;
3. Increased Job Opportunities;
4. Environmental Protection;
5. Market Creation;

6. Opportunity for training and skills acquisition.

Negative impacts

The project will however come along with some negative impacts during its implementation and operation activities. The most common impacts are associated with pollution of the environment from agrochemical and other pollutants though to a less extent due to the production and use of organic fertilizers, impacts on workers from work area health hazard, impacts on water sources, and waste management, an elaborate analysis of these impacts is given in chapter 7 of this report. They include the following:-

1. Loss of vegetation;
2. Soil Compaction and Erosion;
3. Solid Wastes;
4. Impacts on Water Resources, Hydrology and Downstream Users
5. Air pollution;
6. Water pollution;
7. Increase on water usage;
8. Impacts of pesticide use on human health;
9. Occupational health and safety impacts.

ES.9: Proposed mitigation measures

Mitigation measures for the identified negative impacts are clearly discussed in section 7 of this report. An environmental management and monitoring plan upon which each impact will be mitigated is also provided in section 8. The key mitigation measures will include the following:-

- Prepare and implement the following stand-alone environmental planning tools
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Waste Management and Monitoring Plan (WMMP)
- Water Management Plan (WMP)
- Occupational Safety and Health Management Plan (OHSMP)
- Provision of appropriate PPE to the workforce;
- Use of mechanically sound machinery;
- A first aid kit will be maintained onsite for emergency treatments;
- Reuse of organic waste material on the irrigation scheme as manure;
- Crop rotation practices will help reduce soil degradation;
- All personnel involved in the application of pesticides will be adequately trained by a qualified person and PPE will be provided to every worker as stipulated under the Occupational Safety and Health Act 2006;
- The project affected people will be given priority for job opportunities available throughout project implementation;

In order to ensure that the proposed mitigation measures will be implemented, an environmental management and monitoring plans has been developed to guide all activities of the project during all its phases concerning the

protection of the environment. This plan specifies the nature of the negative impact, the proposed mitigation measures, the indicators in the execution of these mitigation measures, the time period, and the responsible party.

ES11: Conclusion

The negative impacts of this project can be eliminated, reduced or compensated if the proposed environmental management plan is followed as proposed. Recommendations have been proposed so that the execution of the project becomes a success without harming or with the least negative effect to the environment in general.

On the basis of the above findings, it is recommended that the project be allowed for implementation provided the mitigation measures outlined in this report are adhered to and the Environmental Management and Monitoring Plan (EMMP) is implemented.

ESIA TEAM COMPOSITION

Name	Role	Signature
Kukundakwe Wilbroad	**Team Leader** Industrial chemist, Waste Management pollution control and cleaner production techniques	
David Sserugga	**Team Member** Soil analyst/Geologist	
Muwanga Lammeck	**Team Member** Soil Impact Analysis and Waste Management Specialist	

Technical team

Eng. Timothy Kavuma- Water Engineer

Mugisha William -Land Use planning and management

Robert Naguyo - Hydro geologist

Solomon Ssendagire- Sociologist

List of Abbreviations and Acronyms

AfDB	African Development Bank
BOQ	Bill Of Quantities
DAO	District Agriculture Officer
DEO	District Environment Officer
DWRD	Directorate Of Water Resources Development
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
FAO	Food and Agriculture Organization
FIEFOC	Farm Income Enhancement and Forest Conservation Project
GoU	Government of Uganda
MAAIF	Ministry Agriculture Animal, Industry and Fisheries
MDGs	Millennium Development Goals
MWE	Ministry of Water and Environment
MFPED	Ministry of Finance Planning and Economic Development
OHS	Occupational Health and Safety Officer
PIU	Project Implementing Unit
PSO	Project Support Officer
RAP	Resettlement Action Plan
UBOS	Uganda Bureau Of Statistics
WUA	Water User Association

ACKNOWLEDGEMENTS

The consultants appreciate the opportunity accorded to them in participating in the ESIA of Ngenge Irrigation Scheme by the Ministry of Water and Environment. They further extend appreciation to the communities in Ngenge Sub County whose consultations made significant contribution in the draft of this report. The Kween District and Ngenge Sub county leaders are thanked for the time and resources offered which ensured a successful study.

1. INTRODUCTION

This Environmental and Social Impact Statement (ESIS) presents the findings of the Environmental and Social Impact Assessment (ESIA) for the proposed Ngenge Irrigation Scheme located in Ngenge Sub County, Kween district.

The Government of Uganda, represented by the Ministry of Water and Environment (MWE) is implementing Farm Income Enhancement and Forest Conservation Project II (FIEFOC) with the overall objective of improving farm incomes, rural livelihoods, and food security and contribute to poverty reduction through sustainable natural resources management and agricultural enterprise development.

Ngenge wetland is one of the candidate sites identified by the team from MAAIF, MWE and JICA study team for a detailed study on paddy irrigation scheme development in the country. The wetland is basically formed from the Ngenge River basin system. The river in this wetland originates from Mt. Elgon and flows westward in the flat terrain of the Ngenge wetland before it enters to Kelim River which is part of Greek (Kiriki) wetland. The wetland area is characterized mainly as seasonal swamp. It covers most part of the lowland of Kween district, which is the entire Ngenge Sub-County, before it joins Kelim River.

The National Environment Act, 1995 lists projects for which EIA is mandatory in the third schedule. The proposed irrigation scheme project is listed in category 8. Agriculture, including: —

a) Large-scale agriculture;

b) Use of new pesticides; and

c) Use of fertilizers.

The basic purpose of the Environmental and Social Impact Assessment (ESIA) study is to identify, predict and analyse the magnitude of environmental and social impacts and propose enhancement and/or mitigation measures for significant environmental and social effects that are likely to arise from the various activities of the proposed irrigation scheme project during site preparation and operation phases.

In compliance with the above legislation, the developer has decided to undertake the EIA prior to establishment of the Irrigation scheme. This Environmental Impact Statement (EIS) has been prepared to provide a detailed and comprehensive assessment of the environmental, social, cultural and economic impacts (beneficial and adverse) of the project. The EIS also identifies mitigation measures that may be applied to effectively manage any potentially adverse impacts arising from the project.

This ESIA therefore seeks to provide sufficient information on the proposed project to enable the National Environment Management Authority (NEMA) and other Lead Agencies to make a decision on whether or not to approve the project in its currently proposed form.

Objectives of the ESIA

The principal objectives of the ESIA are to:

- Predict and evaluate all potential environmental and social impacts likely to result from the proposed project;
- Identify feasible and cost-effective mitigation measures for significant impacts identified; and
- Facilitate the preparation of an Environmental Management Plan (EMP) to guide environmental and social management of the project during implementation.

ESIA Scope

The EIA considered the potential environmental effects of the project on components of the physical, biological, and socio-economic environments that may be affected by the project. The EIA also considered the environmental effects that could occur during all phases of the project, including from credible accidents, malfunctions and unplanned events that could occur. It also addressed any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out. Finally, it assessed the significance of these potential environmental effects.

Spatial and temporal boundaries were developed for each valued environmental component to identify and describe potential project-related environmental effects.

Spatial Boundaries

Spatial boundaries reflect the geographic range over which the project's environmental effects may occur. The spatial boundaries include the project development area, a local assessment area, and a regional assessment area. The project development area is the area of physical disturbance associated with the project (the "footprint" of the project) which is the 883 ha of land. The local assessment area is the area within which potential direct and indirect environmental effects of the project are predicted to occur. The regional assessment area considers the wider area within which cumulative environmental effects may occur.

Temporal Boundaries

Temporal boundaries reflect the timeframe over which the project's environmental effects may happen. The temporal boundaries for this environmental impact assessment will include the three phases of construction, operation, and decommissioning.

Approach and Methods Used

ESIA methodology

The ESIA has followed the process as required by the Ugandan Environmental Impact Assessment Regulations (1998), and guided by the EIA Guidelines (NEMA, 1997). The following summarises the methods used for completion of the ESIA as reported in this document.

Environmental Scoping

The scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, biological, social, and economic aspects. After identifying the project as one for which EIA is mandatory, the consultant, on behalf of the developer, carried out a scoping exercise and prepared a scoping report and terms of reference defining the scope of EIA required and were submitted to NEMA and approved.

Collection and review of available Information

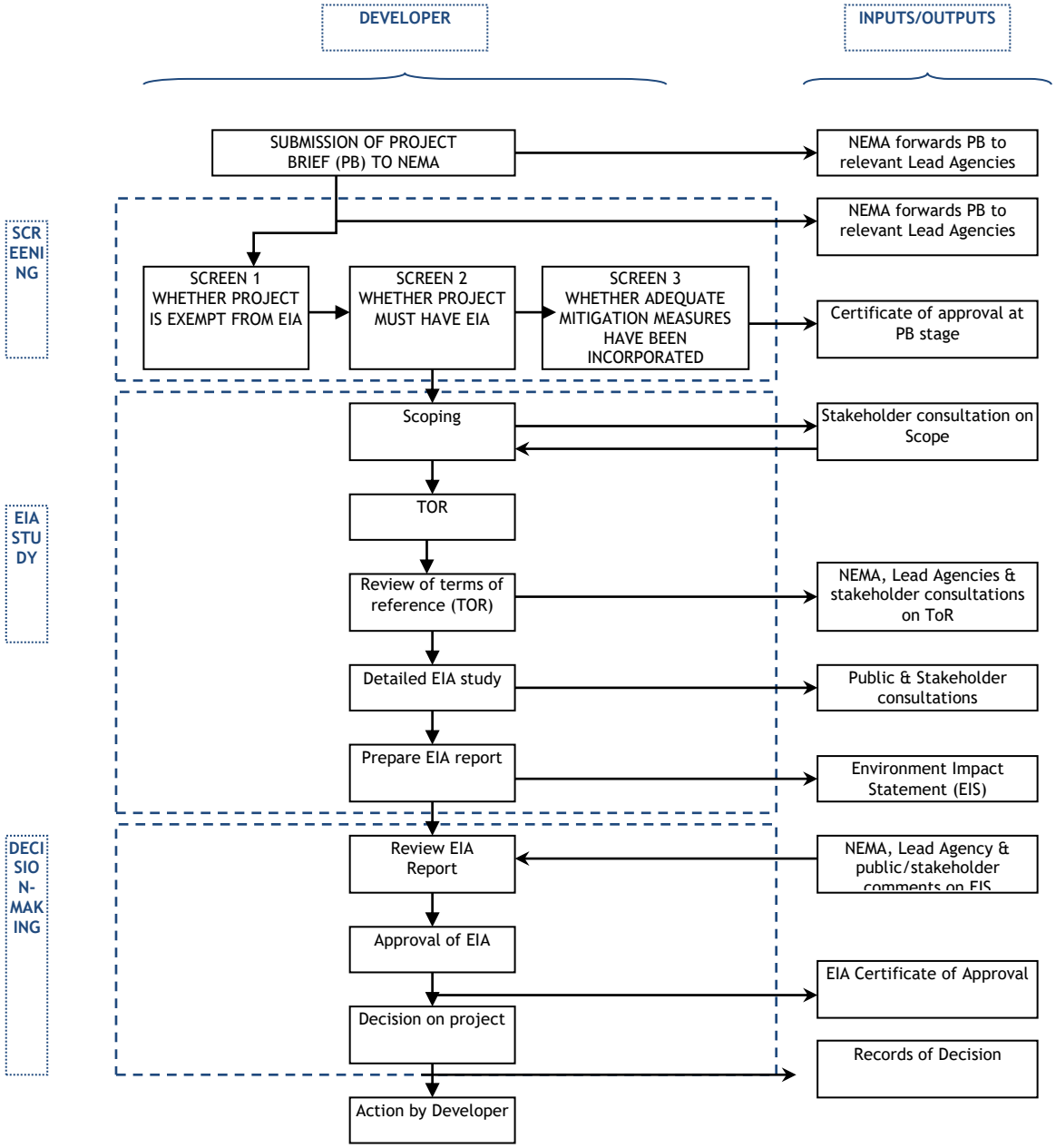
The consultant collected and reviewed published national policies, legislations, regulations and guidelines, census reports and performance standard on social and environmental sustainability documents. The existing environmental and socio-economic data was gathered from relevant sources at the district level (District Development Plan 2015-2020). Primary data and information on the study area was collected using different tools and techniques including household interviews, local community representatives' consultations, checklists and matrices appropriate for this project.

Field Survey

Site visits were made to assess the baseline environmental and social conditions of the proposed project site; to define impacted areas and identify environmental and socio-economic components that are likely to be significantly affected by the proposed project. During field survey, basic data and information on the biophysical resources, socio-economic as well as historical and cultural sites were collected. Site investigations involved visual inspection of all project site area to identify environmental hotspots within and outside the site.

Public Disclosure and Stakeholder Consultation

Public Consultation was undertaken. During the impact assessment process, individuals and group community members were interviewed and consulted on the probable project social, economic and environmental impacts. The key stakeholders that were consulted include Ministry of Agriculture, Animal Industry and Fisheries (Department of Agriculture Mechanisation and Water for Production), Ministry of Water and Environment (Wetlands Management Department), Kween District Local Government, NEMA, the area local leaders, and the residents around the project site and their views were incorporated in the report (Chapter 6).



Source: EIA Guidelines for the Energy Sector (NEMA, 2004)

Figure 1-1: ESIA Process Flow

Impact identification and assessment

Potential impacts were identified by considering how the proposed project would interact with the environmental and social baseline. Initial impact identification was carried out as part of the scoping exercise, and was refined during the full ESIA based on the experience and professional judgement of the ESIA team.

Assessment of the significance of predicted impacts used a system of characterising, for each impact, the magnitude of the impact and the sensitivity of the receptor. Further details of this process are presented in section 5.

Development of mitigation measures

Mitigation measures for potential impacts considered to be of unacceptably high significance were identified primarily through consultation with the developer, lead agencies and stakeholder consultations.

Document structure

The table below presents the structure of this ESIS and identifies how the requirements for content as specified by Regulations 14 and 15 of the EIA Regulations (1998) have been addressed.

Section	Title	EIA Regulations (1998) requirement	Page No
	Non-Technical Summary	Required (Regulation 15)	2
1	Introduction	(l) how the information provided for in this regulation has been generated.	12
2	The Proposed Project	(a) the project and activities it is likely to generate. (b) the proposed site and reasons for rejecting alternative sites. (d) the material in-puts into the project and their potential environmental effects. (e) an economic analysis of the project. (f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them. (g) the products and by-products of the project.	17
3	Policy, legal and regulatory Framework	Not specified.	21
4	Environmental and Social Baseline	(c) a description of the potentially affected environment including specific information necessary for identifying and assessing the environmental effects of the project.	24

Section	Title	EIA Regulations (1998) requirement	Page No
5	Environmental and Social Impact Assessment and Mitigation Measures	(d) the material in-puts into the project and their potential environmental effects. (h) the environmental effects of the project including the direct, indirect, cumulative, short-term and long-term effects and possible alternatives. (i) the measures proposed for eliminating, minimising, or mitigating adverse impacts. (j) an identification of gaps in knowledge and uncertainties which were encountered in compiling the required information. (k) an indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures. (m) such other matters as the Executive Director may consider necessary.	34
6	Alternatives	(b) the proposed site and reasons for rejecting alternative sites. (f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them.	60
7	Public Disclosure and Stakeholder Consultation	Not specified.	63
8	Environmental Management and Monitoring	Not specified.	68
9	References	(l) how the information provided for in this regulation has been generated.	74

1.1 THE PROPOSED PROJECT

The proposed project is a large scale irrigation scheme for rice to cover area coverage of 880ha. Water for irrigation will be drawn from Ngenge and Kabajiria rivers. Details of project location and design are discussed below;

1.2 LOCATION AND ADMINISTRATION

The entire area of Ngenge wetland is found inside Ngenge Sub-County, Kween District. It lies approximately between latitude 1°33`North and 1°31`South and Longitude 34°30`East and 34°27`West.The target irrigation scheme is located inside Ngenge sub-county, which has a total of 10 parishes and77 villages. The location of Ngenge wetland is presented in Figure 1-1 which shows the location map of the Ngenge (Project area) inside Kween district.

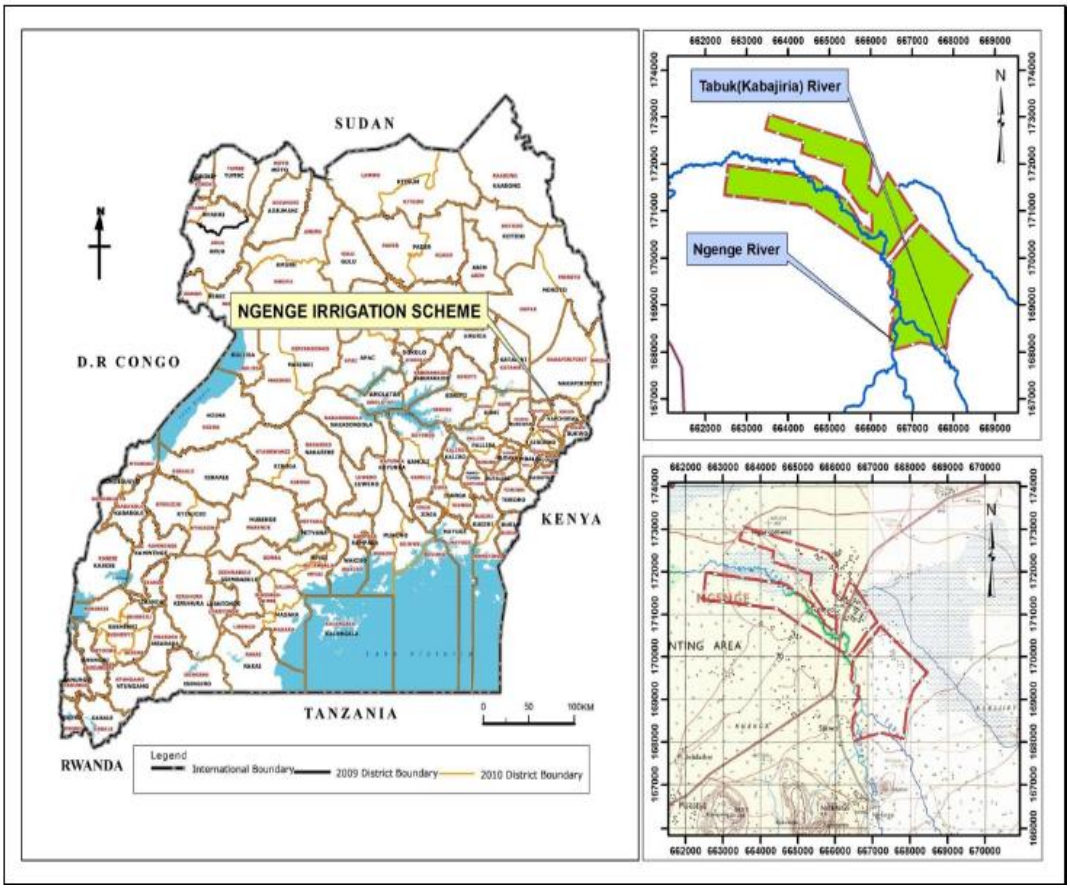


Figure 1-1-2; Location map of Ngenge Irrigation Scheme

Figure 1-1: Google Image showing location of Ngenge

1.3 DESCRIPTION OF THE SITE

The proposed Ngenge irrigation project is planned to utilize the water resource of Ngenge and Kabajiria River basins for developing the available irrigable land on the left and right bank of rivers through constructing diversion structures on both rivers. Accordingly, a proper site has been selected for construction of the diversion structures after assessing the general topographical condition of the site, geological, hydrology, morphological condition of the river. The diversion structure across Ngenge River is located between 666998,166976 and 667001,166939 around 0.6km downstream of the Bridge on Ngenge River. Topographically the river course at the selected diversion site is bounded by the higher ground on the left bank and Mount Kapkot on the right bank. According to the geotechnical investigation the river bed around the site is underlain by 10m thick unconsolidated fine brown MUD a deposition from the rivers soil load with a field coefficient of permeability K = 3.2x10-4 which is rapid. The proposed diversion structure across Kabajiria River is located between 667944,167668 and 667982,167662 around 1.3km downstream of the bridge on Kabajiria River. Unlike the diversion site of Ngenge river the diversion structure at this site requires massive river protection work due to the river morphology and topography of the upstream and downstream course of the river. The river bed at the proposed site is underlain by basically two types of soils; unconsolidated fine brown MUD and stiff compacted black CLAY. The black clay originates from the weathering of the surrounding volcanic rocks and the brown mud is from the depositions of the river. The in-situ permeability test took 1:55:41 minutes giving a field coefficient of permeability K = 2.6x10-3 which is rapid.

1.4 TYPE AND ARRANGEMENT

A diversion Structure is required for diverting the water from the river into the Canal system. This can be a Dam with storage reservoir, a Weir/Barrage type diversion structure or river intake type of diversion structure. The choice of a suitable type depends on various factors such as topographical condition of the diversion site and command area, foundation and geological condition, hydrology, morphological condition of the river etc. and for this project after considering these factors a diversion barrage with a side spill weir has been proposed mainly for the following reasons:

- Lack of sufficient bank to bank length for construction of relatively longer weir with minimum afflux.
- Durability problems related to the provision of a barrage with self-operating gate system.
- Operation problem related with the provision of a barrage with manually without side spiller. operating gate without side spiller

The diversion structures are arranged to comprise the following principal components:

Diversion structure across Ngenge River:

- Four bays of gated barrage (under sluice) 1.2m wide each with gates and operating platform.
- 8.0 m long and 1.8m high sharp crested side spill weir.
- Intake structure with settling basin on the left side of the weir
- Road bridge of 4.5m clear span width and 11.7m span length

Diversion structure across Kabajiria River

- Four bays of gated barrage (under sluice) 1.0m wide each with gates and operating platform.
- 8.0 m length with 1.8m high sharp crested side spill weir with 1.5m wide trapezoidal channel trough.
- The right side of the weir Intake structure with settling basin and the left side intake structure without settling basin.
- Road Bridge of 4.5m clear span width and 10.m span length

1.5 HYDRAULIC DESIGN OF THE BARRAGES

Design flood discharge and flood level

The stage discharge relation curve of Ngenge River at the proposed weir site is established by taking the average Manning's roughness coefficient of the river to be 0.035 and the average slope of the river bed as 0.002. As per this calculation the maximum water level of the river for the design 100 and 500 years return period discharge is found to be around 1112.92 and 1112.98 m.a.sl respectively and for design it is taken as 1113.0 m.a.sl for both return periods. The stage discharge curve of Ngenge River is shown below;

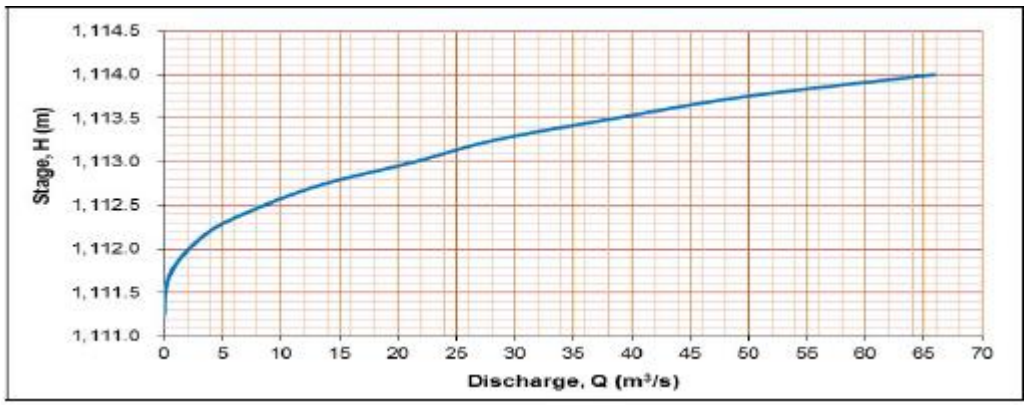


Figure 1-3; Stage Discharge Curve for Ngenge River at the proposed Weir Axis

Similarly, the stage discharge relation curve of Kabajiria River at the proposed weir site is established by taking the average Manning's roughness coefficient of the river to be 0.035 and the average slope of the river bed as 0.007 As per this calculation the maximum water level ofthe river for the design 100 and 500 years return period discharge is found to be around 1115.7and 1115.75masl respectively and for design it is taken as 1115.8masl for both floods.

Figure 1-4; Stage discharge curve for Kabajiria River at the Proposed Weir Axis

1.6 FIXING THE DESIGN POND LEVEL

The pond level is the level of water which is maintained, immediately upstream of the weir to facilitate withdrawal of water into the canals for irrigation or for any other purpose.The pond level of the diversion structures of the project has been fixed with these considerations.

Table 1; Design crest and pond levels

Design parameters	Unit	Weir @ Ngenge River	Weir @ Kabajiria River
Deepest river bed level at the site	m.a.sl	1111.40	1114.50
Required full supply level of canal	m.a.sl	1112.50	1115.00
Minimum driving head for full supply discharge	m	0.50	0.50
Required pond level	m.a.sl	1113.00	1115.50
Crest level of side spill weir	m.a.sl	1113.00	1115.50
Proposed U/S floor level of under sluice	m.a.sl	1111.40	1114.50
Proposed U/S floor level of side spill weir	m.a.sl	1111.20	1114.25
Height of side spill weir	m	1.80	1.25

1.7 LENGTH OF WATER WAY

The gated barrage is the main structure that is provided across the main course of the rivers to create the required pond level during lean flow time and serve as an under sluice during flood periods and during this time the under sluices will work as drowned orifices. Accordingly, the discharge through the under sluice has been computed using drowned orifice formula:

To avoid large span water way and maintain a good proportion between the height and width of the gate the water way of the barrages/under sluices are provided with intermediate piers to divide the calculated width into reasonable bays as shown in the table below;

Table 2; Waterway under sluice/ barrage

Structure location	No. of bays	Width	Opening height	No piers	Width of piers	Clear water way	Over all water way	Discharge capacity at HFL
	No.	m	m	no	m	m	m	m^3/sec
Ngenge River	4.00	1.20	1.00	3.00	0.50	4.80	6.30	10.67
Kabajiria River	4.00	1.00	1.00	3.00	0.50	4.00	5.50	5.82

1.8 Design of the side spill weir

The side spill weir has been provided with 0.5m crested width having a vertical upstream face and 1H:1V downstream glacis and to create smooth hydraulic conditions the top corners of the weir has been provided with 0.25m radius rounded curve. The side spill weir has been designed as a sharp crested weir and the Discharge passing over sharp crested weir.

The channel trough has been provided with a trapezoidal cross-section and to ensure the best hydraulic performance, the channel trough has been designed to have a maximum bed width to depth ratio of 1.0. The flow in the channel trough should be maintained sub-critical state accordingly the channel bed slope should be less than the critical slope.

Table 3; Waterway of the side spill weir

Structure location	Weir height	Width	Side slope	bed slope
	m	m	m:m	m:m
Ngenge River	1.80	1.30	1:01	0.0198
Kabajiria River	1.25	1.50	1:01	0.0129

1.9 CONTROL GATES AND OPERATING PLATFORM LEVEL OF UNDER SLUICE

The under sluice is provided with fixed wheel vertical lift gate. Sufficient clearance between the top level of the opening and the operating platform is provided to facilitate the operations of vertical lift gate in all conditions including the high floods and ensure uninterrupted access. An emergency gate is provided to facilitate maintenance and repairs to the service gate.

Design of intake facilities

Intakes of run-of-river projects are required to draw the desired quantity of water, limited to design discharge, from the river under controlled conditions and transfer the flow to the irrigation canal.

Generally, apart from ensuring consistent withdrawal of water intake structures should be arranged and designed to minimize the entry of sediment, prevent floating debris and trash from entering the water conveyance system and prevent formation of air vortices. Accordingly, one intake structure on the left side of the diversion structure across Ngenge River and two intake structures on the left and right side of the diversion structure across Kabajiria River are provided with the following arrangement and design features:

The crest level of the intakes is fixed 0.4-0.5m higher than the floor elevation of the scouring sluice so that the entryof sediment can be minimized;

To prevent the entry of floating debris and trash inclined rack is provided just at the entrance of the intake structure;

Fixed wheel vertical lift service gate is provided to facilitate a controlled entry of water into the canal system as per the irrigation demand maintenance and repairs to the service gate a slot is also provided upstream of the service gate;

RCC slab platform and breast wall is provided to facilitate the operation of the gates and prevent the entry of flood.

Table 4: Hydraulic Design Parameters of Intake Structures

Design parameter	Unit	Intake for Ngenge weir	Intake for Kabajira weir	
			Right side	Left side
Design intake discharge	m^3/sec	0.60	0.46	0.14
Scouring sluice base level	m.a.s.l	1111.40	1114.50	1114.50
Inlet sill level	m.a.s.l	1111.90	1114.90	1114.50
Water depth	m	0.60	0.60	0.50
Width of water way	m	1.50	1.40	0.30
Number of bay provided	m	2.00	2.00	1.00
Width of each bay	m	0.75	0.70	0.50
Number of piers	m	1.00	1.00	-
Width of piers	m	0.50	0.50	-
Over all width of intake	m	2.00	1.90	0.50
Height of opening gate	m	0.60	0.60	0.50
Velocity	m/sec	0.67	0.54	0.58

1.10 SETTLING BASIN

Sand trap facilities or settling basin is one of the essential components of an irrigation scheme which is planned to be developed by diverting a river flow into the canal system and the provision such structure will become a must for irrigation schemes planned to utilize a river flow characterized by high concentration sediment transport. In this regard, the water resource study of report of this project and the field visit observation has revealed the presence of high concentration sediment on Ngenge and Kabajiria river composed of clay particles, thus to avoid and/or minimize the sediment influx entering to the canal system a structure called settling basin has been provided adjacent to the intake structure, where the velocity of the flow will be reduced resulting in settling out of the fine-grained suspended material. The design principle of settling basin must consider the following points:

The settling basin must have length and width dimensions which are large enough to cause settling of the sediments but not so large that the basin is over expensive and bulky.

Water removed from the flushing exit must be led carefully away from the installation. This avoids erosion of the soil surrounding and supporting the basin foundations. Sufficient capacity must be allowed for collection of sediment.

In order to satisfy the requirement for good hydraulic performance the settling basin structure is arranged to have three main components: inlet zone, settling zone, outlet zone. To ensure the continuous operation of the irrigation system two settling basins parallel to each other are provided so that one of the basin remains in operation while the other is under cleaning operation of the deposited sediment.

Table 5: Design Parameters of settling Basins for Ngenge and Kabajiria Rivers

SI.NO.	Parameter	Unit	Value at Ngenge river		Value at Kabajiria river	
			C-1*	C-2*	C-1*	C-2*
1	Design discharge	m³/sec	0.60	0.6	0.455	0.455
2	Width of intake	m	2.3	2.3	2.2	2.2
3	Width of basin	m	3.5	3.5	3.0	3.0
4	Length of inlet transition	m	2.5	2.5	2.0	2.0
5	Length of basin	m	17.0	17.0	15.0	15.0
6	Length of outlet transition	m	2.5	2.5	3.35	3.35
7	Depth of basin	m	0.6	0.8	0.55	0.65
8	Velocity in the Trap	m/s	0.28	0.28	0.2	
10	Free board	m	0.5	0.5	0.5	0.5

1.11CLEANING METHODS

In the first phase, the suspended sediments in the abstracted water shall be permitted to settle in the settling basin and water that is free from as much of the sediments as possible shall be conveyed to the water conveyance system. In the second phase, the deposited sediments shall be hydraulically removed from the settling basin through a flushing system using gravity flow of water at high velocities. During the flushing, water supply to the water conveyance system will be channeled through another settling chamber or bypass system.

1.12 DESIGN OF BRIDGE

The road bridge is provided for head regulator having clear span 2.0 m and carriage way width 4.50 m. The road bridge is designed in accordance with ERA Bridge Design Manual and Vehicularlive loading on the roadways of bridges or incidental structures, designated HL-93, that consist of a combination of the Design truck or design

tandem Design lane load have been used. The grade of concrete considered is RC-25 and a minimum yield strength of deformed bar of 500mpa is taken in accordance with the manual.

1.13 IRRIGATION SYSTEM

Command area of Ngenge Irrigation Project has Gross command area of 1,031 ha, while net area is 785 ha. The area was divided into three blocks those will be irrigated through MC-1 with design capacity of 0.59 m3/sec, SC-2 with design capacity of 0.140 m3/sec and MC-3 with design capacity of 0.46 m3/sec. MC-1 has a total length of 1.208 km from its off take from Ngenge diversion and MC-3 and SC-2 have 1.22 Km and 2.06 Km total length respectively from Kabajiria diversion. In view of suitable climatic conditions, paddy crop is planned to be cultivated throughout the year. Therefore, a continuous supply of water is required to irrigate the rice fields in different parts of the project area. Paddy will be at different growing stages in different parts of the project area. In wet season, the irrigation system will run continuously as there is no constraint of water availability in both rivers. However, in dry season, due to constraint in water availability only the main canal will run continuously for 24 hour whereas the secondary and tertiary canals will run for 12 hours and field canals may have to run in rotation.

Upstream control has been adopted for the design of the irrigation system of the Project. The main, secondary and tertiary canals will run continuously during peak demand and water will be distributed according to the pre-determined requirements of the area to be irrigated. Head regulators have been provided on the intake structures for regulating flows and cross regulators for maintaining designed water level and adjust the supplies if required. In this way all the canals will be regulated by an upstream control. During periods of low demands, the field canals will be run by rotation

Tertiary Canal Unit

Farm channel is the smallest irrigation channel for delivering water to the farm. The typical water tertiary unit has eight farm channels to supply water to farms after receiving water from secondary canal. Each farm has farm drain on one end of the farm to drain the excess water and discharge to tertiary drain. Design discharge of tertiary and field channel is selected keeping in view of the handling capacity of the individual farmer. Generally, it is difficult to handle discharge more than 60 l/s by a single farmer. Therefore, the discharge field channel has been adopted as 35 l/s. Peak 10-daily irrigation requirements rate for rice crop at watercourse head has been estimated as 2.4l/s/ha. Considering the capacity of watercourse as 35 l/s, the area to be irrigated by a tertiary

is 16 ha. Farm roads of 6 m wide have been provided all around the tertiary unit for the movement of machinery and transport of goods and services. In addition, 4 m wide road has been provided inside the farm unit. The length of the farm channel has been limited to 300 m for ease of maintenance and operation requirements.

Daily Irrigation Period

Continuous 12 hr. irrigation period is preferred based on the experience and existing condition of the project area. The Main canal is designed for 24 hrs irrigation while the rest of the canals are designed based on 12 hr irrigation. For this purpose, night time reservoirs are provided in order to store the night time discharge of Main canals and supply a regular 12-hour daytime flow to each secondary canal. It helps to minimize the impact of the fluctuation in the primary canal flow due to lag-time and creates quick access to irrigation water demand in the remote command areas. Totally, two night storage reservoirs are provided on two of secondary canals (SC-1 and SC-3). While secondary canal two (SC-2) is designed to take 12 hr. irrigation directly from the diversion weir considering the area of the command it is irrigating.

Irrigation System Layout Plan

The layout of the irrigation system for the project has been prepared on the basis of topographic survey carried out during April 2016. The layout has been planned to meet the following basic planning criteria of:

i) Providing irrigation facility to maximum area with minimum channel lengths

ii) Aligning major channels centrally on the ridges for maximum command on both sides

iii) Ensuring minimum cut/fill requirements

iv) Minimum need of crossing natural depressions/water ways

v) Channel alignments are selected as to avoid the channel section being in excessive fill.

vi) Tertiary canals would be so aligned to fit into the adopted size of field unit.

In general, the entire 785 ha, has been divided into 49 tertiary units, in which each unit will cover approximately 16~32 ha. Each unit has been further divided into farm units having 2.3~2.6 ha each. Units have been made for good management of paddy cultivation.

1.14 DRAINAGE SYSTEM

Rice crop requires a certain depth of water to be maintained in the field for best crop production. As such water standing in the field do not have any harmful effect provided the rice plant is not submerged. Generally, water levels in the farm drains have been kept minimum at least 0.2 m below the farm level to allow free discharge of excess water from farms into the farm drain. The water levels in the collector, secondary and tertiary drains have been fixed by the water levels at the outfall of the farm drains into tertiary drains inflowing into the secondary drains and which in turn inflow into the collector drains. Ultimate disposal of drainage water by gravity has been planned to be in the creeks of Ngenge and kabajiria rivers through outfall drains. Adjustments in water levels have been made depending upon the governing water level at their outfalls.

1.15 NEED FOR THE PROJECT

The National Development Plan II (NDP II) 2015/16-2019/20, which has been designated by GoU as the second of a series of six 5-year NDPs to translate the country's Vision 2040 into action, is the overall development strategy for Uganda. The NDP's core objectives are to increase household income; generate employment; develop the infrastructure; increase access to quality social services; promote science and technology; and develop human capital which FIEFOC is consistent with. The Project's activities, notably, construction of irrigation infrastructure and promotion of value addition to enhance household incomes, are also consistent with the Agricultural Sector Development Strategy and Investment Plan (DSIP) 2010, Gender Policy Brief for Uganda's Agriculture Sector (2012), the Rural Development Strategy (RDS) of the Ministry of Finance, Planning and Economic Development (MoFPED), the Local Government Sector Investment Plan (LGSIP Investment Strategy 6, Local Economic Development), the Uganda Forestry Policy, and the Uganda Climate Change Policy.

The Project is also in line with the Bank's Ten Year Strategy (TYS) as it relates to inclusive growth and food security through the involvement of youth and women in skills development and entrepreneurship. The Project is also consistent with the Bank's CSP (2011-2015) with its two pillars focusing on (i) the development and rehabilitation of critical economic infrastructure and increased agricultural productivity; and (ii) improving capacity skills development for poverty reduction, both of which are well aligned to the NDPII. FIEFOC-II was identified by the CSP as one of the key investment projects to be supported by the Bank under its first pillar mentioned above. In addition, the Project is aligned with the Bank's draft Agriculture and Agribusiness Strategy 2015-2020, the Gender Strategy (2014-2018), the Bank's Climate Change Action Plan (CCAP, 2011-2015).

1.16 SUMMARY OF THE PROJECT

Developer	
Project title	ESIA for Ngenge Irrigation Scheme in Ngenge Sub county, Kween District
Address	Ministry Of Water and Environment Plot 21/28 Port Bell Road, Luzira/ P.O.BOX 200226 Kampala
Contact Person	MUGABE MOTRAM Email:mmotram@yahoo.com 0782717329
Location	The site is located in Ngenge Sub-County, Kween District at GPS coordinates 1°30'10.36534"N, 34°30'12.85915"E, 1°31'1.56745"E, 34°30.47.43281"E, 1°30'17.56869"N, 34°30'49.99595"E.

2.0 POLICY, LEGAL AND REGULATORY FRAMEWORK

This section presents a summary of policies, laws, regulations, standards and guidelines relevant to the environmental management of the project. It also identifies agencies, departments and institutions responsible for the monitoring and enforcement of legal requirements specified therein.

The consultancy team reviewed and assessed the conformity of the proposed development to existing relevant Ugandan legislation, policies, and guidelines that have direct bearing on FIEFOC-II. The section also briefly describes some of the African Development Bank Safeguards polices applicable to the project, the following laws and regulations will be put under consideration and observed for the smooth implementation of the project:-

Table 2-1: Policy, legal and regulatory framework

Policy	Relevance

2.1.1 The Constitution of the Republic of Uganda, 1995	The Constitution of the Republic of Uganda, 1995 is the main legislation body in the country. It offers, "every Ugandan the right to clean and healthy environment (clause 39) while at the same time expects citizens to play their part in creating a healthy environment. According to the Constitution, "It is the duty of every Ugandan to create and protect a clean and healthy environment" (clause 17j). The Constitution provides that the State shall "stimulate agricultural, industrial, technological and scientific development by adopting appropriate policies and enactment of enabling legislation." It also provides that the state shall "take appropriate steps" to encourage people to grow and store adequate food." It bestows responsibility for management of the agriculture sector with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). One of MAAIF core functions is formulation, review and implementation of policies, laws, regulations, plans and strategies for the agriculture sector.
2.1.2 National Environment Act of 1995 Cap 153	The National Environment Act of 1995 Cap 153 is the main law relating to the protection of the environment in Uganda. The Act provides for various strategies and tools for environment management, which also include EIA (Section 19) for projects likely to have significant impacts on the environment. The Act imposes a mandatory duty on a project developer to have an Environmental Impacts Assessment conducted before embarking on a project. The Third Schedule of the Act made under section 18 of the Act lists the types of the projects to be subjected to EIA, including large-scale agriculture and flood protection. The NEMA was created under the NEA and is mandated with the responsibility to oversee, coordinate and supervise environmental management in Uganda, including the review of environmental impact assessments carried out for various projects.
2.1.3 The Water Act, Cap 152	The Water Act, Cap 152 of 1995 provides for the management of water in Uganda under the mandate of the Directorate of Water Resources Management in the Ministry of Water and Environment. Section 31, subsection (1) of the Water Act deals with prohibition of pollution to water and stipulates that a person commits an offence that, unless authorized under this Act, causes or allows:- a) Waste to come into contact with any water; b) Waste to be discharged directly or indirectly into water; and c) Water to be polluted. Under section 107, the Water (Waste Discharge) Regulations (1998); the Water Supply

	Regulations (1999) and the Sewerage Regulations (1999) have been put in place in order to implement this Act and are aimed at minimizing pollution of public waters by developers and other users.

2.1.4 The Land Act, Cap 227	The Land Act, Cap 227 of 1998 provides that the Government or the local government shall hold land in trust for the people and protect natural lakes, ground water, natural streams, wetlands and any other land reserved for ecological purposes for the common good of the citizens of Uganda. A local government may, upon request to the government, be allowed, to hold land in trust for the people and the common good of the citizens of Uganda. Sections 43, 44 and 45(1) and (2) of the Land Act (1998), provides that national or local government may acquire land in accordance with the provisions of Article 26 and clause (2) of Article 237 of the Constitution of the Republic of Uganda. A person who owns or occupies land shall manage and utilize the land in accordance with the National Environment Act, Cap 153 and any other laws binding. Part III sections 43, 44, and 45 specifically address the utilization of land in accordance with the various statutes and acts of environmental concern, which include the National Environment Act, The Water Act, and any other law. In addition section 45 addresses the control of environmentally sensitive areas.
2.1.5 The Local Government Act, 1997	The Local Government Act, 1997 provides for decentralization and devolution of Government functions, powers and services from the central to local governments and sets up the political and administrative functions of local governments. The local governments are responsible for the protection of the environment at the district level. This therefore, implies that local governments shall be consulted on projects to be located within their areas of jurisdiction and on matters that affect their environment. The Local Government Act, 1997 sets out the decentralization of functions, powers, responsibilities and services to Local Governments. Issues to do with WfAP are the responsibility of the Production sector in collaboration with the Department for Water.
2.1.6 The Occupational Safety and Health Act, 2006	The Occupational Safety and Health Act, 2006 consolidate, harmonize and update the law relating to occupational safety and health and repeal the Factories Act of 1964. It makes provisions for the health, safety, welfare and appropriate training of persons in work places. The application of this act will be critical during the re-establishment phases as well as during the operation and maintenance of the irrigation project.
2.1.7 Water Act, Cap 152	The objective of the Act is to enable equitable and sustainable management, use, and protection of water resources of Uganda through supervision and coordination of public and private activities

	that may impact water quantity and quality. Section 18 requires that before constructing or operation of any water works, a person should obtain a permit from Water Resources Management Directorate (WRMD). Irrigation scheme project is herein defined to include alteration, improvement, maintenance and repair of water systems. The Act also aims to control pollution of water resources (Sections 28 and 31). This Act is specifically applicable to one aspect of the proposed scheme project which will divert the river to access different sections of the gardens. Different canals will be constructed within the scheme.

2.1.8 Environmental Impact Assessment Regulations, 1998	The procedures for conducting EIAs and guidelines for EIA practitioners and regulatory bodies are stipulated in this document. The regulations require a detailed study to be conducted to determine the possible environmental impacts, and measures to mitigate such impacts. At the end of the study, the environmental assessment report is submitted to NEMA to take a decision as to whether to approve or reject the project. The Guidelines also stipulate that the EIA process should be participatory, that is the public should be consulted widely to inform them and get their views about the proposed investment. The developer has the legal obligation to seek the views of the public, persons that may be affected by the proposed project, as well as all other stakeholders. In this case, key stakeholders have been consulted in the course of the study and their views have been integrated into the study (See section 6).
2.2 Policy Framework	
2.2.1 The Plan for Modernization of Agriculture	The Plan for Modernization of Agriculture (PMA) is a multi-sectoral policy framework for agriculture and rural development, is responsible for shaping the policy environment for agriculture in Uganda over the past eight years or so. The PMA pillars include: - research and technology development; national agriculture advisory services; rural finance; agro processing and marketing; agricultural education, physical infrastructure and sustainable natural resource utilization and management. The PMA outlines the national agricultural goals and priorities (Uganda Government, 2010). Linkages with PMA interventions have been used in designing recommendations for this project.
2.2.2 The National Environment Management Policy, 1994	The National Environment Management Policy, 1994 is the cornerstone of Uganda's commitment to socio-economic development that is environmentally sustainable and brings the benefits of a better life to all. The National Environment Management Policy gives the overall policy framework, which calls for sustainable development that maintains and enhances environmental quality and resources productivity to meet human needs of the present generation without compromising ability of future generations to meet their own needs. The policy sets a guiding principle that Environmental Impact Assessment should be required for any activities which may cause significant impact on the environment.
2.2.3 The National Wetland Conservation and	The National Wetland Conservation and Management Policy

Management Policy	requires the preparation of Environmental Impact Assessment and Audit procedures for all activities to be carried out that will have an impact on a wetland (s). Furthermore, the policy aims at maintaining an optimum diversity of uses and users and consideration for other stakeholders when using a wetland.
2.2.4 The National Water Policy, 1999	The National Water Policy, 1999 aims at promoting an integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda. It stipulates that the quality of drainage water shall be such as not to pollute the receiving water or ground water and that all measures must be taken by the users to prevent increase in salinity levels in receiving waters, to prevent the accumulation of dangerous or toxic compounds in the subsoil, capable of contaminating underground waters.
2.2.5 The National Environment (Riverbanks, Lakeshores and Wetlands) regulations, 2000	The National Environment (Riverbanks, Lakeshores and Wetlands) regulations, 2000 provides a list of regulated activities whose implementation in wetlands is subject to issuance of a Permit granted by NEMA in consultation with the Lead Agencies. These include, among others, cultivation, drainage, commercial exploitation, sewerage filtration, fish farming and aquaculture. Environmental Impact Assessment is mandatory- under the statue- for all activities in the wetlands, riverbanks and lakeshores and special measures are essential for protection of these ecosystems.
2.3 Institutional Framework	
Institution	**Role and Responsibilities**

2.3.1 The Ministry of Water and Environment	The Ministry of Water and Environment (MWE) is the principal Executing Agency for FIEFOC-II project and will be responsible for the overall monitoring and management of the project during both construction and operation, including ensuring the implementation of the mitigation and enhancement measures and adherence to Uganda's environmental regulations and the Bank's Operational Safeguards. Other institutions that will be directly and indirectly involved in the implementation process include the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the Uganda National Environmental Management Authority (NEMA), the Ministry of Finance, Planning and Economic Development (MFPED), Ministry of Gender, Labour and Social Development, and the Ministry of Local Government (MLG).
2.3.2 The National Project Coordination Unit	The National Project Coordination Unit (PCU) established under FIEFOC-Phase 1 and housed in the MWE will coordinate the activities of all institutions. The PCU shall have 1 or 2 environmental and social safeguard specialist(s) (recruited or appointed by the MWE) who will monitor and manage the implementation of the ESMP. The functions of the specialists will include working with consultants and reviewing reports as well as ensuring that safeguard decisions are adequately mainstreamed. They will also participate in monitoring and evaluation exercises.MWE/PCU, in liaison with District Local Government, the Ministry of Works, Directorate of Water Resources Development, Department of Water Resources Management, Wetlands Management Department, the department of Occupational Health and Safety (MGLSD), Civil Society and the Farmers' Organization will undertake regular environmental, social, safety and health inspections. A monitoring committee is proposed, comprising the above stakeholders to undertake quarterly environmental and social monitoring of project implementation.
2.3.3 The National Environmental Management Authority	The National Environmental Management Authority (NEMA) will be responsible for review, comment and overall approval of the ESIA/ESMPs reports for the proposed irrigation scheme. Once approved, NEMA will issue Conditional Approval Certificates for the ESIA for the proposed construction and operation of the irrigation scheme.
2.3.4 Kween District Local Government (KDLG)	Since the proposed irrigation scheme is within the jurisdiction of Kween district (Ngenge sub-county), the technical staff of this respective district will participate in the monitoring and enforcement of the environmental regulations, provision of extension services, and; mobilization of communities, sensitization and capacity

	building activities. The District will designate a Project Support Officer (PSO) among its staff, who will support the implementation and technical supervision of the Project, including sensitization of farmers, training, and monitoring and evaluation. More so, the district environment officer will be responsible for ensuring the compliance of all the project components in line with relevant regulations and conditions during construction and the operation of the irrigation schemes. The district environment officer will relay environmental and/or social concerns on the project to NEMA for technical guidance. These selected district officers will report periodically to the MWE/PCU on all issues related to the irrigation scheme activities including environmental and social safeguards.

2.4 African Development Bank's Environmental and Social Safeguard Policies

The African Development Bank's Strategy for 2013-2022 emphasizes the need to assist regional member countries in their efforts to achieve inclusive growth and transition to green growth. In addition, the Bank is committed to ensuring the social and environmental sustainability of the projects it supports.

The Integrated Safeguard System (ISS) is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. The safeguards aim to (i) avoid adverse impacts of projects on the environment and affected people, while maximizing potential development benefits to the extent possible; (b) minimize, mitigate, and/or compensate for adverse impacts on the environment and affected people when avoidance is not possible; and (c) assist borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks

The Bank requires that borrowers/clients comply with these safeguards requirements during project preparation and implementation. The Integrated Safeguards Policy Statement sets out the basic tenets that guide and underpin the Bank's approach to environmental safeguards. In addition, the Bank has adopted five Operational Safeguards (OSs), limiting their number to just what is required to achieve the goals and optimal functioning of the ISS:-

Table 4.3: African Development Bank's Environmental and Social Safeguard Policies

Operational safeguards	Relevance

2.4.1 Operational Safeguard 1: Environmental and Social Assessment	This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social requirements. The FIEFOC-II project activities include the construction and use of irrigation infrastructures that may likely have significant environmental impacts such as loss of vegetation, soil erosion, pesticide use, wetland degradation and increase in waterborne diseases. These risks will be managed through implementation of mitigation measures elaborated in site specific Environmental and Impact Social Assessment (ESIA)/Environmental and Social Management Plans (ESMP).
2.4.2 Operational Safeguard 2: Involuntary Resettlement: Land acquisition, population displacement and compensation.	This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporate a number of refinements designed to improve the operational effectiveness of those requirements. The proposed irrigation schemes will not require land acquisition or resettlements. The scheme will be sited on lands owned by the community who are the direct beneficiaries of the proposed project, and as such there is no likelihood of a change in land status at this stage.
2.4.3 Operational Safeguard 3: Biodiversity and ecosystem services	This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management in operational requirements. FIEFOC-II project activities will be implemented on existing irrigated/farm land; hence degradation of natural habitats (wetlands and natural vegetation) is not anticipated from a modified habitat.
2.4.4 Operational Safeguard 4: Pollution prevention and control, hazardous and control, hazardous materials and resource efficiency	This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow. The FIEFOC-II project interventions may likely intensify the use of agro-chemicals including pesticides needed to enhance productivity. Sustainable agronomic practices will be promoted to farmer groups including the preparation of Pest Management Plan to promote integrated pest management. Soil and water quality will be monitored during construction phase of the project as per requirements of country's regulations.

2.4.5 Operational Safeguard 5: Labour conditions, health and safety.	This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions rights and protection from abuse or exploitation. It also ensures greater harmonization with most other multilateral development banks. The Contractor shall comply with the Labour laws and Best Practice Occupational Health and Safety requirements.

2.5 International Conventions

2.5.1 United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC or FCCC is an international environmental treaty produced at the UNCED, informally known as the Earth Summit, held in Rio de Janeiro from June 3 to 14, 1992. The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Uganda having ratified this convention and putting into consideration the nature of the proposed project, there is an apparent need to ensure all the activities to be undertaken at the proposed irrigation scheme live within the carrying capacity of the environment and to avoid the emission of potentially atmospheric debilitating gases.

2.5.2 The Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the UNFCCC. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions, these amounts to an average of five per cent against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities." Observance to this protocol will influence future potential funding. There should be adherence to minimal carbon emission levels during the all phases of project implementation.

3.0 ENVIRONMENTAL AND SOCIAL BASELINE

This section describes the environmental and social baseline conditions in which the project will operate and which impacts may be experienced. The description is designed to enable identification of particularly sensitive receptors and resources that may be vulnerable to impacts arising from the project. In order to take into account the extensive scope and cumulative nature of impacts arising from the project, the baseline environmental and social setting has been examined at both site- specific and regional levels:

Primary sources of information, including field surveys and stakeholder consultations were used in the determination of site-specific conditions. Secondary sources of information through desk top review were helpful too.

Regional Environmental Setting

In regards to this report, the term region refers to Kween District as a whole. This section therefore describes the physical and biological regional setting of the project area.

3.1 Bio-Physical Environment

3.1.1 Climate

The climate of Ngenge and Kabajiria catchments varies from tropical humid in the highlands that include the extreme south to the hot arid climate in the north western parts of the flood plain. Intermediate between these extremes and for greater part of the basin the climate is tropical sub humid. The seasonal variation in climate is associated with the oscillation of the Inter-Tropical Convergence Zone (ITCZ) in which the project area is under the influence of Atlantic equatorial westerlies and southerly winds from the Indian Ocean.

Figure 3-1: Mean Monthly Rainfall

Table 6; Mean Monthly Rainfall

Month	Mean Min T (°c)	Mean Max T (°c)	Mean RH (%)	Mean Wind Speed (m/sec)	Mean Sunshine (hr)
January	17.0	31.1	62.1	4.1	9.2
February	17.4	31.9	57.6	4.4	8.1
March	17.8	31.1	64.5	4.1	8.0
April	17.9	29.8	70.2	4.1	6.9
May	17.6	29.6	72.0	3.7	7.5
June	16.9	28.5	69.4	3.6	7.6
July	16.5	28.4	68.0	3.6	6.5
August	16.4	28.9	70.1	3.9	6.8
September	16.8	29.2	69.1	3.8	7.7
October	17.2	29.6	70.3	4.0	7.6
November	17.1	29.2	70.8	4.1	7.3
December	16.8	30.1	65.1	4.2	8.3

Long Term Rainfall

The Tororo annual rainfall record shows pronounced periods of wetter and drier fluctuations. The early period (from 1999 to 2005) is comparatively dry (average 1425 mm), but this is followed by a wet period (from 2006 to 2014) with an annual average of 1567 mm. The driest year in the record is 1993, with an annual rainfall of 1048 mm. The wettest year is 1998, when the total was 1839 mm. The mean and median of the annual series rainfall are 1509 mm and 1508 mm respectively. 70% of the annual rainfalls are above 1430 mm and 80% above 1410 mm.

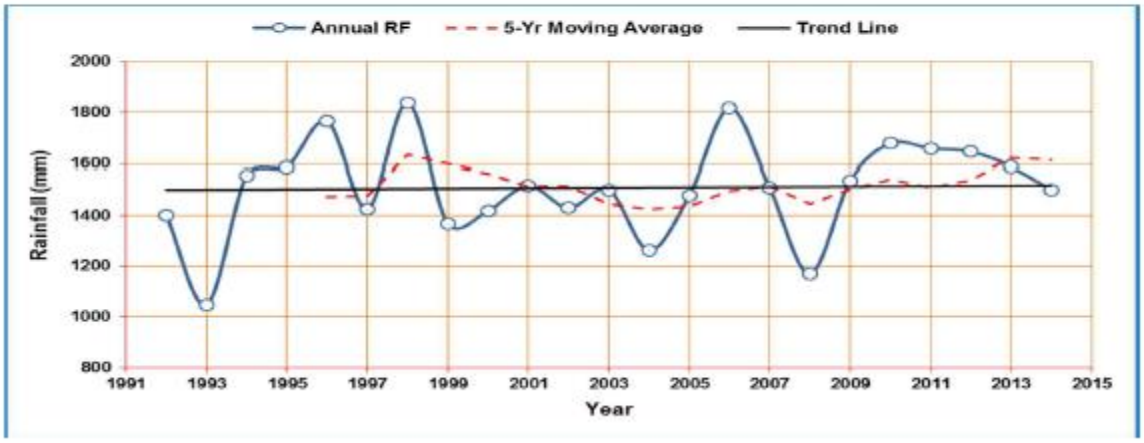


Figure 3-2: Tororo Annual Rainfall Series

3.1.2 Regional Geology

The proposed Ngenge Irrigation Scheme is to be located at the foothills of the Elgon Mountains that span the eastern boundary of Uganda from Tororo up to Moroto Districts. The rocks found around Ngenge comprise the charnockite complexes that are dated as 3000-3500 million years. These complexes are granulite facies metamorphism usually found as inliers (old rocks found in between young rocks). These rocks are highly metamorphosed generally having suffered retrograde metamorphism and are parent to the black clayey indigenous soils of the area. Ngenge area is affected by its proximity to the Elgon Mountains which is a large low angle volcano of tertiary age. The volcano consists of fossiliferous sediments and or tuffs below or within the basal volcanics. The sediments accumulate in basins, troughs and valleys and consist of nephelinites, Melilite, Phonolites, Trachytes and Trachyandesites, coarse pyroclastics and

agglomerates. These are released into the rivers flowing out of the Mountain and form the brown recent sediments known as the Bugisu series that now overlies most of the areas close to River Ngenge and Kabajiria. The Bugisu series has a maximum thickness of 253m comprising two subseries, the upper being a series of mud flows only and the lower sediments of are niterudites and calcareous types.

Ngenge Geology

The geology of Ngenge areas is mainly of tertiary volcanic rocks and associated sediments with intrusions of metamorphic granulite Faciesrocks, Charnokites, Enderbitesand retrograded derivatives.

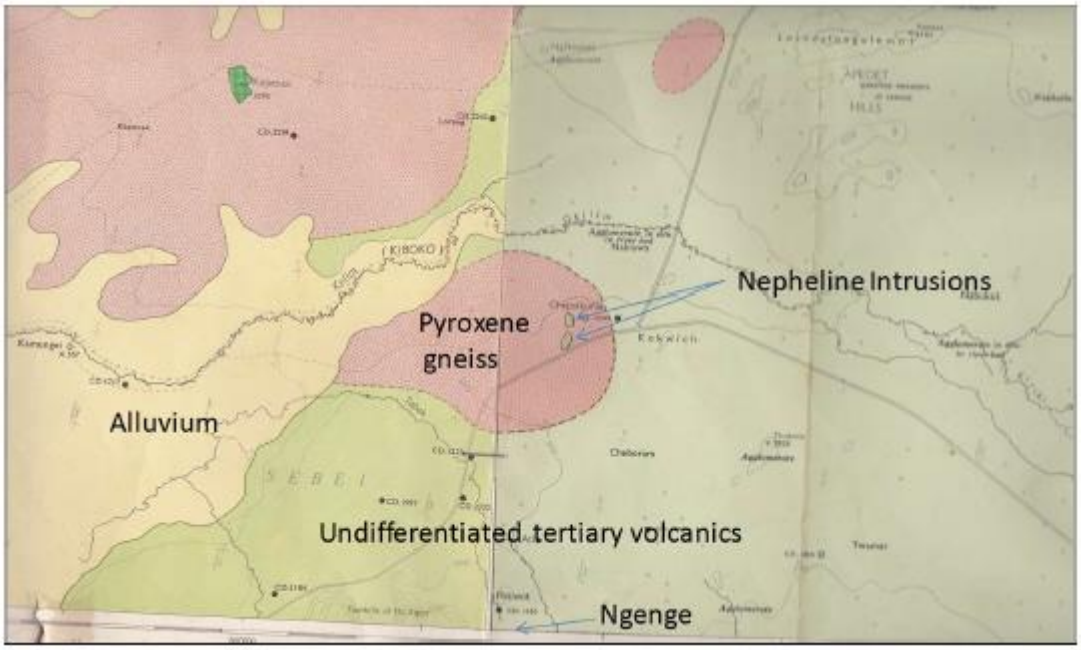


Figure 3-3: Ngenge geological map

The locations of the Ngenge River Head Work Site, night storage Reservoir and cross drainage structure are proposed within the habited areas of Ngenge town. The creation of channels to the sites may cause some rejection and sensitizing the community is required. Some sides of the rivers are almost vertical slopes to the water below with some slope sides up to 4m high especially at the select head work sites. These slope sides are being kept in place by the vegetation along the rivers and farming in some cases is being done too close to the river banks. The soils along the slopes are of rapid permeability and will be further weakened when the dammed river water reaches the surface level or floods.

3.1.3 Soils

According to the soil maps prepared by National Agricultural Research Laboratory of Uganda, Luvisols and Vertisols are dominant in the lower land of the area. Luvisols have a higher claycontent in the subsoil than in the topsoil, as a result of pedogenetic processes (especially claymigration) leading to an argic subsoil horizon. Luvisols have high-activity clays throughout theargic horizon and a high base saturation in the 50–100 cm depth. Most Luvisols are fertile soils and suitable for a wide range of agricultural uses. Luvisols with a high silt content are susceptible to structure deterioration where tilled when wet or with heavy machinery. In places, the dense subsoil causes temporarily reducing conditions with stagnic properties. Vertisols are heavy clay soils with a high proportion of swelling clays. These soils form deep wide cracks from the surface downward when they dry out, which happens in most years. The nameVertisols

refers to the constant internal turnover of soil material. Large areas of Vertisols in the semi-arid tropics are still unused or are used only for extensive grazing, wood chopping, charcoal burning and the like. These soils have considerable agricultural potential, but adapted management is a precondition for sustained production. The comparatively good chemical fertility and their occurrence on extensive level plains where reclamation and mechanical cultivation can be envisaged are assets of Vertisols. Their physical soil characteristics, and notably their difficult water relations, cause management problems. The agricultural uses of Vertisols range from very extensive (grazing, collection of fuel wood and charcoal burning) through smallholder post-rainy season crop production (millet, sorghum, cotton and chickpeas) to small-scale (rice) and largescale irrigated agriculture (cotton, wheat, barley, sorghum, chickpeas and sugarcane). Cotton is known to perform well on Vertisols, apparently because cotton has a vertical root system that is not damaged severely by cracking of the soil. Tree crops are generally less successful because tree roots find it difficult to establish themselves in the subsoil and are damaged as the soil shrink sand swells. Management practices for crop production should be directed primarily at water control in combination with conservation or improvement of soil fertility. The area lies on an alluvial plain with sediment from rivers.

Soil Textural Classes

The soils have been studied up to 1.5meter depth from the natural surface level. Four textural classes have been recognized and mapped. The area has been grouped in to four classes and their characteristics are given below in;

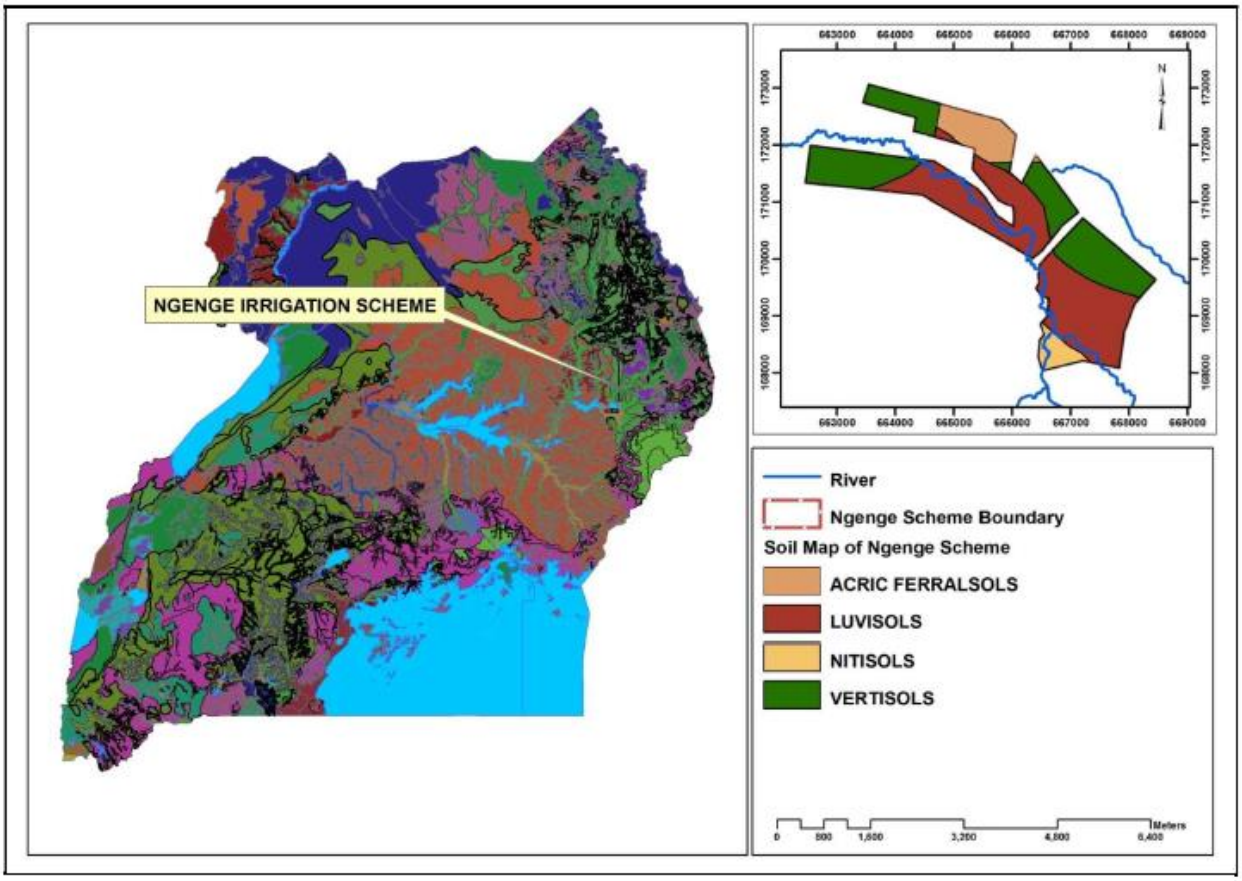


Figure 3-0-4; Soil characteristics of Ngenge Irrigation Scheme

Table 7; Soil Textural Groups in Ngenge Irrigation Scheme

Mapping Unit	Textural Class	Extent	
		Area (ha)	(%)
Ferralsols	Fine textured soils with sandy loam surface	81.7	9.3
Luvisols	Fine textured soils with clay loam surface	409.4	46.5
Nitisols	Fine textured soils with clay loam surface	34.2	3.9
Vertisols	Fine textured soils with clay loam surface	355.1	40.3
Total		**880.4**	**100**

Infiltration Estimation;

The infiltration values were derived using the textural analysis result from National Agricultural Research Laboratory of Uganda and by utilizing SPAW (USDA Soil and Water Characteristics) model. The average intake rates of four soil types are given below in

Table 8; Infiltration values

Mapping Unit	Textural Class	Average Intake Rate	
		(cm/hr)	(m/day)
Ferralsols	Fine textured soils with sandy loam surface	1.68	0.40
Luvisols	Fine textured soils with clay loam surface	1.25	0.30
Nitisols	Fine textured soils with clay loam surface	1.10	0.26
Vertisols	Fine textured soils with clay loam surface	0.98	0.24

Location	Soil Type	Permeability [*k* (cm/s)]	Bedrock depth (m)	Geotechnical/Geologic Impediment
HWS Ngenge River	Fine grained brown MUD	3.18×10^{-5}	10	Slope instability Close to built up areas
Night Storage Ngenge	Gritty hard dry black CLAY (compacted)	6.14×10^{-6}	20	Close to built up areas
HWS Kabajiria River	Fine grained loosely bound brown MUD	1.92×10^{-4}	7	Slope stability
Night Storage Kabajiria River	Stiff black sandy CLAY	5.05×10^{-5}	20	

Plate 3-1: Cutaway section showing soil horizon characteristics

3.1.4 Surface Water

The river waters of Ngenge and Kabajiria Rivers are heavily laden with the brown mud load from the mountain. This load is gradually deposited within the Irrigation command area and clearer water eventually emerges near the River crossing along the Namalu highway. Water for construction can be picked from this river crossing on UTM Coordinates 666140E, 170444N.

The main river system in the project area is Ngenge River basin which emerges from mountainous area of Mt. Elgon and flows toward the west and pass through Ngenge wetland, which is the project area, before joining Kelim River which is part of Greek (Kiriki) wetland. There are also many other tributaries flowing towards the Ngenge swamps, the main tributaries within the project area are Kabajiria and Cheborom River. At the proposed head work location, the Rivers have a catchment area of about 92.5 Km2 and 52.8Km2 for Ngenge and Tabuk catchment respectively. The Ngenge catchment has a mean slope of 22.8% and mean catchment elevation of 2003masl that ranges from 2959masl to 1103masl at the head work. The Kabajiria river catchment on the other hand has a mean slope of 23.1% and mean catchment elevation of 2035masl that ranges from 2996m.a.s.l to 1108 m.a.s.l at the proposed head work site.

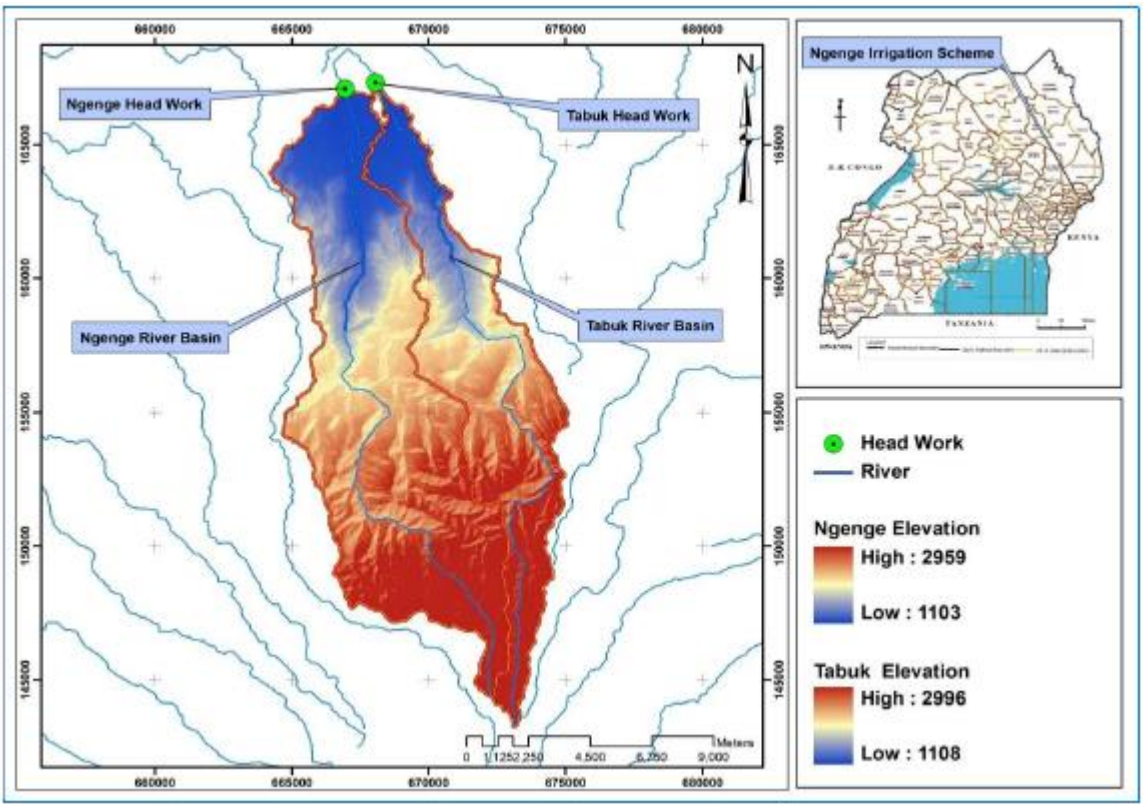


Figure 3-0-5; Ngenge and Kabajiria river systems

3.1.5 Flora/Vegetation

The vegetation cover of the project area is predominantly tropical savanna grasslands and wooden vegetation. The tree cover is diminishing through human deliberate activities like animal grazing, construction, cutting of grass and trees for firewood and bush burnings.

The wetland is dominated by grassland. Common species include *Cyperus rotundos, Cyperus aticulata, Echinochloa spp., Cyperus papyrus, Typha spp., Setaria spp.,* elephant grass, and other species of sedge. Trees like eucalyptus, and acacia spp. growing within and along the wetland. Sugarcane, rice, bananas, and maize are also common flora in the area.

Plate 3-2: A farmer clearing some of the vegetation at the scheme

Plate 3-3: Eucalyptus trees within the gardens at the scheme

3.1.6 Agriculture

The agriculture of a particular area is influenced by various factors such as soil conditions, availability of irrigation water, availability of farm labor and inputs, pricing policies, marketing facilities, socio-economic conditions and the farmer's practices. Presently most of the command area is covered by the field crops. On the assumption that the command area will be leveled, the irrigation system will be established and only rice crop will be cultivated for which the climate and soils are best suited. The establishment of Commercial Farm in the project area will bring socio economic changes and prosperity in the region. The JICA studies in the project area confirm that fine varieties of rice can be successfully be produced under irrigated conditions. The selection of rice crop for the project area is further strengthened on the basis of following factors.

- Dependable, adequate and good quality irrigation water is available from Ngenge and Tabuk Rivers (locally known Kabajiria River).
- Soil and Climate is suitable for growing rice throughout the year.
- Labor is not a constraint in achieving the required cropping intensity.
- Technology & technical manpower for growing rice is available.
- Investment and Financial support is available through the Government of Uganda.


Figure 3-6; Agricultural practices in the surrounding Environs

3.2 The Social Environment

3.2.1 Location and Administrative Structure

Target Project Area by District

The entire area of Ngenge wetland is found inside Ngenge Sub-County, Kween District. It lies approximately between latitude 1°33`North and 1°31`South and Longitude 34°30`East and 34°27`West. For administration purpose the district is sub-divided into sub-county, parish and village which is the lowest level of administration in the country. The sub-division of these units has been modified every now and then that the correct figures of these divisions have been keeping on changing every year. The recently available information collected from UBOS gives the following number of sub-divisions in the target (Kween) district.

Table 9; Number of Administrative Divisions in the Target District

District	Total No. of Sub County/TC	Total No. of Parishes	Total No. of villages/ward
Kween	14	71	486

Source: UBOS 2014

Target Project Area by Sub-Counties

The target irrigation scheme is located inside Ngenge sub-county, which has a total of 10 parishes and 77 villages. Table 10 shows the administrative division of the target area of the project. The location of Ngenge wetland is also presented in Figure 3.1 which shows the location map of the Ngenge swamp (Project area) inside Kween district.

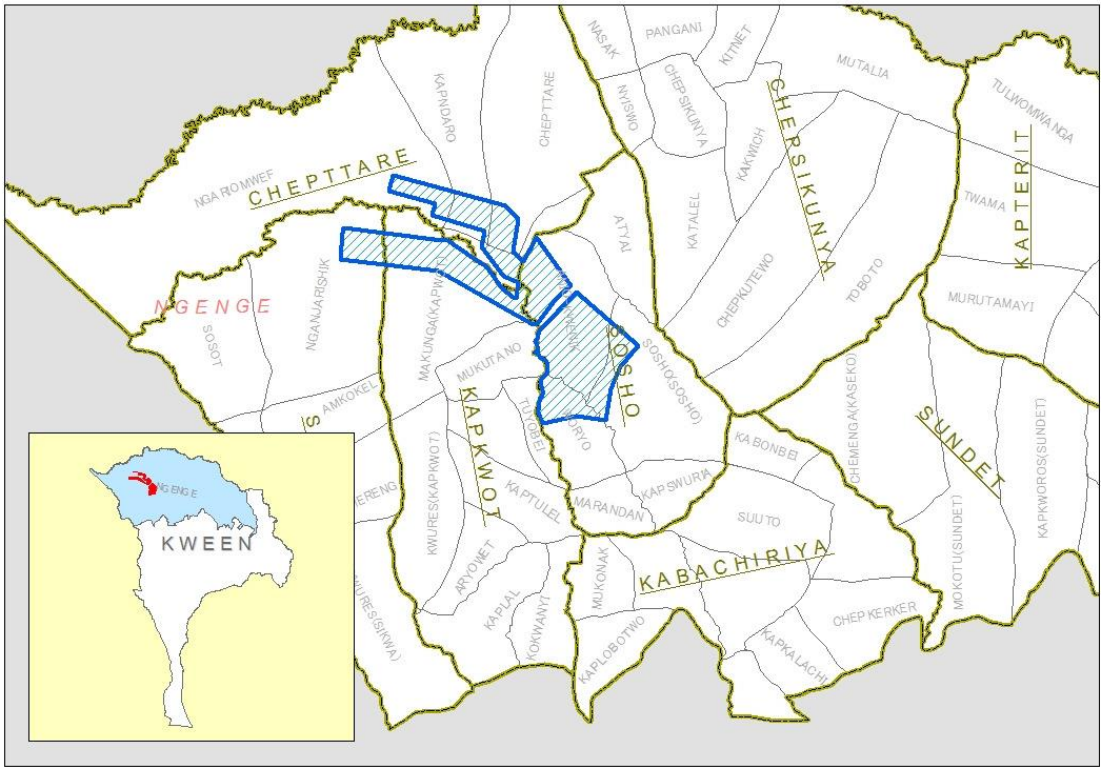
Table 10; The Administrative Division of the Project Area

District	Target Sub County	Total No. of Parish in the Sub-county	Total No. of villages in the Sub-county	Sub-county Area (km2)
Kween	Ngenge	8	77	193

Source: DDP of Kween district, 2010/2011-2014/2015

Target Project Area by Parishes and Village

Administratively, the target project area where the planned irrigation scheme development is proposed covers around 9 villages out of the 30 villages found inside the 4 parishes of the target Ngenge sub-counties. Figure 3.8 shows the draft layout of proposed irrigation scheme of Ngenge Swamp inside the target sub-county including village level boundary.



No.	Activity	Duration	Quantity	Rate (USD.)
1	Professional fees for the two Consultants	45 working days	2 Consultants (120 days)	
2	Field work (vehicle hire, fuel, per diem)	30 days i.e. 15 days each study		
3	Field Assistants	50 days (25 days of support by an Assistant for each of the consultant).	50 days	
4	stakeholder consultations(venues, refreshments and lunches)			
5	Capacity building aspects			

3-7; proposed layout of irrigation scheme inside the target subcounty

3.2.2 Population and Target Beneficiary

Total Population

According to Uganda Population and Housing Census 2014, Kween district has a total population of 95623. Of which 48579 were males and 47044 were females. There were 18234 households with an average household size of 5.2. Over 80% of the households in the District depend mainly on subsistence agriculture as their main economic activity. Only 9.7% of the population was dependent on earned incomes and 0.4% on property income.

Target Beneficiary

The target area (Ngenge Sub County) of this project has a total population of 11,174 people (or 2,595 households) lives in the ten (10) parishes and 73 villages of the target sub-county. Recently, the population of this sub-county has been changing a lot due to resettlement of the people who fled the dispute with neighboring communities (the Karamoja). The breakdown of population per sub-county is presented in Table 11:

Table 11; Kween District Population as per 2014 Census by Sub-county

Sub county	Households	Average size	Male	Female	Total
Benet	1,957	5.8	5,639	5,675	11,314
Binyiny	978	5.2	2,516	2568	5,084
Binyiny TC	664	5.4	1,755	1821	3,576
Kaproron	965	6.0	3,162	2585	5,747
Kaptoyoy	1,599	5.3	4,142	4294	8,436
Kaptum	1,863	5.1	4,690	4778	9,468
Kiriki	1,107	4.0	2,417	1981	4,398
Kitawoi	1,381	5.7	3,855	4051	7,906
Kwanyiy	1,822	5.7	5,190	5139	10,329
Kwosir	2,131	5.8	6,126	6284	12,410
Moyok	1,176	4.9	2,877	2904	5,781
Ngenge	2,595	4.3	6,210	4964	11,174
District (Total)	18,238	5.2	48,579	47,044	95,623

The population projection of Sub County in the Project site is shown in Table 12 below.

Table 12; Population Projection of Sub county in the Project Site

Sub-county	Population projections		
Ngenge	**Male**	**Female**	**Total**
	1,500	1,400	2,900

Source: UBOS, 2014

The average annual population growth rate between 2002 and 2014 of the district showed a declined 2.9%. The decline was as a result Children below 18 years constituted over 52% of the population and nearly half of the district population is below the age of 15 years. This population age structure is expected to be youthful for the next 15 years and this poses a big population and development problem of a high dependency ratio.

3.2.3 Economic Activity of the Area

Agriculture forms a base of the mainstream economic life of the people. Despite the agricultural potential of the area there is limited application of modern techniques of production which leaves farmers to operate below their potential. Besides crop production the people also engaged in animal rearing of mainly Zebu cattle, goats, pigs and donkeys.

The major cash crops grown in the area include rice, sesame, peas and beans. Cotton used to be the main cash crop in the area; however this is no longer the case. Due to lack of diversification in cash crops, food crops such as cassava.

Sorghum, maize, finger millet have increasingly become source of income for the community. The major market outlets for agricultural produce are the trading centres found around the project area.

3.2.4 Education

The target sub-county has a total of 16 UPE aided primary schools, one secondary school and privately owned three nursery schools. The schools are distributed throughout all the parishes with some parishes having two primary schools. There are also many schools in the neighbouring sub-counties or district which can be accessible to the communities in the project area. Table 13 shows the status of schools and enrolment in Ngenge sub-county.

Table 13; The Numbers and Enrolment Status of the schools in Ngenge

District	Category	Number	Owner	Enrolment		
				Boys	Girls	Total
Kween	Primary	16	Gov't	4,321	4,198	8,519
	Secondary	1	Gov't	131	79	210
	Nursery	3	Private	88	76	164

3.2.5 Health

In the target project area there are four health centres of which two are functional and the other two are not working because of lack of staff house and latrine. The list of these health centres are tabulated in Table 14. The major diseases in the area which are believed to be the cause of mortality are: Malaria, Pneumonia, Acute diarrhea.

Table 14; List of Health Facilities in the Project Area

Name of health centre	Type	Status
Ngenge Health Centre	HC III	Working
Tajar Health Centre	HC II	Working
Apopong Health Centre	HC II	Not Working
Amint Busano Health Centre	HC II	Not Working

3.2.6 Access road

The project area generally has a poor road network due to many swamps covering the area. There are two major roads which connect the project area, (Ngenge sub county), with the district head quarter (Binyinyi town) and the other part of the country (such as Ngenge, Mbale, and Kampala). These roads pass either through stony mountainous dangerous terrain or through a dry weathered road which is inaccessible during the rainy season. In addition, most of the available farm roads are inaccessible by vehicle, especially during the rainy season. The road network of the area is presented in Figure 3-9:

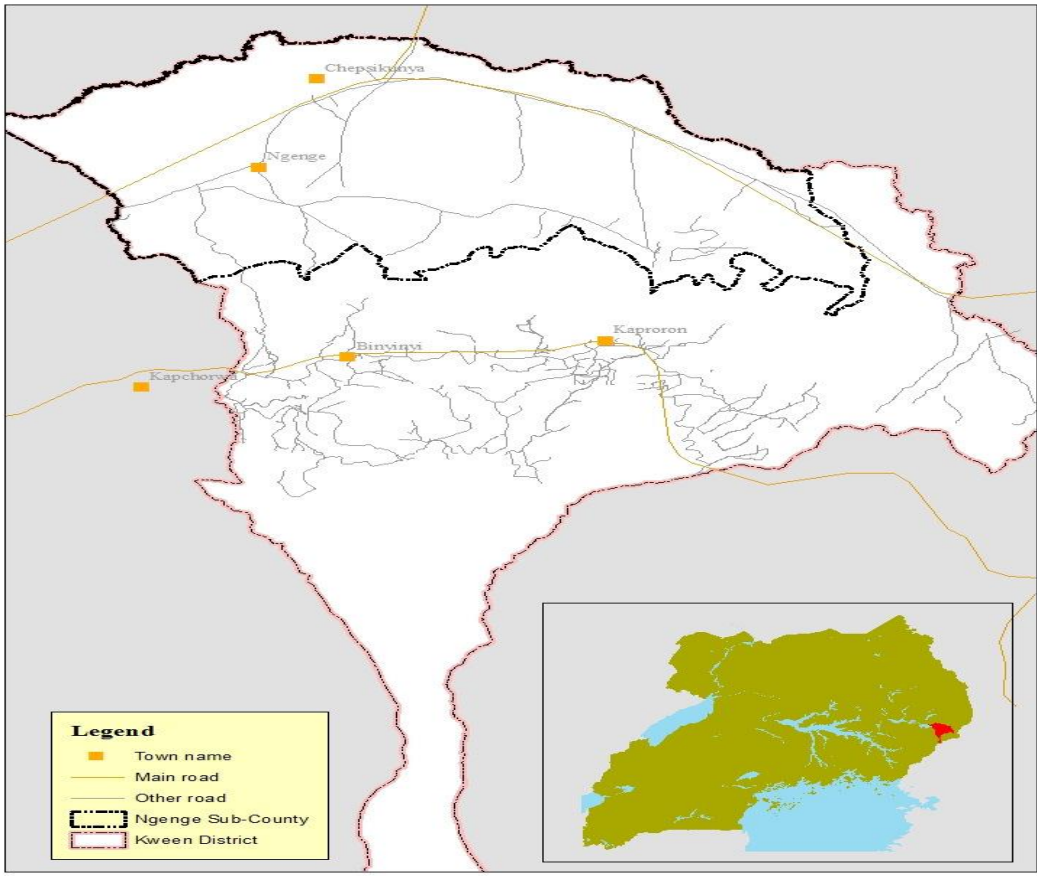


Figure 3-8; Road Network Map in the Project Area

3.2.7 Water Supply

The source of portable water to the communities living in the project area is stream, spring, rainwater harvesting and borehole. According to the information presented in Kween district development plan, there are over 28 boreholes, 11 protected springs, over 20 hand dug wells and about 15 rainwater harvesting facilities which supply portable water to the community. The breakdown of water supply points in the project area is shown in the following table. In addition, every year each sub-county receive budget from district for drilling of, on average, two boreholes.

Table 15; Breakdown of Water Supply Facilities inside the Project Area

District	Target sub-county	Number of Boreholes		Spring + RWH + HDW
		Functional	Broken	
Kween	Ngenge	28	12	Over 61

Source: DDP of Kween

3.2.8 Land tenure and land use

The types of land tenure system in the project area are; 1) Customary tenure, 2) Freehold tenure, 3) Leasehold tenure, and 4) Mailo land tenure. Customary land tenure system is dominant in this area, sharing 85 % in the related sub-county.

The land use classification for the target area was initially carried out by using satellite images and GIS software, and then site investigation was made for confirmation and revision of the results. The target area of the Ngenge irrigation scheme is 883 ha. The paddy field is located along the swamp with the area of 450 ha, which is 51 % in the total area. The present land use is shown in table below.

Table 16; Present Landuse in the Target Area

Scheme	Total Area	Lowland Paddy Field	Lowland Cropped	Lowland Not Used	Upland	Trees	Others
Ngenge	883	450	80	205	75	70	3

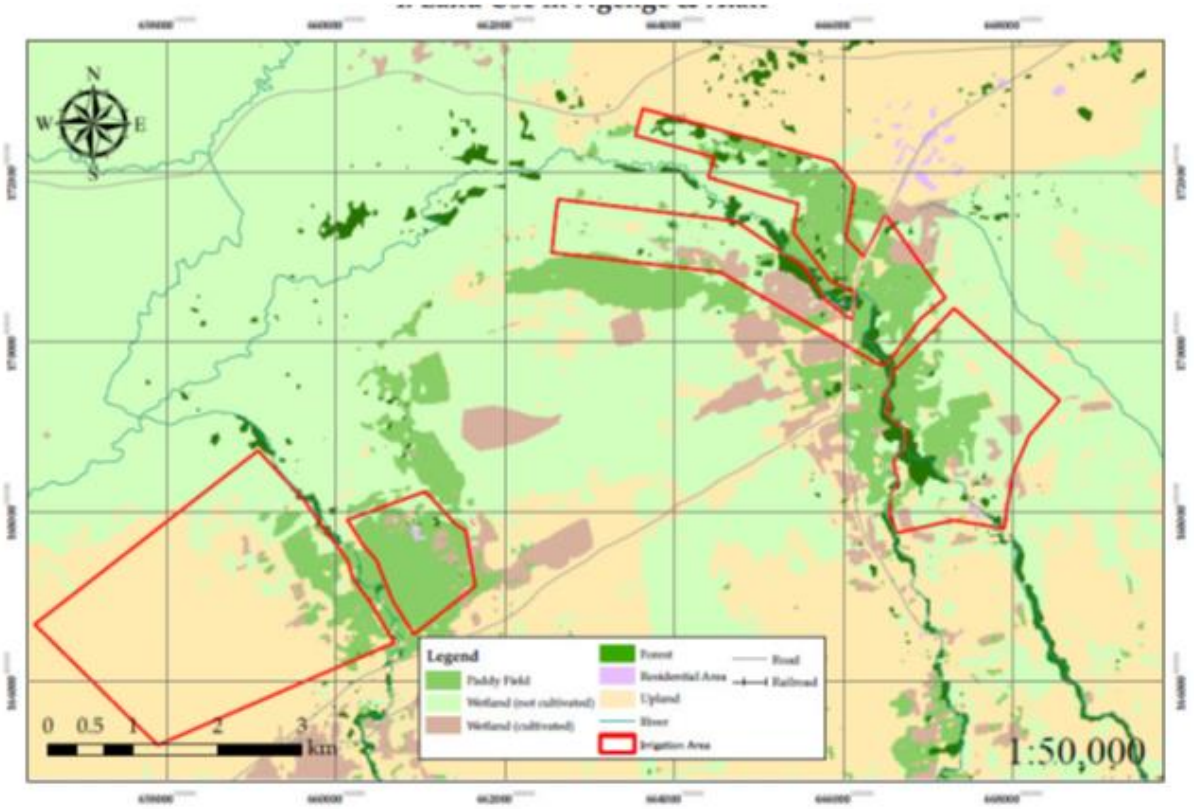


Figure 3-9; Landuse Map of the Project Area

4.0 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND MITIGATION MEASURES

This section first describes the methodology by which project-related impacts are assessed, and then presents the results of the assessment and the mitigation measures that have been developed as a result of the assessment process.

4.1 Assessment Methodology

4.1.1 Impact Screening

Mitigation of potential adverse impacts and the enhancement of beneficial impacts has been an integral part of the project. Potential impacts that will be either eliminated or reduced to an acceptable level by the application of the mitigation measures listed in table 17 and 18. This is geared towards ensuring that the significant impacts are abated.

4.1.2 Impact description

Impact description helps in the formulation of additional, project-specific mitigation measures to reduce them to acceptable levels, or to compensate for them where this is not possible.

Describing a potential impact involves an appraisal of its characteristics, together with the attributes of the receiving environment. Relevant impact characteristics may include whether the impact is:

Adverse or beneficial;

Direct or indirect

Short, medium, or long-term in duration; and permanent or temporary;

Affecting a local, regional or global scale; including trans-boundary; and

Cumulative: such an impact results from the existence of an irrigation scheme near an already existing one. A cumulative impact is “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions”.

Consideration of the above gives a sense of the relative **magnitude** of the impact. The **sensitivity** of the receiving environment is determined by specialists based on the baseline data collected during the ESIA.

4.1.3 Impact significance for planned project activities

By considering the combination of the magnitude of impact and the sensitivity of the receiving environment, the **significance** of the potential impact is derived. The determination of significance of an impact is largely subjective and primarily based on professional judgement.

To provide a relative illustration of impact significance, it is useful to assign numerical descriptors to the impact magnitude and receptor sensitivity for each potential impact. Each is assigned a numerical descriptor of 1, 2, 3, or 4, equivalent to very low, low, medium or high. The significance of impact is then indicated by the product of the two numerical descriptors, with significance being described as negligible, minor, moderate or major, as in table 17:.

Table 17: Determination of impact significance

Significance			**Sensitivity**			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude	Very low	1	1	2	3	4

			Negligible	Minor	Minor	Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

This is a qualitative method designed to provide a broad ranking of the different impacts of a project. Table 7 below gives illustrations of the types of impact that would be assigned the different grades of significance value (examples are given with respect to legislative compliance, and the biophysical and social environments; beneficial ('B') impacts are also noted).

Table 18: Illustration of impact significance

Aspect	Impact	Significance
Legislative Compliance	Expected non-compliance with national regulatory standards or AfDB Performance Standards.	>9 Major
	Potential for non-compliance with national regulatory standards or AfDB Performance Standards.	6-9 Moderate
	Expected compliance with national regulatory standards or AfDB Performance Standards, or no regulations and standards apply.	<6 Minor
Biophysical	Long-term (>10 years) and widespread changes to habitat or ecosystem features, structures or functions that reduce its integrity, affect the ability to sustain valued components and may require extensive intervention. The habitat/ecosystem may not recover to its baseline state. Major change to the visual quality, setting and feeling associated with the landscape. Widespread and permanent change to hydrology and hydrogeology	>9 Major
	Changes to a habitat or ecosystem ecological features, structures or functions that reduce its integrity, but recovery to baseline state is expected within 5-10 years. Disturbance of a sufficient portion of the bio-geographic population of a species to cause a decline in abundance, distribution or size of genetic pool such that natural recruitment would not return the population of the species, and other species dependent on it, to former levels within several generations. Major change to the visual quality, setting and feeling associated with the landscape.	6-9 Moderate

Aspect	Impact	Significance
	Fundamental change to hydrology and hydrogeology within a catchment resulting in temporal changes to the water shed.	
	Reduction in ecosystem or habitat integrity, but recovery to baseline state is expected within 2-5 years with minimal intervention. Disturbance of a bio-geographic population or individuals of a species resulting in a decline in abundance or distribution over one or more generations, but that does not change the integrity of the population of the species or populations of other dependent species. A noticeable but not fundamental change to hydrology or hydrogeology.	2-4 Minor
	Some loss of ecosystem or habitat integrity, but recovery to baseline state will occur on completion of reinstatement activities. Localised short-term disturbance of individuals of a species, but does not affect other trophic levels or the integrity of the bio-geographic population. The development will fit the key characteristics of the existing landscape. A detectable change amounting to non-material changes to the hydrology and hydrogeology.	1 Negligible
	Change resulting in positive, desirable or beneficial effects on an ecosystem such as greater likelihood of maintaining ecosystem integrity, improvement of habitat for rare and endangered species, enhanced natural biodiversity, or increased population of valued species.	B
Social	Incident causing multiple fatalities, extensive property damage, affecting the livelihoods of people over a wide area, and damage to international corporate reputation.	>9 Major
	Physical resettlement (as defined in ADB) of one or more households/businesses. Reduction in community and household assets, or access to assets, such that economic displacement (as defined in ADB) affects five or more individuals, households or businesses. Changes likely to prejudice success of an existing policy or plan. Job losses in small communities with very limited alternative opportunities in near-medium term (within one year of job losses). Change that differentially adversely affect the livelihoods or life chances (access to health care/medicines) of vulnerable groups (disabled, elderly, female-headed households and those living below officially defined poverty or subsistence levels).	

Aspect	Impact	Significance
	Damage to corporate reputation. Increased public exposure to health threats that may increase mortality rates. Unplanned in-migration flows considered sufficient to cause exceedance of the capacity of at least one component of physical or social infrastructure. Increases of cultural conflict likely not to be contained within existing social control norms. Increases in rates of serious crimes involving violence and property theft. Development traffic will travel through very sensitive sites such as several built-up areas and/or areas including schools, pedestrian crossings, clinics, markets. Additionally has the potential to add unacceptable or prolonged loadings to roads unsuitable for such traffic level increases or proposed vehicles.	6-9 Moderate
	Job losses in a community able to adapt and provide alternative job opportunities in near - medium term (within one year of job losses). Reduction in community and household assets, or access to assets, such that economic displacement (as defined in IFC PS 5) affects 1-4 individuals, households or businesses. Damage to local corporate reputation. Damage to a site of local or regional cultural importance. Short-term (<1 year) financial loss to owners of businesses where recovery is likely. Unplanned in-migration not expected to cause infrastructure capacity exceedance. Increases in incidences of cultural conflict, but expected to be contained within existing social control norms. Increases in rates of non-serious crimes. Increased public exposure to health threats that may increase morbidity rates. Decline in access to health care facilities and acquisition of treatment.	2-4 Minor
	Some owners of businesses to experience short-term financial loss. Temporary (<1 year) or intermittent changes to some aspects of the livelihoods and life chances of a limited number of individuals/households (including job opportunities, health status, income, access to education and infrastructure), but to which most individuals/households are expected to be able to adapt relatively easily. Incident causing treatable 'Lost Time Incident' injury to a member of the public with regard their work.	1 Negligible

Aspect	Impact	Significance
	Increased ability of individuals, households or communities to maintain or improve livelihoods through enhancement of the following: Financial and physical assets Quantity, quality and availability of petroleum product and vehicle maintenance services Human and social assets (skills, knowledge, community support networks) Job gains and increase in per capita income Increased local business viability	B

4.1.4 Impacts of Unplanned events

Impacts associated with unplanned events, such as vehicle accidents, fires or uncontrolled releases of hydrocarbons from underground storage tanks, are difficult to assess within the framework outlined above, because:

- The range of possible effects of a single event can be very large (i.e. the impact magnitude is almost infinitely variable); and
- The kind of unplanned event that may result in significant environmental impact is, by definition, undesirable, and the project has substantial built-in controls to avoid such occurrences. Therefore, the probability of such an event occurring should always be low, whereas the framework outlined above is designed for the assessment of impacts that are considered reasonably likely to happen.

Therefore, while consideration is given in this report to some of the project design measures designed to prevent undesirable events, the assessment of potential impacts is limited to comments regarding the relative sensitivity of the receiving environment.

4.1.5 Mitigation and residual impact significance

Following description of the potential impacts and assessment of their significance, mitigation measures designed to reduce the impact significance are outlined. The significance is then re-assessed, assuming application of the mitigation measures, to derive the 'residual' impact significance; i.e. an appraisal of the impact that is predicted to result even after mitigation has been applied.

Table 19: The impacts of the scoping matrix for potential impacts

Parameters	Components	Construction Phase		Decommissioning phase/ Operation and Maintenance	
		Positive	Negative	Positive	Negative
Air	Dust, Noise,		x		

	Air pollution				
Land	Loss of vegetation cover, Soil erosion.		x		
Water	Water course diversion, Irrigation water supply.			x	
Aesthetic environment	Visual intrusion		x	x	
Noise	Noise pollution, Traffic noise, Construction activities.		x		
Public health	Respiratory problems, Water borne diseases.		x		x
Socio-economic	Human-Livestock conflicts				x
	Community health issues-HIV/AIDS		x		x
	Agricultural development			x	
	Employment	x		x	
	Food Security			x	
	Displacement of communities		x		

4.2 Positive Impacts

4.2.1 Improved Water for Productive Uses

The development of the proposed Ngenge irrigation scheme will help all farmers at the scheme access water for agricultural production which will help them counter the problems of frequent dry periods. Canals and other piping systems will be constructed throughout the crop fields. Apart from improving agricultural production this will avail additional water that would have been wasted to downstream users and thereby reduce water stress commonly experienced by farmers at the scheme.

4.2.3 Increased Agricultural Acreage and Productivity

The construction of irrigation infrastructure and proper management of the irrigation scheme (through efficient water application and sustainable irrigation practices) is expected to yield considerable increase in the agricultural output (rice, maize, high value vegetables etc). The irrigation scheme will particularly encourage the rise of farmer groups that can support the supply of agricultural crops to the regional markets and will contribute to the overall economy of the region and country as a whole.

4.2.4 Increased Job Opportunities

The project will provide substantive employment opportunities to local populations, particularly during the construction phase of the irrigation scheme. An influx of labourers and construction workers will characterize the construction phase, which will drive the demand for basic services including housing, transport, food and healthcare. The local communities will meet these needs; local women can provide food-vending services, homes can be rented out for the new population and small enterprises will benefit from increased sales of products and/or services.

During operation of the proposed irrigation scheme, increased agricultural employment and non-farm activities is also expected to occur as a result of increased agricultural acreage. Entrepreneurial activities in supplying inputs and other support services to the production activity will generate multiplier effects on the targeted communities through increased income and creation of job opportunities especially to 50% of the targeted youth and women.

4.2.5 Environmental Protection

The proposed project will be based on a catchment approach that will not only improve the livelihood of people living in the catchment area, but also promote sustainable development of the watershed to address environmental challenges (land degradation) in the project areas. Tree planting and other watershed management activities planned as part of the project will contribute to restoration of forest cover and ecosystems, thus reducing soil erosion, water pollution, combat desertification and deforestation as well as enhance water catchment functions. These activities will mitigate climate risks and contribute to reduced vulnerability to extreme weather events and provide a more secure social environment for targeted populations.

4.2.6 Market Creation

During the construction phase, the project will create a market for building and construction materials. Once the project is operational, demand for seeds, pesticides and herbicides will increase, spurring the market development. In addition, alternative livelihood sub-component of the project would create markets for honey (apiculture) and farm raised fish production (aquaculture). The growth of markets, new businesses and economic development along the access road (Mbale-Moroto) that connects the irrigation scheme with the nearby road network will have added social benefits including access to healthcare and educational facilities.

4.2.7 Opportunity for training and skills acquisition

Successful implementation of the project activities will require dynamic and multi-disciplinary professionals including agronomists, irrigation experts, among others. Regular short and tailor made training courses and seminars will be organized to reinforce the capacity of the farmers and project stakeholders. Some of the proposed training activities will be done for the operations and maintenance of the irrigation infrastructure and farm management. This will enhance the skills of community members.

Irrespective of the above stipulate positive impacts, FIEFOC-II project will contribute to long-term environmental positive impacts in the project areas including:-

Improved land conditions due to improved land management from sustainable land management activities promoted through the project to reduce land degradation and improve soil fertility; and

Enhanced soil and water conservation measures and activities as well as improved watershed management programme whose net impact will be improved soil and water conditions.

4.3 Construction and Operation phase impacts

The following sub-sections describe the potentially significant impacts associated with the construction and operation phase of the project, together with mitigation measures and an evaluation of impact significance, both pre-and post-mitigation. A summary of the impact assessment is presented in Table 20 at the end of the section.The potential impacts in the context of the above situation are as follows.

4.3.1 Loss of Vegetation

Vegetation clearance is anticipated during the construction phase of the infrastructure development including irrigation infrastructure and access roads. The construction site will be established in areas with prevalent vegetation that are mostly characterized by dry savannah woodlands and bushy vegetation. Vegetation cover will be lost from the excavation of earth materials and cutting of indigenous trees. These activities will expose the land to elements of erosion such as wind and water and thus will trigger the process of land degradation.

Mitigation

- Make counts and a record of flora and fauna species cut or lost during operations
- Replanting of these areas after operational phase
- Cordoning off worksites to limit works on project footprint
- Grassing of all embankments

4.3.2 Soil Compaction and Erosion

The use of heavy machineries and increased traffic during the construction work within the project area is likely to lead to compaction of the soil structure which may lead to reduced soil infiltration capacities and subsequently resulting in increased run-off. The increased run-off may lead to soil erosion. Soil erosion will result in degradation of the land, loss of fertile soil, siltation and pollution of water as a result of silt accumulation. Siltation will affect hydraulic structures and will incur additional cost for silt removal on the users.

Mitigation

- Encourage appropriate tillage practices
- Management will enclose the proposed site and keep of un-necessary visitors to the site
- Management will reduce the impact of grading by engineering works which involves less excavation of the land
- The developer will make necessary arrangements to dispose of excess earth materials at an approved site following consultation with the Environment Officer
- Management will initiate storm water harvesting techniques to reduce surface run off

4.3.3 Solid Wastes

Construction activities will result in the creation of various solid wastes, including surplus earth and rock(soil debris), metal scraps, plastics (wrappings and containers).Effects of mismanaged wastes include public nuisance due to littering or smell from rotting and creation of breeding grounds for vermin like rats and roaches. Unmanaged disposal of spoil can result in sterilization of productive land and the creation of on-going erosion, sedimentation or drainage problems.

Mitigation

- Gazette areas of proper waste collection
- Waste segregation should be adopted and labelled bins provided
- Provision of adequate sanitary facilities in work areas which cater for both sexes
- Hazardous wastes should be handled by NEMA licensed waste collectors
- Workers sensitization on proper waste handling
- Provision of antipollution equipment like oil interceptors on paved forecourts before waste water is discharged into drains

Consequence of Residual Effect

Proper implementation of the above mitigations should lower the residual effect to low

4.3.4 Water Pollution

The construction phase will involve the use of construction vehicles and machinery that will require refuelling and engine repairs. Accidental spills and discharges during these activities may potentially lead to pollution of soil and water sources. Contamination of water is potentially more serious since pollutants may move fast, destroying aquatic life and rendering water unsafe for domestic and livestock use.

During the operational phase, the irrigation scheme will involve the use of fertilizers in order to improve the agricultural production. Pollution of irrigation and drainage water by residual chemicals is a potential problem, especially, residuals of persistent organic chemicals that can potentially pose debilitating effect on downstream users (human/livestock) and aquatic organisms. A high nutrient level is toxic to aquatic life and encourages rapid rates of algae growth that tends to decrease the oxygen level of the water and thus lead to the suffocation of fish and other aquatic biota; reservoirs and slow-moving water in particular have a higher risk.

Mitigation

- Observing recommended buffer zones from water resources
- Using engineering controls like containment of potentially hazardous materials
- Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures.

Consequence of Residual Effect

Proper implementation of the above mitigation measures is expected to reduce impact significance to low

4.3.5 Air Pollution

Potential impacts to air quality will occur in all phases of the project. The sources of air emissions include a) Exhaust Emissions from internal combustion engines of construction vehicles. This comprise of gases–such as carbon monoxide, methane, and oxides of nitrogen, sulphur and particulates-that can contribute to global warming, acid rain and adverse health effects when present in large quantities, and b) Dust and particulate matter generated during construction and vehicular traffic can lead to adverse health effects. These combine with other gases to cause global warming and ozone layer depletion. The dust and the fumes when inhaled could lead to adverse effects to residents, especially to young children.

Mitigation

- Developer to ensure regular servicing of vehicles and machinery
- Sprinkle with water on dry surfaces during dry seasons
- Truck movements should follow recommended speed limits

4.3.6 Impacts on Water Resources, Hydrology and Downstream Users

The proposed construction works will require diversion of water that may modify natural flow regimes and thus affect downstream water users. Poorly planned drainage channels in some areas may also lead to reduction or rise in the water table. The reduction in water table (draining out wet areas) will consequently affect other ground water beneficiaries while the raise in water table (draining to wet areas) may cause water logging in the scheme area. The proposed activities may therefore in one way or another have detrimental effects on water quality, water availability for production, aquatic life forms, water table and riverine vegetation, and may result in flooding of fields and possible water conflicts with downstream users.

Operations of irrigation scheme may change the flow regime of a river or ground water table in the irrigated fields. The consumptive nature of irrigation means reduced discharges downstream of the irrigation scheme, which may affect some beneficiaries. Poor management of the operations at the scheme may lower or raise the water table. Low irrigation efficiencies (as low as 20 to 30% in some area) is one of the main cause of rise of water table (water logging). Poor water distribution systems, poor main system management and archaic in-field irrigation practices are the main reason. This may affect the crops within the scheme especially if they are of low crop water requirement.

Mitigation

- Minimize water retention in pits
- The developer will construct a drainage system adequate to the scale of the project to prevent on-site flooding. This should be approved by the Consulting Office of the physical planner at the district to ensure conformity to building codes.
- The developer shall also temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent channel waters.
- Re-cover exposed soils with grass and other native species as soon as possible.
- Monitor areas of exposed soil during periods of heavy rainfall throughout the construction and operational period.

Consequence of Residual Effect

Following the implementation of mitigation measures, all surface run off water will be trapped at the onsite drainage system and redirected to the right channel. The potential effect will be of low significance.

4.3.7 Occupational Health and Safety

There are a number of health and safety concerns relating to rehabilitation and construction works, including injuries to workers, incidences of disease including malaria and water borne diseases.

Mitigation

- Provide adequate and appropriate PPEs
- Establish a documented site safety plan to address operational hazards, and communicate safety requirements to all persons on site through visible and legible signage.
- Establish clearance zones for lifting operations and other wireline work.
- Ensure standard construction materials and procedures are observed.
- Train workers on safety procedures

Consequence of Residual Effect

Proper implementation of the above mitigation measures is expected to reduce impact significance to low

4.3.8 Land Degradation due to poor agronomic practices

A wide range of agronomic activities associated with an increased intensity of production can contribute to reduction in soil fertility and subsequently lead to soil erodibility and land degradation. The increased use of agro-chemicals, needed to retain productivity under intensification, can introduce toxic elements present in fertilizers and pesticides. Other agronomic practices that could lead to reduction in soil fertility include mono-cropping with no fallow periods, lack of crop rotation, inadequate soil conservation measures, water logging, bush burning, inadequate use of soil amendments and lack of training and raising awareness for farmers on good practices.

Mitigation

- Adopt good agronomic practices
- Gazette areas of proper waste collection
- Waste segregation should be adopted and labelled bins provided
- Provision of adequate sanitary facilities in work areas which cater for both sexes
- Hazardous wastes should be handled by NEMA licensed waste collectors
- Workers sensitization on proper waste handling
- Provision of antipollution equipment like oil interceptors on paved forecourts before waste water is discharged into drains

Consequence of Residual Effect

Proper implementation of the above mitigations should lower the residual effect to low

4.3.9 Visual Blight

The construction of site works will generate a significant amount of solid waste including excess earth materials (sand and gravel), wooden, plastics, and steel. These will create unsightly surroundings and may constitute a health hazard for neighbouring residents.

Mitigation

- The Developer shall build a storehouse for building materials to be used at the site. The developer shall also ensure the prompt disposal of excess earth materials by contracting a competent waste management contractor. In additional, the developer will be required to;
- Provide adequate waste collection facilities
- Properly dispose waste in gazetted area
- Implement good housekeeping methods

Consequence of Residual Effect

Application of the above mitigation measures is considered sufficient to reduce the impact magnitude to 'low', resulting in low impact significance.

4.3.10 Increased Background Noise

The generation of noise during the construction phase may disturb the community members near the proposed site. Continual exposure to this noise will consequently become a nuisance to neighbouring residents. The impact is therefore assigned a low magnitude and medium receptor sensitivity due to the short lived span of construction activity and being located in a moderately populated area. Therefore,a moderate impact significance is assigned before mitigation.

Mitigation

- The developer shall limit the construction activity to day time only
- Provide PPE, such as ear plugs will be provided to workers at the site
- The developer shall limit the construction activity to day time only
- Provide PPE, such as ear plugs will be provided to workers at the site.
- Where applicable use labour intensive techniques against machine related technique which are noisy.

Consequence of Residual Effect

Proper scheduling of activities should reduce impact magnitude to 'low' hence reducing impact significance to minor.

4.4 Negative Social impacts

The following sub-sections describe the potentially significant impacts associated with the operational phase of the project, together with mitigation measures and an evaluation of impact significance, both pre-and post-mitigation. A summary of the impact assessment is presented in Table 20 at the end of the section.

4.4.1 Strain on Existing Social Infrastructure

Influx of population can strain the already existing weak resource base, health and educational facilities due to increased demand for social services such as water, health care and schools.

4.4.2 Incessant Traffic

Traffic congestion from construction and operation phases of the investments could potentially cause disruption, health and safety impacts, as well as economic impacts. The use of heavy moving construction vehicles and machineries in project sites is generally known to cause traffic; reducing movement and flow of vehicles. It is also further envisaged that with the improvement of the transportation due to expansion and construction of new access roads the traffic volumes and speeds will increase. This will likely increase the frequency and severity of accidents in the project area.

Mitigation

- Observe traffic speed limits
- Use of appropriate road signage
- Employ and train regularly traffic guides and drivers
- Coordinating delivery schedules
- Optimize lorry loads through for example use of twin deck lorries
- Development of back hauling (round trips)

4.4.3 Public Health (HIV/AIDS)

Public health could be a major concern during the implementation of the proposed project. The prevalence of HIV/AIDS, for instance, could increase due to the free-flow and high influx of people (construction workers in particular). It is expected that the enhanced trade and employment activities due to the project intervention, will result in increased interactions and subsequently lead to increased infections. In addition, the irrigation systems may create favourable habitats for water-borne diseases such as malaria, which is endemic in Uganda. The irrigation structures are likely to result in increased accumulation of water, which may have several negative impacts such as water-borne diseases (typhoid, bilhazia, etc) and also result in accidental deaths through drowning of people and livestock.

4.4.4 Human-Livestock-Wildlife Conflict

If livestock are left unattended to, they may stray into the farms and damage the crops through illegal grazing and encroachment and in search of drinking water. Crops grown on farms may attract wild animals such as monkeys which will lead to human-wildlife conflict and farmers-wildlife conflict since the site is within the jurisdiction of Mount Elgon National Park.

Mitigation

- Placement of Appropriate and readable caution signage
- Follow Traffic management plan
- Observe the waste management plan
- Contractor should identify animal crossings
- In instances where cliffs/ steep slopes are created and animals cannot cross over, the contractor should open up passages
- Wild animal habituation should be avoided

4.4.5 Grievances

Implementation of the project is bound to result in grievances which need to be immediately addressed before they can cause conflict between the contractor and the community. Grievances may arise due to unfair compensation. Grievances throughout this project will be mitigated in the following ways;

Mitigation

- Establishing a grievance redress mechanism
- Ensuring a two way flow of information between stakeholders and the contractor

Consequence of Residual Effect

Proper implementation of the above mitigation measures is expected to reduce impact significance to low

4.4.6 Impacts during the Decommissioning

The project is expected to last over 40 years and therefore decommissioning may not be anticipated to happen in the near future thereby reversing the positive impacts identified. The main negative impacts at the phase are mainly losses in the irrigation infrastructure. Other notable negative effects include;-

Loss of livelihood and the income earning capacity;

The generation of solid waste;

Noise pollution;

Dust and exhaust emissions;

Occupational hazards;

Positive impacts at decommissioning include;-

Land rehabilitation

Employment opportunities

Table 19: Summary of operational phase impacts

Summary of impacts

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Construction and Operation Phase Impacts							

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Loss of vegetation	Medium 3	Medium 3	Medium 9	• Avoid cutting down vegetation during underground piping and canal construction • Make counts and a record of flora and fauna species cut or lost during operations • Community training on catchment protection/ conservation • Replanting of these areas after operational phase • Cordoning off worksites to limit works on project footprint • Grassing of all embankments	Minor 2	Minor 2	Minor 4
Effects on Fauna through loss of Habitats	Medium 3	Medium 3	Medium 9	• Avoid processes and activities that impact negatively on both fauna and flora i.e. interfering with breeding, sheltering, watering and feeding grounds.	Minor 2	Minor 2	Minor 4
Soil compaction and erosion	Medium 3	Medium 3	Medium 9	• Encourage appropriate tillage practices • Management will enclose the proposed site and keep of un-necessary visitors to the site • Management will reduce the impact of grading by engineering works which involves less excavation of the land • The developer will make necessary arrangements to dispose of excess earth materials at an approved site following consultation with the Environment Officer • Management will initiate storm water harvesting techniques to reduce surface run off • Planting of trees along the exposed area through the help of the existing Community;	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Pollution of rivers	Medium 3	High 4	Major 12	• There should be regular education from the agriculture experts on the safe use of fertilizers and agro-chemicals in the farms; • There should be adequate solid and waste water disposal from the construction sites.	Minor 2	Minor 2	Minor 4
Solid wastes	Medium 2	Medium 3	Medium 6	• Gazette areas of proper waste collection • Waste segregation should be adopted and labelled bins provided • Provision of adequate sanitary facilities in work areas which cater for both sexes • Hazardous wastes should be handled by NEMA licensed waste collectors • Workers sensitization on proper waste handling • Provision of antipollution equipment like oil interceptors on paved forecourts before waste water is discharged into drains	Minor 2	Minor 2	Minor 4
Extraction of construction materials	Medium 2	Medium 3	Medium 6	• Establish a comprehensive rehabilitation plan for the quarries and barrow pits where materials are extracted including landscaping and repairs of the intake and the materials disposal sites.	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Water pollution	Medium 2	Medium 3	Medium 6	• Observing recommended buffer zones from water resources • Using engineering controls like containment of potentially hazardous materials • Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures.	Minor 2	Minor 2	Minor 4
Air pollution	Medium 2	Medium 3	Medium 6	• Developer to ensure regular servicing of vehicles and machinery • Sprinkle with water on dry surfaces during dry seasons • Truck movements should follow recommended speed limits • Provide dust mask to the workers; Sprinkle water during the spreading and trench land filling;	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Impacts on Water Resources, Hydrology and Downstream Users	Medium 3	High 4	Major 12	• The levels of the river should be monitored over time; • The DWRM limits given should be adhered to in reference to the amount of water abstracted. • Minimize water retention in pits • The developer will construct a drainage system adequate to the scale of the project to prevent on-site flooding. This should be approved by the Consulting Office of the physical planner at the district to ensure conformity to building codes. • The developer shall also temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent channel waters. • Re-cover exposed soils with grass and other native species as soon as possible. • Monitor areas of exposed soil during periods of heavy rainfall throughout the construction and operational period.	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Occupational Health and Safety	Medium 2	Medium 3	Medium 6	• Provide adequate and appropriate PPEs • Establish a documented site safety plan to address operational hazards, and communicate safety requirements to all persons on site through visible and legible signage. • Establish clearance zones for lifting operations and other wire line work. • Ensure standard construction materials and procedures are observed. • Train workers on safety procedures • Follow stipulated conditions within the Occupational Safety and Health Act, 2006, all scheme workers should have trainings on OHS; all workers to be covered under the Worker's Compensation Act, 2000 and ensure adequate facilities for sanitation for the workers;	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Land Degradation	Medium 3	High 4	Major 12	• Adopt good agronomic practices • Gazette areas of proper waste collection • Waste segregation should be adopted and labelled bins provided • Provision of adequate sanitary facilities in work areas which cater for both sexes • Hazardous wastes should be handled by NEMA licensed waste collectors • Workers sensitization on proper waste handling • Provision of antipollution equipment like oil interceptors on paved forecourts before waste water is discharged into drains	Minor 2	Minor 2	Minor 4
Visual Bright	Medium 2	Medium 3	Medium 6	• The Developer shall build a storehouse for building materials to be used at the site • The developer shall also ensure the prompt disposal of excess earth materials by contracting a competent waste management contractor. • Provide adequate waste collection facilities • Properly dispose waste in gazetted area • Implement good housekeeping methods	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Increased Background Noise	Medium 2	Medium 3	Medium 6	• The developer shall limit the construction activity to day time only • Provide PPE, such as ear plugs will be provided to workers at the site • The developer shall limit the construction activity to day time only • Provide PPE, such as ear plugs will be provided to workers at the site. • Where applicable use labour intensive techniques against machine related technique which are noisy.	Minor 2	Minor 2	Minor 4
Strain on Existing social Infrastructure	Medium 2	Medium 3	Medium 6	• Provide alternative social infrastructure for project workers	Minor 2	Minor 2	Minor 4
Incessant Traffic	Medium 2	Medium 3	Medium 6	• Observe traffic speed limits • Use of appropriate road signage • Employ and train regularly traffic guides and drivers • Coordinating delivery schedules • Optimize lorry loads through for example use of twin deck lorries • Development of back hauling (round trips)	Minor 2	Minor 2	Minor 4
Public Health-HIV/AIDS	Medium 3	Medium 3	Medium 9	• There should be proper and adequate passage of information to the local communities to prevent spread of the social diseases; • Provision of control measures such as condoms to prevent disease occurrences	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Human-Livestock-Wildlife Conflict	Medium 3	Medium 3	Medium 9	• Community sensitization forums; • Fencing of the farmlands; • Use of Indigenous Knowledge System at planting. • Placement of Appropriate and readable caution signage • Follow Traffic management plan • Observe the waste management plan • Contractor should identify animal crossings • In instances where cliffs/ steep slopes are created and animals cannot cross over, the contractor should open up passages • Wild animal habituation should be avoided	Minor 2	Minor 2	Minor 4
Water-Logging, Soil Salinization and sedimentation and Nutrient Leaching	Medium 3	Medium 3	Medium 9	• Project support officer should advise on the irrigation patterns and methods so as to avoid incidences of over irrigation; • There should be promotion of the use of organic manure as much as possible.	Minor 2	Minor 2	Minor 4
Water-Borne Diseases	Medium 2	Medium 3	Medium 6	• Avoid water leakage and stagnation; • Awareness creation on prevention of malaria by use of mosquito nets; • There should be regular collaboration with other community players on training and sensitization on disease and control during construction and operation phases to prevent diseases' spread.	Minor 2	Minor 2	Minor 4

Description of impact	Magnitude	Sensitivity	Significance	Mitigation measures	Magnitude	Sensitivity	Residual significance
Interference with the movements paths	Medium 2	Medium 3	Medium 6	• Bridges/Culverts should be constructed along the livestock-human corridors; the excavation along the animals/human pathways should be done last before completion of the project so as to prevent potential for human-livestock conflicts.	Minor 2	Minor 2	Minor 4
Pests and Crop Diseases	Medium 2	Medium 3	Medium 6	• There should be adequate involvement of the district Agricultural officer in the prevention and mitigation of the various prevalent diseases; • Proper guidance to farmers on the appropriate agro-chemicals to use.	Minor 2	Minor 2	Minor 4
Grievances	Medium 3	Medium 3	Medium 9	• Establishing a grievance redress mechanism • Ensuring a two way flow of information between stakeholders and the contractor	Minor 2	Minor 2	Minor 4
Loss of livelihood and the income earning capacity	Medium 2	Medium 3	Medium 6	• There should be adoption of economic earning activities to promote food security; • The contractor should assist in the redeployment of workers to other sites.	Minor 2	Minor 2	Minor 4
Decommissioning Impacts	Medium 2	Medium 3	Medium 6	• Restoration	Minor 2	Minor 2	Minor 4

5.0 ALTERNATIVES

The EIA study should seek to consider possible alternatives of the inputs and outputs that are to be used throughout the project cycle. These inputs include alternative sites, activities, products, materials, technology and waste management procedures among others. The project report seeks to give a detailed description of the project area, technology, resources and other inputs that are to be put in place so as to promote the best working models that could be adopted to prevent injurious activities to the supporting resources.

This study has therefore sought to identify and assess alternatives to the proposed developments so as to have the best working models that may not have adverse effects or those that have the least minimal effects. The best alternative is to be selected based on minimal negative impacts and through a cost benefit analysis.

The "No Project" alternative model helps the proponent and various decision making levels to approximate the impacts of project implementation against the non-implementation thereby making the right decision regarding project implementation. The following alternatives are probable in the project area.

5.1 NO PROJECT ALTERNATIVE

This model helps the proponent measure impacts from the project baseline information and helps in the assessment of impacts in regard to the project's activities. This alternative implies the project does not proceed thereby enhancing the status quo.

The status of the environmental resources neither improves nor worsens since the state of the resources is not interfered with at all. However, project implementation could improve food security, increase household incomes and help to provide employment as well as upgrading the regional economy. The 'No Alternative' has various negative and possibly long term impacts to the region which include;-

The local population will continue to suffer from food scarcity due to lack of adequate harvests pushed by insufficient water for agricultural use;

There is projected to be reduced productivity and poverty.

The effects of adopting this model largely shows there will be huge losses to the local residents and the district at large since the areas especially around Ngenge provide the local markets and other nearby towns with much needed fruits and vegetables. The economic level of the project area is low and need to be improved so as to promote the fiscal outputs of the area. The 'No Project Alternative' is the least preferred option since the costs far much outweigh the benefits to be accrued.

5.2 ALTERNATIVE IRRIGATION METHODS

There are several irrigation methods that can be used in the project area. There is an apparent need to choose the most appropriate method that will promote the effectiveness in the waterconservation measures. There was a consideration of various methods that would be used in the areas so as to ensure water conservation measures are promoted. Some of the methods include:-

5.2.1 Sprinkler Irrigation

There are limiting factors to implementing this kind of method. Firstly, the amount of water required would be limiting due to water wastage. The capital investment to this method would be prohibitive to the projects' implementation thereby making the initial costs high. The method is rather prohibitive in terms of costs and capital investments. In addition, some of the project areas have sticky soils with low infiltration rates and therefore are unsuitable for this irrigation method.

5.2.2 Surface irrigation

In this method, water flows to the land by gravity, the irrigation water must be available at higher grounds/ levels than the recommended fields. Water is diverted from the main source by the head works and supplied to the field through a network of conveyance and distribution canals or pipes. Water can be supplied directly to the fields using canals or

indirectly from a storage reservoir. Storing water in a reservoir or dam allows for more area to be covered but it is more expensive due to the high construction cost of the reservoir. This method is rather convenient to the project area since the water intakes can be seen to be of higher gravity to the areas water is needed.

5.2.3 Flood irrigation

This is a form of gravity irrigation from a river without the need for an intake structure to divert the water. Seasonal rains raise the streams and rivers courses and the flow waters can be used by the farmers to irrigate their fields. Channels can be constructed to maintain the water in the fields for as long as possible, and as the flood recede the residual moisture, is used by the crop. Once the floods and residual moisture have been exhausted the farmer can make use of the shallow water table and construct shallow wells to lift the water by bucket for watering/ irrigating the crops. However, the method could be prohibitive since it requires a significant amount of water to sustain crops thereby making it rather impracticable in these drought prone areas.

5.2.4 Drip irrigation

This kind of method is largely sustainable though prohibitive in terms of capital investments and especially when the project is large and diverse. The method saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant thereby avoiding all potential water losses. This method is very sustainable and water conserving though the capital investment and the distance becoming rather prohibitive. The main advantages are that Water application efficiency is high thereby heavily reducing water losses and that soil erosion is minimized. However, the disadvantages that may hinder its implementation include:-

It is highly expensive; the initial cost can be more than overhead systems;

Harsh weather conditions e.g. the sun can affect the tubes used for drip irrigation, shortening their usable life.

If the water is not properly filtered and the equipment not properly maintained, it can result to clogging;

Drip irrigation might be unsatisfactory if herbicides or top dressed fertilizers need sprinkler irrigation for activation thereby making them less effective.

From the above analysis, it is apparent that the drip irrigation is the most effective method when it comes to saving water. However, with the initial project costs that are estimated, it may become largely prohibitive thereby making the best alternative to be surface irrigation.

5.3 Alternative Location

This project can be considered to be more or less site specific. From the initial feasibility study report for the intake of the proposed canals, the intake sites are appropriate as they are located on slightly higher levels from the land to be irrigated. Some of the factors that influenced the choice of the locations include the agro-climatic conditions of the area, the soils, water availability and the drainage system in the areas.

5.4 The Comparison of Alternatives

Under the proposed development alternative, the project would enhance expansion of irrigation infrastructure and would provide employment both directly and indirectly to the population of Ngenge sub-county in all phases. Once implemented, this project will not only ensure food sufficiency in the project area but to the whole region and also increase on the district revenue from the sale of surplus harvest. The design has been chosen after a careful cost benefit analysis and in regard with the available budget and targeted irrigation area. It has also been made practical and aesthetically pleasing hence will improve the general outlook in the area. Under the No Action alternative, there would be no development at all, no impacts on the environment and serious losses to the project proponent being the farmers.

6.0 PUBLIC DISCLOSURE AND STAKEHOLDER CONSULTATION

This section presents a summary of the views and concerns expressed by project stakeholders during the public disclosure and stakeholder consultation process undertaken as part of the ESIA. It includes responses in terms of how and where the comments have been addressed in this ESIS.

The National Environment Act, Cap 153, the EIA Regulations 1998, the conduct of Environment Practitioners Regulations, 2001, and the Guidelines for the EIA in Uganda all emphasize public participation in the EIA process. Consequently, several stakeholders and the community neighbouring the site were met and consulted. The consultations were aimed at getting views of stakeholders and the community on a number of issues such as health, safety, economic and others, in regard to the proposed irrigation scheme. Plates below illustrate consultations on-going with some members of the community within the jurisdiction of the proposed project site. The majority of the residents and other relevant stakeholders in the area acknowledged the fact that improved agriculture was necessary for the development of their area given the fact that there is presence of large chunk of land to boot crop growing.

6.1 Objective of stakeholder consultations

The objectives of stakeholder consultations include the following:-

1) To disclose the proposed development to the community surrounding it;
2) To provide sufficient information to all stakeholders and interested parties that will help them to participate in the whole process of the project;
3) To obtain views from stakeholders on anticipated benefits, fears, opportunities and any other concerns of the community as well suggestions on how best to mitigate their fears in regard to the project;
4) Putting stakeholders concerns into consideration during project implementation.

6.2 Stakeholder Identification

Various stakeholders were incorporated into the consultation processes. A stakeholder identification and involvement based on various needs, interest and potential influence to the project was used. The stakeholders used were:-

Primary stakeholders i.e. the direct project beneficiaries of the development project (Community);

Secondary stakeholders i.e. those indirectly affected by the project but influence development. They include the responsible agency; MWE and the district administration.

6.3 Issues arising from the consultative meeting

The meeting provided opportunities to get first-hand information on issues of concern by the community including local environmental management approaches and some of the traditional conflict resolution mechanisms. The issues that emerged from the community sensitization meetings are both positive and negative as listed below:-

6.3.1 Negative

The potential for chemical pollutants getting into the aquatic resources as the agricultural activities intensifies;

Interruption of livestock movement and people to access the river during excavation and construction phase. This should be addressed in the due course the construction to facilitate human and livestock access to water during and after canal excavation. The culvert bridges should be put up in such a way that every livestock corridor has a crossing;

Deforestation through vegetation clearance and establishment of more agricultural land and the expansion of the current land sizes. This would be addressed through reforestation programs as is ongoing in Ngenge and the protection of indigenous plant species through sparing of indigenous trees during the clearing process;

Increased dust during the excavation and site clearance; the contractor should ensure there is fast completion of the project so as to ensure a reduction in exposure period for people and livestock;

Noise emission from the machineries in use at the construction phase;

Increase of mosquito prevalence and therefore increased incidence of malaria and other water-borne diseases due to increased breeding sites, this would be addressed through educating the community on preventive and control measures such as spraying and use of treated nets and boiling of drinking water and avoiding stagnant water. It would be important to improve the existing health facility in the project area and also to ensure the availability of medicines closer to the population or in worst case scenario establish more health facilities;

Inadequate water for target users at the downstream, the project maintenance should ensure minimal siltation to have a regular water flow to all the locations;

There was also concern over the reduction of water levels from the main river as a result of abstraction to serve the irrigation project.

6.3.2 Positive concerns

The proponents cited various positive for their support to the project, key among them:-

Food security

Due to the availability of water, the rate of agricultural production is meant to increase thereby availing more food to the residents.

Job creation

There is meant to be increased employment opportunities to the local communities in the project activities and when the project is complete. This has the ripple effect of increasing the income potential to the residents and the resultant uplifting of the welfare of the local residents.

Improved crop varieties

There is projected to be an increased variety of crops grown thereby increasing the yields to the local farmers.

Constant water supply

The community anticipates that there is going to be a regular supply of water even during the dry season thereby ensuring a constant supply of food and water. This goes a long way in ensuring effects of famine are tackled adequately.

Figure 6-1: Consultation with some of the community members at the scheme

Table 6-1: Stakeholders consulted and their remarks

Stakeholder		Remarks	Recommended actions
National Level	**Ministry of Water and Environment** (Wetlands Management Department) **Principle Wetlands officer** Barugahare Vincent 0774434969	✓ Integrated water management strategy should be considered key during project implementation. (Water catchment protection); ✓ The role of community development officers should be clearly streamlined; ✓ District political and technical officials should work hand in hand for the common goal of developing the scheme; ✓ There should be equity in accessing the scheme resources; ✓ Water reservoirs should be thought of in the designs; ✓ Boundaries on the ecological resources should be clear in order to avoid encroachment.	✓ Water users associations shall be formed to effectively manage the water catchment areas; ✓ The role of selected community development officers shall be clearly explained to the beneficiaries; ✓ Since the project is looking forward to enhancing farmers income, no politics should be brought on board during implementation; ✓ The dam shall be constructed to store water during dry spells; ✓ Specific tree species shall be planted in the boundaries of the river to avoid encroachment on the river banks.
	Ministry of Agriculture Animal Industries and Fisheries (Department of Agriculture Mechanisation and Water for Production) **Benon Lwanga-**Senior Engineer 0772892580	✓ Land levelling to guarantee a good slope to effect irrigation exercise; ✓ Water from the scheme should be well managed through provision of proper drainage system; ✓ Issues of fertilizer and pesticide application should be well dealt with through liaison with district agriculture officer and other technical staff at the scheme; ✓ Nutrient loads should be controlled in the scheme before joining the main water sources; ✓ High value crops should be considered in relation to the costs incurred during water pumping; ✓ Crops grown should target market not for	✓ During construction land levelling shall be conducted to effect water flow in the scheme; ✓ Proper drainage shall be included in the designing process; ✓ The implementing authority shall station a well trained agronomist to guide famers' on proper fertilizer and pesticide application; ✓ Crops that provide quick returns shall be thought of during operation phase.

District Level		home consumption.	
	District Natural Resources/Environment officer Chemusto Samuel arapgiogisam@gmail.com 0772459166	✓ Buffer zones need to be created to avoid encroachment; ✓ Formation of watershed management committees amongst the communities; ✓ Liaison with Uganda Wildlife Authority in Mount Elgon to effectively manage water catchment areas since most rivers prominently used to irrigate crops in Ngenge irrigation scheme are from Mt Elgon; ✓ Climate smart agriculture should be practiced at the scheme; ✓ Fruit trees such as mangoes, oranges, jack fruit etc should be considered key when planting trees within the boundaries of the scheme; ✓ Alternative sources of livelihood should be thought of other than crop production alone; ✓ Sanitation and hygiene is key at the scheme; ✓ Monthly water monitoring should be conducted by the implementing authorities.	✓ A recommended distance from the river banks to the cultivation fields shall be maintained to avoid encroachment; ✓ Various species of trees as recommended by the district forest officer shall be planted as a way of managing the watershed; ✓ Over use of fertilizers and pesticides shall be discarded through adopting other mechanisms of boosting soil fertility and pest control; ✓ Fruits trees shall be apriority when planting trees; ✓ Alternative sources of income such as aquaculture, horticulture shall be thought of during project implementation; ✓ Sanitary facilities such as toilets and safe water shall be put in place; ✓ Monthly water sampling shall be carried out to check on the level of river pollution.
	District Water officer Anguria Albert alkguria@yahoo.com 0772646460	✓ The consultant carrying out the design of the scheme should work hand in hand with the district water engineer; ✓ The proposed dam to be constructed should cater for the number of blocks/plots within the scheme during the dry spell; ✓ Thorough research/studies should be undertaken on the rivers proposed to supply water to the scheme to determine the flow in both the dry and wet seasons. This will help in determining the volumes of	Before any implementation, the design shall be shared amongst the respective engineers to iron out the gaps; Thorough consultations shall be done to determine the number of plots/blocks to be created at the scheme. This shall help in determining the capacity of the dam to be constructed; Studies are underway to clearly understand the flow of the respective rivers;

		water to be abstracted in both dry and wet seasons; ✓ The carrying capacity of the scheme should be effectively managed. This will deter further conflicts over water use; ✓ Compensation issues should be looked into before construction begins; ✓ By-laws should be set up in the management of the watershed.	The Resettlement Action Plan (RAP) report shall clearly articulate all issues related to compensation.
Sub-county level	**District Agriculture officer** Kapting Irene irenechenaonges@gmail.com 0777256134	✓ The implementing authority should boost rice growing; ✓ Canals to be constructed should be of recommended size to ease the flow of water in the scheme; Routine de-silting of the canals should be conducted by farmers' through the guidance of the water engineer at the scheme; ✓ Water reservoirs should be constructed; ✓ Value addition of harvests should be conducted at the scheme through construction of stores, processing facilities and among others; ✓ Farmers' unions should be formed to effectively manage all the activities at the scheme.	✓ Rice growing shall be boosted since it is the main crop grown at the scheme; ✓ The canals to be constructed shall be of a recommended size by the designing consultant; ✓ De-silting shall be conducted to avoid flooding within the scheme; ✓ A dam shall be constructed as well illustrated in the design; ✓ Different infrastructures shall be constructed for instance granaries, processing facility etc; ✓ Cooperative unions shall be formed and the majority members shall be farmers.
	District Fisheries officer Chemutai Patrick O755577213	✓ Rice growing should be practiced with aquaculture; ✓ Farmers water should be separated from that of the cattle keepers; ✓ Fertilizer use should be under the supervision of a well trained agronomist at the scheme.	✓ The District Fisheries Officer shall spearhead this good practice; ✓ Valley dams for the cattle keepers shall be constructed to avoid future conflicts which might arise as a result of water usage; ✓ The implementing authority shall establish a position for a well trained agrarian at the scheme.
	Parish Chief-Ngenge	✓ We appreciate modern way of farming in our area;	✓ The project shall focussing on implementing betters farming methods at the scheme;

	Songok Daniel 0788273935	✓ Increased output in crop production is projected; ✓ Employment opportunities to the youth during construction; ✓ The project should be extended to other parishes; ✓ There should be a good working relationship between the contractors and the community.	✓ Various jobs shall be created in all phases of scheme development; ✓ A good working relationship shall be created between the contractors and the community.
Local Community		✓ Employment should be given to the local youth; ✓ Electrification in the area since it has been left behind; ✓ The government should not take out land after modernising the scheme; ✓ Improved market for the produced crops at the scheme; ✓ Skill development in agriculture.	✓ All casual labour force shall be sourced from the local community within the jurisdiction of the scheme; ✓ Government intension is to improve farmers' well being for that matter therefore, markets for the produce shall be created hence better standards of living; ✓ The government shall maintain its goal of enhancing farmers' income not taking away farmers land.

7.0 ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN

The proposed Ngenge Irrigation Scheme will operate in accordance with existing safety standards for the management of an irrigation scheme. As such it is important to provide a monitoring and management plan to facilitate the monitoring and improvement of environmental performance. Monitoring will begin during the construction phase and must continue throughout all the phases of project cycle (cradle to grave). This will include regular reviews of the impacts that can't be adequately assessed before the beginning of the project, or which arise unexpectedly. In such cases, appropriate new actions to mitigate any adverse effects must be identified. The developer will maintain inspection and auditing records, while ensuring that incident reporting and emergency response procedures are established and enforced.

Table 20: ENVIRONMENTAL MONITORING AND MANAGEMENT MATRIX

Anticipated Impact	Mitigation measures	Responsible party	Phase	Indicators	Cost
Compliance with National environmental land and all applicable AfDB Environment and Social Safeguards Policies	Identify and assess the environmental and social impacts and risks including those related to gender, climate change and vulnerability; Address all land acquisition, involuntary resettlement and compensation; Identify and address all pollution, biodiversity and occupational health and safety issues.	MWE, Consultants (NEMA)	Pre-construction	ESIA and ESMP prepared for each irrigation scheme; Resettlement screening and appropriate safeguards document developed and implemented.	Part of BOQ
Environment and Social Safeguards Training	Safeguards training including AfDB operational safeguards for all district officers and MWE Project Implementing Unit (PIU).	MWE, DLG (NEMA)	Pre-construction	Project staff and district officers trained	Part of BOQ
Community mobilization and consultation	Prepare and implement a stakeholder engagement plan, inform all communities affected by the project implementation schedule and their right to compensation if any	MWE, DLG	Pre-construction	No of farmers/community groups engaged/sensitized	
Land Use, Acquisition, and Resettlements	Irrigation scheme will be located on community land and they are the direct beneficiaries of the proposed irrigation scheme.	Contractor (MWE and Kween District)	Once before commencement of any activity		Part of BOQ
Loss of Flora	Ensure clearing is undertaken with minimal disturbance to the surrounding environment within the approved work sites; Avoid cutting indigenous trees and vegetation within the survey area/ path of the water conveyance; Avoid excessive bush clearing; where possible adopt re-vegetation around the water intakes;	Contractor (MWE) and District Environmental Officer)	During Construction	Area re-vegetated or restored; Conservation of at least 50% of indigenous trees.	Part of BOQ

	Minimize number of indigenous trees cut; A forestation and reforestation programs in certain parts of farmlands; Preserve certain sections for grazing purposes.				
Air and Dust	✓ Provide dust masks to workers; ✓ Sprinkle water on the soil during excavation and land filling; ✓ Control speed of working machinery	Contractor (MWE and District Environmental Officer)	During construction	Number of Masks availed to workers; Litres of water and times sprinkled.	Part of BOQ
Noise	Abate noise by sensitizing drivers in the project; Use manual labour as much as possible; Restriction of activities to daytime; Workers within the vicinity of high level noise to be provided with adequate PPE; No idling of vehicles and machinery if not in use, they should be switched off; Control speed and noise of construction machinery; Insulate noisy machines and activities during construction to minimize noise impact to neighbouring communities; Unnecessary hooting is to be avoided as much as possible.	Contractor (MWE and District Environmental Officer)	During construction	Number of Cases handled	Part of BOQ
Conflicts due to differences in social, cultural norms/values	Sensitization of workers on respect for cultural norms and values; Develop grievance mechanisms to handle	Contractor (MWE and District Physical Planner)	Construction	Number of workers sensitized	Part of BOQ

	related grievances.				
Occupational Health and Safety	Develop, implement and disseminate occupational health and safety guidelines; Employ qualified fist aider and safety officer; First aid kits to be available on site for use by the workers; Provide Personal Protective Equipment (PPE) to employees; Sensitize community about ongoing works through notice boards, reflective liners and detour.	Contractor (MWE District Environmental Officer)	Construction	OHS guideline in place (% of contractor staff aware of OHS measures and trained; Documented qualifications of first aider and safety officer; PPE usage; Informed public and employees; Gender and HIV/AIDs mainstreamed	
Employment	Both skilled and non-skilled labour as much as possible to be accessed locally; Equal opportunities to gender and youth; Engage local stakeholders in such issues.	Contractor; Local community	Construction phase	Number of local communities' employed and/or procured as part of project interventions.	
Social diseases (HIV/AIDs)	✓ Implement awareness creation of eminent social evils such as HIV/AIDS and other STDs; ✓ Organizing community sensitization drives on the prevention and management of the HIV/AIDS ✓ Liaising with the local NGOs and CBOs for the training and education on the right prevention mechanisms; ✓ Contraceptives should be provided at acceptable locations.	Community liaison officer; DLG.	Construction Phase	HIV/AIDS is included in regular Health, Safety and Environment awareness	Part of BOQ
Irrigation related	✓ There should be adequate health facilities that	District Health	The entire	Number of patients	

diseases	are provided; ✓ There should regular spraying of homes to control the presence of mosquitoes; ✓ Mosquito nets should be adequately supplied and at subsidized prices; ✓ The ground water abstracted for domestic use should be boiled or be treated; ✓ Stagnating water should be regularly dried so as to prevent potential breeding grounds for mosquitoes; ✓ Adequate information should be disseminated regularly on the need to treat drinking water	Inspector; PSO.	project cycles	admitted;	
Possibility of increased conflicts	Avail drinking points for the livestock along the canal or build the water pans along the canal; Fencing off the farms to prevent animals entry into the farms; Regular communal discussions and dialogue should be facilitated between to bring about mutual agreements between various land users; Other modes of grazing could be encouraged such as zero grazing as it is less pasture demanding Fodder production can be done on irrigated land to reduce the pressure on the pastoral land; Ensure that reasonable percentage of River water is allowed to flow downstream.	Kween District administration	Operation and maintenance	Peace/ Conflicts	
Population pressure	✓ Monitor the trend in migration to the area during the project implementation and increase the requisite facilities; ✓ Develop an efficient water and sewer system in	District Physical planner	The entire project cycle	Population increase patterns	

	the project areas in conjunction with the area districts' water offices				
Degradation of land due to poor agronomic practices	✓ Sensitize farmers on adoption of improved irrigation/agriculture technologies; ✓ Promote soil conservation practices and labour saving technologies.	DLG (MWE District Environmental Officers, Local Leaders)	Operation phase	Number of farmers trained in improved agronomic practices; Soil conservation practices implemented.	
Improved water for productive uses	This positive impact will be enhanced by developing water user associations and raising awareness on water conservation and efficiency	DLG (MWE District Environmental Officers, Local Leaders)	The entire project cycle	Water User Association developed; Training on water conservation and water use efficiency	
Soil Erosion	There should be erosion control measures on areas prone to erosion; The topsoil should not be used during the construction phase; There should be intensive re-vegetation on bare grounds after construction.	MWE and District Environmental Officer, Local Leader, Farmer Groups	During and after the construction	Reduced Soil degradation	Part of BOQ
Soil compaction	✓ The excavation works should be backfilled and compacted; ✓ The quarries and barrow pits should be rehabilitated after activities	Contractor	Construction	Reduced erosion Reduced suspended dust	Part of BOQ
Siltation and Farm flooding	✓ Ensure proper design and layout of field to avoid canals on the steep gradients; ✓ Ensure there is appropriate terracing where possible; ✓ Ensure water application does not exceed soil	PIU DAO	Construction	Reduced siltation	Part of BOQ

	intake rate, over irrigation ✓ Construction of water pans along the conveyance route.				
Salinization/ Leaching	✓ Avoid water logged conditions, where possible; ✓ Add humus and organic manure to the soils regularly.	Contractor; Farmers.	Construction and operation	Prevalent soil fertility rates	
Water borne diseases	Awareness creation to the local community; Adequate provision of mosquito nets; Better equipped health centers closer to the people with trained personnel; Boiling and treatment of drinking water if collected from water pools; ✓ Regular surveillance to ensure water does not stagnate	DLG PIU	Construction and operation	Number of Patients cases to health Centres	
Waste water and effluents	✓ The minimization of waste water must be the principle governing project activities; ✓ All grey water run-off or discharges should be contained and properly channelled away from water sources; ✓ Water containing cement, lime or concrete should not be discharged on site; ✓ Wash areas should be placed in areas where there is no infiltration of waste water into the groundwater resources; ✓ Pollution incidences on site should be acted upon speedily.	Contractor; DEO	During Construction	Waste effluent incidences	Part of BOQ
Impact on Downstream Water Users and River	✓ Sensitive farmers on land and water rights;	MWE District Environmental	Operation	Number of farmers sensitized;	Part of the BOQ

reservoir	✓ Establish and strengthen Water User Associations; ✓ Installation of control and water metering, and establishment of payment mechanism for water served ✓ Water scheduling protocol based on irrigation policy	Officer, Local Leaders, Farmer Groups, WUAs		Number of WUAs established and strengthened; Water metering system in place Functional water scheduling protocol.	
Frequent breakdown of infrastructure	Training of farmers on maintenance and operation of irrigation structures; Provision of equipment, tools and manuals; Provision of incentives to maintain infrastructures e.g. access to silt from traps, seeds	DLG (MWE District Environmental Officer, Local Leaders, Farmer Groups, WUA)	Operation	Percentage Farmers trained; Training manuals for irrigation management, O&M, equipment and tools maintenance. Presence of designated sand mining areas	Part of the BOQ

Summary of the potential environmental components

Environmental component	Parameters	Frequency	Applicable regulation and standards	Monitoring Indicator	Overseer	Estimated Cost
Air quality	Total suspended particles	Daily during construction	NEMA guidelines	Suspended particulates	Contractor; PSO; DEO	Part of BOQ
Noise Levels	Noise levels on the dB (A)	As directed by contractor	NEMA guidelines on noise levels	Stress levels	Contractor NEMA officials	
Soil quality	Soil pH					Part of BOQ

	Soil erosion levels Exchangeable sodium percentage sodium adsorption level, P,K and Ca status					
Groundwater quality	pH, Salinity, Nitrates, Pesticides residues	Monthly especially after the rain seasons	DWRD guidelines	Water tests results	MWE PSO	Part of BOQ
Groundwater levels	Groundwater depth	Monthly During the dry season	DWRD guidelines	Water availability in wells	PSO MWE	Part of BOQ
Surface water quality	pH, Salinity, Nitrates, Phosphorous, Pesticides residues, Coliforms, BOD, COD	Monthly	DWRD guidelines	Surface Water quality	MWE PSO	Part of BOQ
Soil erosion	Turbidity	During and after the rainy seasons	NEMA guidelines	Water colour	DAO Farmer	Part of BOQ
Solid wastes	Slag, domestic	Quarterly per	NEMA guidelines	Waste disposal	Contractor,	

	wastes, metallic scraps, sludge	year		sites	DEO	
Vegetation and habitats	Vegetation structure, biodiversity, fuel wood	Twice/annum	ESMP	Project areas	DEO	
Accidents	Safety training for workers, accident and incidents reports,	Till completion of construction	ESMP	Project areas	Contractor	Part of BOQ
Health	Signage, information, health awareness	Regularly till completion	ESMP	Project' area	Contactor	Part of BOQ

8.0 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

The study has been conducted to equip Ministry of Water and Environment with relevant and sufficient information about the proposed irrigation project in Ngenge irrigation scheme. It is hoped that MWE would use this information to evaluate whether the proposed project is likely to have significant environmental impacts. It is anticipated that the proposed development project would bring substantial economic benefits not only to the local communities within the project area, but to the entire nation as a whole.

The negative environmental impact on the implementation of this project is minimal and could be addressed by implementing the mitigation measures to ensure that they pose no threat to the environment and communities. These measures are part of the projects' component and will bring no added cost in the implementation process. The benefits of implementing the project are enormous and will address persistent problems of irrigation water shortage that has affected the communities for a long time.

8.2 Recommendations

It is important that during the implementation, relevant line authorities should be actively involved to address some of the cross cutting issues such as Health and sanitation, integrated watershed management amongst stakeholders. This will ensure that emerging issues are tackled as they come. Water borne diseases that may occur include malaria, bilharzias and typhoid as the canals may act as breeding sites for mosquitoes and other bacteria causing vectors. Therefore, there is need for creation of awareness to the public on prevention and control of the diseases and expansion and equipping of existing health facility to better cope with any outbreaks. If the project implementation is managed well then there will be no need for additional health facilities. However, any investment in healthcare is always welcomed in the community now and in the future. More so, Water Users Associations (WUAs) need to be created for effect usage of water amongst all farmers' at the scheme.

In summary the potential negative impacts of the project are low and easy to mitigate, therefore they should not prevent the project from proceeding. Moreover the project has a strong environmental component the river protection and conservation thereof since it is the source of the irrigation water. The positive impacts and the benefits to the communities are immense and highly beneficial.

It is recommended, the project proceed as planned with the mitigation measures integrated in its implementation. It is however prudential that the project be implemented in compliance with all the relevant legislations as proposed at all phases of the project implementation. The contractor and the proponent should take into consideration all the legislative measures put in place so as to ensure the due process is followed.

The mitigation measures provided under the ESMP need to be followed so as to address the environmental issues that may arise in the course of the implementation, so as to ensure there is safety both to the project workers (experts) and the benefiting communities. There is need to have all the safety measures put in place so as to promote the well-being of the workers especially at the construction phase and entire community most especially farmers at the operation phase.

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Uganda Population and housing census (2014) UBOS;

APPENDICES

Appendix 1: NEMA approved Tors

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

RECEIVED 10 SEP 2015 PERMANENT SECRETARY MIN. OF WATER & ENVIRONMENT

NEMA House
Plot 17,19 & 21, Jinja Road,
P.O.Box 22255, Kampala, UGANDA.
Tel: 256-414- 251064, 251065, 251066
342758, 342759, 342717
Fax: 256-414-257521 / 232686
E-mail: info@nemaug.org
Website: www.nemaug.org

NEMA/4.5

3rd September, 2015

The Permanent Secretary,
Ministry of Water and Environment,
KAMPALA.
Tel: +256 (0)414 505945 / 221198

PERMANENT SECRETARY MINISTRY OF WATER & ENVIRONMENT 10 SEP 2015 P. O. BOX 20026, KAMPALA - UGANDA

RE: REVIEW OF TERMS OF REFERENCE PERTAINING TO THE PROPOSED REHABILITATION/RECONSTRUCTION OF FIVE SELECTED IRRIGATION SCHEMES, UNDER THE FARM INCOME ENHANCEMENT AND FOREST CONSERVATION PROJECT – PHASE-II

This is in reference to the Terms of Reference (TOR) for carrying out an environmental and social impact assessments (ESIAs) for proposed rehabilitation/reconstruction of **five selected irrigation schemes,** which you submitted to this Authority for review and consideration for approval. This Authority has finalised the review and grants formal **APPROVAL** of the said TOR, relating to the project sites listed in the table below.

Irrigation Scheme	Project / Location	District
1. Doho-II	Doho Parish, Nazimasa Sub-county, Bunyole East County.	Butaleja
2. Mubuku-II	Sebwe Parish, Nyamwamba Division, Kasese Municipal Council	Kasese
3. Wadelai	Regem and Pakwinyo Parishes, Wadelai Sub-county, Jonam County	Nebbi
4. Ngenge	Kapkwat, Sikwo, Sosho and Cheptarre Parishes, Ngenge Sub-county, Kween County.	Kween
5. Tochi	Abanya Parish, Acaba, Oyam Sub-county, Oyam County.	Oyam

In addition, you are advised to consider the key aspects outlined below, during the conduct of the ESIAs and preparation of the ESIA reports.

(i) Note that the ESIA reports for the five proposed project areas **should be submitted separately for review.**

(ii) Carry out comprehensive stakeholder consultations involving, among others, the respective District Local Government Authorities, the concerned local communities in the targeted project areas that will accommodate the projects, and other Authorities responsible for provision and management of public utilities *(road network, among others),* respectively; and, ensure that the concerns/views of the stakeholders **are well-documented and appended to the ESIA reports.**

1 of 2

(iii) Provide **correct citation of details of the location of the project areas** that will accommodate the project components / infrastructure, preferably in tabulated format – *by names of **villages**, zones, wards, parishes, sub-counties, division, county – whichever is applicable.*

(iv) Present the narratives on **any identified project-affected communities/entities** and the related compensation aspects, land-take aspects, shared resources, respectively, in a comprehensive manner.

(v) Provide comprehensive **baseline information/data** relating to the project areas and their environs, public utilities, regulated and sensitive/fragile areas, settlements, **water source** (supplying water for irrigation); and, **a set of coloured photographs** showing the current state of some of the critical sections of the targeted project area, respectively.

(vi) Include in the ESIA reports **coloured location/google maps** *(preferably covering A-4 or A-3 paper size)* that are clear, well-labelled and legible and showing the alignment of the project infrastructure, as well as sets of **GPS coordinates.**

(vii) Provide comprehensive narratives on all the **proposed project components, activities,** and the size of the workforce.

(viii) Include in the ESIA reports comprehensive **analyses of alternatives** in terms of project design, type of technologies, among other aspects.

(ix) Provide **detailed evaluation of the identified potential environmental impacts, residual impacts and risks** associated with the project components and activities.

(x) Ensure that **comprehensive mitigation and environmental management and monitoring plans** are well presented, respectively, that relate to the identified potential environmental impacts.

(xi) Consider any other critical environmental aspects/concerns not initially foreseen during the preparation of the TOR, and **include evaluations of such aspects/concerns** in the respective ESIA reports.

(xii) Indicate the **total project (investment) cost** covering all the project components and activities.

This is, therefore, to recommend that you proceed with carrying out the ESIAs for the proposed projects. We look forward to receipt of five sets of copies of comprehensive environmental and social impact statements, for our further action.

Margaret Aanyu
FOR: EXECUTIVE DIRECTOR

c.c The Director,
Directorate of Water Resources Management,
ENTEBBE.

2 of 2

Appendix 2: Occupational Safety and Health Plan for Ngenge Irrigation Scheme

1. INTRODUCTION

1.1 Purpose of the Plan

The purpose of this plan is to establish and maintain effective Occupational Health and Safety Management Systems (OSHMS), and to ensure the safety of all stakeholders involved in the implementation irrigation scheme project including direct employees, engineer's staff, contractors, the surrounding communities and visitors to the site. Ministry of Water and Environment is implementing a structured safety management system to achieve a consistently high standard of safety performance.

The internal occupational health and safety culture of the company demands that it strives to deliver maximum benefit to its client by ensuring project results are achieved without compromising health and safety of all involved.

1.2 Objectives of the Occupational Health and Safety Management Plan

To adopt a planned, systematic approach to occupational safety and health

To minimize the risk of personal injury, property damage and damage to the environment

To encourage employee innovation and involvement in safety and health

To create a safety culture where safety and health are entrenched in daily operations

To provide employees with safety information, supervision and training appropriate to the hazards they are likely to encounter

To achieve industry best practice in safety and health performance

To continuously improve the standard of occupational safety and health for all employees.

To achieve a reduction in lost time through early intervention and effective management of occupational injuries to facilitate an early return to work

1.3 Occupational Health and Safety Management priorities

As priorities, Ministry of Water and Environment/Contractors will ensure that:

- ✓ An effective Occupational Health and Safety Management program is introduced and maintained to ensure that all workplace hazards are identified, the associated risks assessed and appropriate measures introduced to control these risks once established
- ✓ The Occupational Health and Safety Management program is monitored and reviewed to take account of changing conditions and circumstances at the workplace
- ✓ Appropriate records are kept in relation to the risk management program
- ✓ Employees are consulted on Occupational Health and Safety issues relevant to them.
- ✓ All relevant documentation relating to Occupational Health and Safety issues is made available to employees.
- ✓ All necessary inspections, maintenance, repairs, cleaning, modifications and housekeeping are undertaken in a timely manner.
- ✓ Tasks requiring specific qualifications, skills or experience are only undertaken by those competent to do them.
- ✓ All employees are appropriately trained, supervised and provided with adequate information to undertake their duties safely and without risk to health.
- ✓ All visitors to the workplace are briefed on safety procedures, provided with identification and any necessary protective equipment including reflective vests.
- ✓ All visitors to the site, particularly children, are adequately supervised to ensure workplace health and safety.
- ✓ Appropriate means are provided to prevent visitors and other unauthorized people from entering restricted areas or parts of the workplace where they may be at risk, or endanger others' safety and health.
- ✓ Any personal protective equipment needed to secure health and safety of an employee is provided free of charge and are adequately instructed in its proper use, maintenance and storage.
- ✓ Best practice industry standards are observed with regard to the safety of its operations.
- ✓ All work systems, plant and substances are introduced in line with the established risk management processes.
- ✓ All necessary registration, certification and licensing requirements are complied with and systems for compliance are developed, implemented and maintained.
- ✓ All accidents, incidents and near misses are reported to the Safety Officer by all employees; the circumstances of the accident, incident or near miss are investigated and recorded; and appropriate measures are taken to prevent a recurrence, and
- ✓ This plan is regularly monitored and revised in the light of legislative, best practice or organizational changes.

1.4 Organisational responsibilities

The contractor(s) will ensure the health, safety and welfare of its employees whilst at work. The contractor(s) shall comply with the Occupational Health and Safety Legislation of Government of Uganda, as well as all other relevant legislation, regulations, and codes of practice.

In order to ensure that health and safety is successfully managed within the company, the following responsibilities have been allocated:

1.4.1 Senior Management

The Project Manager and the entire Senior Management team accept overall responsibility for the effective management of workplace health, safety and welfare on site, including responsibility for employees and safe operating environment and systems for shared common areas.

1.4.2 Duties of Managers and Supervisors

Managers and Supervisors at all levels are responsible, within the scope of their authority, for ensuring that:-

The objectives of this plan are integrated into work practices.

The tasks required for the successful implementation of contractor's risk management program are undertaken.

Employees are consulted on workplace health and safety matters that may affect them.

Communication on Occupational Health and Safety (OSH) issues is promoted as a normal component of work.

All plant, substances and work systems used are suitable for their intended purpose on site and meet safety requirements.

Adequate training, information, instruction and supervision are provided so that work is conducted safely.

Employees and visitors are made aware of safety procedures.

Immediate and appropriate steps are taken to investigate and rectify any risks to health and safety arising from work activity.

Any relevant health and safety issues are promptly brought to the attention of senior management.

All accidents and near misses are properly recorded and reported, and an investigation is carried out to determine causal factors

Safe access to, and egress/outlet from the workplace is maintained at all times.

1.4.3 Duties of Employees

Employees are responsible for:

Carrying out their duties in a manner that does not adversely affect their own health and safety or that of others.

Cooperate with measures introduced in the interests of workplace health and safety.

Undertake any training provided in relation to OSH.

Immediately record and report all matters that may affect workplace health and safety.

Correctly use any information, training, personal protective equipment and safety devices provided.

Refrain from intentionally misusing or recklessly interfering with anything that has been provided for health and safety reasons.

Undertake only those tasks for which they have authorization and/or the necessary training, and for which all-necessary safety arrangements are in place.

1.4.4 Duties of the Workplace Health and Safety Representatives/Committee (headed by the Safety Officer)

The Committee has a duty to:-

Promote fulfilment of this plan's objectives.

Support the successful implementation of the risk management program.

Facilitate consultation on OSH matters impacting on site users, particularly employees' concerns.

Encourage cooperation with agreed OSH measures and objectives.

Immediately report to management any issue that may affect workplace health and safety.

Participate and cooperate in workplace investigations into accidents, incidents or near misses.

Hear the concerns of fellow employees who have grievances with regard to health and safety and report these to the management.

1.4.5 Duties of Subcontractors

Responsible for:

Ensuring their safety plan and safe operating procedures for the work to be undertaken are lodged with Ministry of Water and Environment before the commencement of any work, and complied with throughout the duration of the assignment.

Adhering to the safe work practices and any other health and safety requirements of Ministry of Water and Environment.

Ensuring compliance with all relevant OSH Legislation and Regulations.

They immediately report any accident/ incident, dangerous occurrence or hazardous conditions they become aware of during their assignment to the Safety Officer of Ministry of Water and Environment.

Performing all work activities in accordance with occupational health and safety legislation, standards and criteria as agreed to by Ministry of Water and Environment.

Providing safe tools, equipment, training and occupational health and safety policy and plans for its own employees.

2. ACTIVITY WISE HAZARD ANALYSIS

Lessons from our previous experience in implementing safety procedures at various construction sites have led to the development of the following safety precautions.

2.1 Temporary Facilities

Hazards:

a. Fire hazard
b. Electric shock
c. Hygiene related hazards

Precautions:

All electrical connections will be routed through an Earth Leakage Circuit Breaker

Direct make shift-wiring will not be allowed at any circumstance on the site.

If any additional requirement arises, flexible wires installed in conduits will be used

Fire extinguishers will be provided in strategic locations in the camp site (especially laboratory, offices, the kitchen and at the workshop)

The fire-fighting equipment will be inspected and serviced for their readiness for use annually by a certified service provider

Disposable wastes which can cause fire hazard will not be allowed close to fire places

Dustbins will be provided in the office, stores and rest areas to prevent employees from disposing waste materials indiscriminately.

2.2 Excavation (Drilling)

Hazards:

Men/material falling into the pit

Collapse of the sides

Breakage of buried service lines

Precautions:

Before taking up any excavation work, necessary approval shall be sought from the relevant supervisors to ensure the safety of the workers and stability of such areas. The supervisor will provide all the safety precautions needed to undertake such exercise

Side-walks of all excavations must be a safe angle not steeper than the angle of repose of the particular soil

If the excavation or the earthwork is close to the foundation of any adjoining building, adequate steps shall be taken to prevent damage to such existing structure(s)

Every accessible part of an excavation pit into which there is a danger of a person falling, shall be suitably fenced with a barrier as close to the edge of the excavation as practicable. Warning signs and lamps shall also be provided along the fence, if the excavation is in a public place

All construction machinery used in the excavation shall have reverse horn and authorized personnel to operate them. They shall not be operated within two feet of the edges of excavation

The excavation supervisor is responsible to enforce all the above precautions.

2.3 Concreting

Hazards:

- Collapse of casing while pouring concrete
- Persons falling off the working platform
- Hygiene problem
- Environmental threat

Precautions:

Slabs:

All workmen involved in pouring the concrete shall be required to use gumboots and gloves

Delivery hose of the concrete pump or the concrete shall be controlled properly to avoid dumping excess of concrete at one location, which may place undue loading on the shutter;

Power cables of the vibrator, trowels etc. should not have any joint and shall be provided with industrial plugs

Safe handling of concrete will be ensured with trained workforce;

Spilling of concrete will be checked. Site cleaning will be ensured after works are over

Enough lighting shall be arranged at appropriate locations and spare bulbs kept as standby.

2.4 Hand Tools

Hazards:

Tools falling down from heights

Hit by the sharp edges of the hand-tools

Hit by flying objects

Slipping and falling due to the use of worn out hand-tools

Precautions:

- The storekeeper will inspect all the hand tools before issuing them out to ensure that, they are in good working condition
- All the supervisors and the OSH Specialist will look for defective tools being used on the job on a continuous basis with specific reference to broken handles, blunt edges, worn out heads, cracked parts etc. Any such damaged tools, if found in the site, will be removed and returned to the store or destroyed

- Technicians will be reminded regularly during safety talks about the implications of misusing hand tools and the necessity of reporting the defects found in the tools immediately
- Technicians will be asked to use goggles while carrying out chipping, hammering and similar operations.

Using pliers or wrenches as hammers, using screw drivers as chisels, using screw spanner or pipe wrench instead of double end or ring spanner etc. are unsafe practices and are bound to result in minor accidental injuries. All these will be avoided to the extent possible.

2.5 Material Handling & Storage

The following precautions will be borne in mind with regard to this measure. These are:

While transporting materials in vehicles, it will be ensured that undue projections from the vehicle will not be allowed. If there is any projection, either a red flag or red lamp will be tied to the projections to warn the vehicles coming behind.

Trained and authorized operators/drivers will be used to operate lifting machinery;

All technicians will be instructed on the correct and safe way of handling various types of materials;

Lifting materials to higher elevations, single point slinging will not be allowed for handling any materials

All slings, ropes and other lifting tools will be periodically checked for wear and tear.

2.6 Fire Prevention and Fighting

Strategies for the prevention and fighting of fire in the project include:

a) Smoking will not be allowed at the site store, fuel pump area and the laboratory premises or any other prohibited place. **"No Smoking"** stickers or writings will be displayed at appropriate locations;

b) Fire extinguishers will be installed and maintained at such site locations;

c) The OSH Specialist will conduct a fire survey as frequently as required to assess the fire load, type of prevention and fighting plan required at the site (s)

d) The flammable liquids' (paint, insulation compounds etc) storage area will be clearly identified and access to it controlled

e) All the used flammable liquid containers will be collected immediately and brought back to a safe storage place and suitably disposed off in an appropriate way

f) Flammable liquid containers will not be left unattended to at site without their lids in the laboratory areas

g) Training on the use of fire extinguishers will be conducted to all the employees as a part of the induction session and it will be repeated in the toolbox talks whenever required.

It should be noted that the above hazard analysis is by no means comprehensive. Additional environmental hazards may be encountered depending upon the actual field conditions while executing the work. All critical jobs will be analysed to identify the hazards likely to be encountered during the execution and to decide the precautions to be taken. Before taking up any critical activity, any additional safety precautions to be taken will be added to the method statement, which will be prepared by the site engineer.

3. MANAGEMENT OF RISKS

3.1 Risk identification, assessment and control

Ministry of Water and Environment will introduce risk management techniques by ensuring all workplace hazards and associated risks have been appropriately identified, assessed and controlled. This will be achieved by:

Establishing a register of hazards (located at the Gatehouse and Administration office) for the reporting of all risks.

Ensuring effective formal investigation and follow-up of accidents/incidents or hazardous occurrences is carried out as soon practicable.

Engaging expert external services (where necessary) to deliver professional risk management audits on a regular basis or as required.

Undertaking all relevant risk management activities in conjunction with OSH Representatives/Committee members, and Employees.

Training all Employees in the use and application of all controls introduced for each identified risk.

Employing specific techniques to ensure risks are managed effectively.

Systems will be developed to implement the following risk management strategies to continuously improve workplace safety and protection of employees.

3.1.1 Controlling site access

All visitors to the site must:

- Report and register with Security staff at the main entrance.
- Wear reflective safety vests reserved for visitors at the gate.
- Be accompanied by one of the Security Officers or a designated employee, in an endeavour to ensure their health and safety is safeguarded as far as reasonably possible.
- Unauthorized persons shall be prevented from entering the site.

3.1.2 Traffic Safety Regulations

All employees and visitors must strictly adhere to the company's safety rules in order to minimize risks of accidents. To achieve this, Management is committed to:

- Ensure every reasonable measure is taken to ensure all persons who operate vehicles on site are made aware, understand and adhere to this policy.
- Ensure controls are put in place to minimize the risk to pedestrians and individuals working in hazardous, congested or high traffic areas.
- Ensure all vehicles adhere to the temporary speed limits by the company.
- Ensure enforcement and infringement systems and provisions are in place and enforceable, including taking disciplinary action against traffic safety breaches.
- Ensure traffic safety statistics are maintained and published to inform all parties involved.

3.1.3 Risk Assessment and Control

Ministry of Water and Environment shall control all risks identified within the project sites and/or areas under our control to an extent that is practically possible. The company shall implement all controls using the following hierarchy of hazard control:

Eliminating the hazard

Substituting the hazard

Modifying the process

Isolating the hazard

Implementing engineering controls

Using a combination of controls

Using back up controls, such as personal protective equipment

In addition, the company shall:

See that all controls identified in an investigation are authorized with signed documentation.

Allocate responsibility against each control, to ensure everyone is aware of what is required of him or her. Any lack of response shall be tracked to the responsible person.

Ensure controls have a time frame allocated to them for completion.

Ensure all employees concerned have received sufficient training, or arrange for retraining, as per the recommendations of the investigation.

After implementing controls, ensure there is follow up, to ensure that the controls have not caused any further hazards.

3.1.4Hazard and Accident/Incident Reporting and Control

a) All workers must take appropriate steps to notify the Management of a hazard, accident, incident, near miss or dangerous occurrence.

b) All workers are welcome to contribute 3 information regarding OSH matters at any time, either through formal reporting systems or by reporting urgent concerns immediately to Safety Officer and/or Safety Representatives.

c) Any 'near misses' that fall under the definition of a 'Dangerous Occurrence' must be immediately or within 24hours be reported to Safety Officer and/or Safety Representatives. This is the responsibility of all parties involved although where an employee believes it appropriate, he/she may also contact Management.

d) Upon receipt of information on a hazard/accident/incident or near miss, the Safety Officer shall take immediate and appropriate steps to enable management to investigate and rectify any risks to health and safety arising from work activity in worksites.

e) All accidents and near misses are properly recorded and reported, and an investigation is carried out to determine cause and provide statistical and preventative information to improve site safety.

f) All employees are expected to participate and cooperate in workplace investigations into accidents, incidents or near misses.

3.1.5 Equipment Safety and Isolation

All powered equipment must be isolated before any maintenance work is undertaken on it. The only exception to this rule is by written exemption in cases where equipment must be energized for fault finding or other safety requirements. In these cases, a skilled and competent person must supervise the activity if any risk of injury is apparent.

3.1.6 Hazardous Substances and Dangerous Goods Policy

No hazardous substances or dangerous goods must be brought on site, used or stored in any manner which could risk the health and safety of others.

Correct storage of all flammable liquids is mandatory.

No substance shall be brought onto the site for use or trial without a material safety data sheet having been obtained, and the contents of the sheet having been previously read and understood by those using the substance.

Wherever possible, safer alternatives will be used if a substance poses a risk to the health and safety of the Employees and/or other users.

3.1.7 Insurance

Ministry of Water and Environment will secure liability insurance cover for injuries and ill health to its employees. They will also have insurance for accidents involving vehicles and possibly third party. However, insurance policies only cover a small proportion of the costs of accidents. Costs that will not be covered by insurance will be including:

Sick-bay

Damage or loss of product and raw materials

Repairs to plant and equipment

Overtime working and temporary labour

Investigation time.

4. REPORTING ON OH&S

Ministry of Water and Environment shall comply with all the statutory reporting requirements for Uganda with regard to incidents, accidents or near misses involving employees or visitors that occur within the project and its vicinity.

Ministry of Water and Environment shall review corrective actions by taking the following steps:

Defining the scope of the activity that is to be assessed.

Identifying the risks.

Assessing the risks.

Controlling the risks.

Monitoring and reviewing the process.

The Ministry shall implement all controls using the following hierarchy of hazard control:

i) Eliminating the hazard.
ii) Substituting the hazard.
iii) Modifying the process.
iv) Isolating the hazard.
v) Implementing engineering controls.
vi) Using a combination of controls.
vii) Using back up controls, such as personal protective equipment.

In addition, Ministry of Water and Environment shall:

- See that all corrective actions identified in an investigation are authorized with signed documentation.
- Allocate responsibility against each corrective action, to ensure everyone is aware of what is required. Any lack of response shall be tracked to the responsible person.
- Ensure any corrective actions have a time frame allocated to them for completion.
- Ensure all Employees concerned have received sufficient training, or arrange for retraining, as deemed necessary by the findings of the investigation.
- After implementing corrective actions, ensure they are evaluated at a future time.

This is to ensure that the controls have not caused any further hazards, and that they are in fact appropriate to reducing the likelihood of a recurrence of the same event.

5. EMERGENCY PROCEDURES

5.1 Emergency Planning

5.1.1 Emergency Policy

While Ministry of Water and Environment will take all reasonably practicable steps to minimize the risks of accident (and particularly fire and other situations where there may be significant risks to personnel and property), it is acknowledged that, despite these measures, it cannot be assumed that a major incident will never occur. In consideration of this circumstance, our primary objective is to provide a practiced, swift and effective response to any emergency situation.

5.1.2 Ministry's commitment

Ministry of Water and Environment is committed to providing a safe place of work and safe systems of work, as well as protecting the health and safety of people during reasonably foreseeable emergency situations. The organization will maintain a fully documented emergency response plan that:

1. Identifies the possible emergency scenarios for our site
2. Prescribes the Emergency Organization (people and duties)
3. Specifies the arrangements to be implemented (systems and procedures).

5.2 Fire Fighting Equipment

Fire-fighting equipment will be located in strategic places throughout the camp especially in/scheme buildings. The equipment shall also be mounted on scheme vehicles especially heavy machinery.

Nominated contractor's employees shall be trained in the use of the equipment. This training shall be by both verbal instruction and practical demonstration. The training is compulsory and shall be conducted for all nominated employees on an annual refresher basis.

All fire-fighting equipment shall be regularly checked and serviced. This will involve both internal inspections as well as external tests conducted by approved experts.

Fire-fighting equipment will not be used for any purpose other than its intended use for fighting fires.

Abuse of the equipment will lead to disciplinary procedures.

5.3 First Aid Policy

5.3.1 Company commitment

Ministry of Water and Environment is committed to the provision of an effective first aid service to protect the health and safety of all Employees who may be affected by accidents, incidents or injuries arising from the work carried out.

Ministry of Water and Environment will train at least two of its employees in each work section to work as first aid personnel to deal with minor accidents and emergencies. The first aid personnel will be introduced to workers in the various work fields.

5.3.2 First aid management priorities

The Ministry will ensure that:

Legislative requirements for the first aid service are complied with

The particular hazards of the workplace are taken into account when equipping and staffing the first aid service

Adequate equipment, facilities and supplies are provided as required for the first aid service

First aid kits are available at the main entrance gatehouse, and worksites

Suitable trained personnel are appointed to staff the first aid service

Appropriate recording systems are established to record treatment provided

These records will be used to guide the development of strategies to prevent work-related injury and illness

Appropriate arrangements will be made for the transportation of injured people, and

Training will be provided in skills to maintain basic life support in the case of critical injury.

5.3.3 Managers and supervisors commitment

Managers and supervisors of are responsible, within the scope of their authority, for ensuring that:

The objectives of this policy are integrated into work practices, and

Effective action is taken to ensure the company's first aid service is appropriate for workplace needs.

5.3.4 Employee commitment

Employees are responsible for cooperating with the giving and receiving of first aid, as needed.

5.4 Emergency Measures

a. Project Support Officer shall develop and implement comprehensive emergency response procedures specific to site work areas and activities occurring. All related equipment and supplies for implementation of the written plan shall be provided by the management.
b. The company shall develop the site-specific Emergency Response Plan.
c. All personnel shall be regularly (not less than annually) trained on emergency response procedures, and their role in response activities.
d. All personnel shall be informed of and be expected to know who their emergency responders are and have the contact information for all pertinent responders.
e. The Scheme management shall conduct a minimum of one (1) emergency drill every three (3) months (quarterly). Drills shall be spearheaded by the Project Support Officer, and shall incorporate Project site emergency services.

5.5 Liaising with Emergency Services

Ministry of Water and Environment firmly endorses the need for close liaison and cooperation with emergency services within Eastern Uganda. In accordance with this, the local police, fire and ambulance services' representatives will be invited to visit and inspect our site on a regular basis. The site management, as well as representatives of the emergency response team and Occupational Health and Safety Committee, will accompany them during their visit. During these visits there will be discussion about processes, site hazards and current control measures.

6. CONSULTATIVE PROCESS

6.1 Demonstration of Management Commitment

Ministry of Water and Environment has the highest commitment to the health and safety of all employees and visitors operating within the project sites and will ensure that:

The occupational health and safety plan is communicated throughout the site.

The plan will be reviewed regularly.

Senior management will always be represented at meetings of the Occupational Health and Safety Committee.

Unsafe acts and conditions will be recorded and rectified as soon as is physically possible.

Where delays in resolution are expected, such situations will be made safe immediately and the progress on full correction communicated to the relevant people on a regular basis.

Employees lead by example, adhering to these policies and procedures without exception.

Non-compliance with safety policies and procedures by employees will result in appropriate action being initiated.

Safety will be an agenda item at all management meetings.

Training and OSH related activities shall be offered to employees on a regular basis.

6.2 Safety Promotion

Ministry of Water and Environment has a strong commitment to safety promotion amongst all employees and other people who are likely to be affected by its operations including visitors.

As part of this commitment, all safety management issues will be published through memos/newsletters and other information, education and communication (IEC) materials to all employees. MW&E's safety promotion activities and training will be conducted regularly throughout the year. These activities may involve trainers, regulators and industry speakers and are designed to raise everyone's awareness of health and safety issues on the site.

7. GENERAL SAFETY POLICIES

7.1 General Rules of Conduct

Ministry of Water and Environment has a number of safety rules that must be adhered to by scheme individuals at all times. These will be reviewed from time to time as the need arises to deal with any safety problems. The following obligations apply to OSH issues:

a) Obey Officers

- Every person must, while in the premises of the irrigation scheme, promptly obey all orders and directions given or made by a Manager, Supervisor or Officer including Security Officers.
- A person who is an employee, subcontractor, or visitor must at any time while in the Ministry of Water and Environment premises and, upon request by an Officer, produce their identification card or visitor's pass for inspection by that Officer.

b) Desist from Prohibited Conduct

In order to ensure a safe and pleasant work environment for all, every individual while in the Irrigation scheme's premises or sites, must not:

Assault, abuse, obstruct, restrict or intimidate a fellow employee

Cause a nuisance, bully or harass other employees

Damage any property belonging to the scheme or any other person

Discriminate against on the grounds of age, race, nationality, sex, pregnancy, marital or family status, political or religious beliefs

Physically or sexually harass any other person

Obstruct or interfere with fire extinguishers, alarms and other security or emergency services and equipment nor use any fire extinguisher for any purpose other than fighting fires

Deposit or dispose of any waste or rubbish in any place except bins or receptacles provided to that person for that purpose

Bring or allow any animals into the scheme premises

Fail to wear reflective vests at all times within the project site

Fail to adhere to all proposed development's rules, policies and procedures.

7.2 Managing Non Compliance

Employees are expected to follow any applicable policies and procedures outlined in this plan. It is our goal to create a fair and efficient environment for all employees, visitors etc. Sufficient induction training, explanation and assistance shall be given to all employees to ensure they fully comprehend what is required of them. However, neither management nor the employees will tolerate unsafe behaviour and non-compliance with the safety policies and procedures.

7.2.1 Subcontractors Non-Compliance

Subcontractors shall be subjected to the same disciplinary and warning system as employees. Copies of such actions shall be forwarded to the Subcontractor's management for their records. Under certain circumstances, a Subcontractor may be refused the right of entry to the Company premises due to non-compliance with health and safety policies and procedures and early termination of a subcontract may occur.

7.2.2 Employee Non-Compliance

Employees, who fail to comply with the health and safety requirements of the Company, or those who demonstrate consistently poor safety performance shall be subject to disciplinary measures up to and including dismissal. The disciplinary procedure for health and safety issues for employees shall follow the same format as the warning system used for any disciplinary matter.

7.3 Personal Protective Equipment (including Reflective Vests) Policy

High Visibility Clothing (Reflective Safety Vests)

In accordance with the Occupational Health and Safety Policies of the Government of Uganda, hi visibility clothing must be worn at all times within the site office(s) and other project sites. All hi visibility clothing (reflective safety vests) used shall comply with the requirements of concerned institutions' code of practice and be suitable for day/night wear.

Ministry of Water and Environment is strictly committed to ensuring non-compliance notices or sanctions are issued whenever individuals are found to be in breach of the Personal Protective Equipment policy.

Other Personal Protective Equipment

Other personal protective equipment (PPE) such as helmets, heavy duty gloves, respirator masks etc. used by employees shall comply with the relevant Occupational Health and Safety Standards of the Government of Uganda.

Ministry of Water and Environment is committed to protecting the health and safety of all Employees by a systematic process of risk management. Where better methods of controlling risks are not feasible, we are committed to the effective selection, use, care and maintenance of suitable personal protective equipment. The Company shall ensure that all employees have full access to the appropriate personal protective equipment needed to safely undertake their work, particularly in high-risk areas of the project. Specific personal protective equipment shall be used in certain instances depending upon the nature of the task being undertaken. Professional advice shall be obtained, where necessary, to identify the most suitable types of PPE required. Training and information shall be provided to all employees in the fitting, use and maintenance of PPE.

Management shall be responsible for supervising and enforcing the PPE policy for employees. The effectiveness of the PPE policy shall be evaluated on a regular basis.

7.4 Plant and Equipment

Ministry of Water and Environment is committed to providing a safe place and safe systems of work. Since uncontrolled hazards associated with plant and equipment could have serious and even fatal consequences for employees and others, the Company regards the maintenance of and adherence to our safe systems of work for controlling plant and equipment risks as a safety-critical element of its overall safety program.

Ministry of Water and Environment is committed to ensuring that all plant and equipment that it owns is fit for its intended use.

No plant or equipment shall be operated without the relevant license from the appropriate statutory authority, unless under the supervision of a competent authorized person using a current logbook, or unless an appropriate internal assessment has been made and documented where no statutory licensing is required.

7.5 Housekeeping

It is the responsibility of all employees to ensure appropriate standards of housekeeping are maintained at all times.

To ensure compliance is maintained with housekeeping standards:

Each area shall set an acceptably high standard. The employees must then ensure compliance is maintained at all times, through utilization of such tools as inspection checklists to determine the appropriate and agreed standard.

In particular, all employees will practice good housekeeping practices in the common areas. All pallets and machinery must be managed to reasonably limit the safety risk to all site users.

Management or Committee members shall occasionally carry out housekeeping inspections and audits without notice in common areas.

7.6 Smoke Free Site Policy

It is recognized that smoking can be a source of ignition resulting in fire, which can impact the ongoing operations of the facilities at the scheme. The Ministry also supports the food hygiene requirements of preventing the use of tobacco products in areas where food items are stored, processed or handled. There will be 'No Smoking:

Inside any building which is the property of Ministry of Water and Environment Adjacent to intakes or areas where natural ventilation take smoke into buildings

In any areas where waste or rubbish is collected

In any storage areas

In any areas where flammable liquid is stored or handled

In any other special hazardous areas

In any areas where discarded butts may be washed or swept into drains or gutters.

7.7 Waste Management Policy

Ministry of Water and Environment will undertake all efforts to ensure compliance with environmental policies and obligations regarding waste management.

All waste shall be disposed of in the most appropriate and environmentally sensitive way possible. If necessary for compliance, suitably qualified specialist Contractors shall be engaged for disposal.

Staff at their cost is responsible to appropriately dispose of all waste they generate. Produce waste, crates, containers and any other type of rubbish must not be left or deliberately dumped on Ministry of Water and Environment. Disciplinary action including sanctions or legal action will be taken against offenders.

Waste bins will be provided in designated places throughout the project site camp(s) and any other sites under the jurisdiction of the company where waste is generated.

Disposal of waste shall follow the waste management hierarchy below:

a. Prevention
b. Minimization
c. Recycling
d. Energy recovery
e. Volume reduction, and
f. Disposal.

Training or information shall be provided to employees so that they are aware of waste management procedures and able to carry them out safely.

7.8 Children on Site Policy

Ministry of Water and Environment recognizes that there may be a need for employees, subcontractors and visitors who are working on site to bring their children occasionally. However, the Ministry strongly recommends that children not be brought on site due to the high level of congestion and dangerous traffic movements that could potentially cause death or serious injury to a child.

Consideration should be given to the:

Circumstances of the need to bring a child onto site

Nature of the area to which the child will be taken

Child's accessibility to hazardous work activities

Level and nature of supervision for the child or children

Time required being on site.

Children are not to accompany employees, subcontractors or visitors to the following areas:

Fuel dispensing area/pump, parking areas, stores, and mechanical workshop except when transiting to and from these areas/ sites.

Where heavy machinery such as cranes, wheel loaders, excavators etc.

Operate or be taken as passengers on any machinery/equipment in which there is potentially significant risk of injury associated with the operations or activities of the work area or where the child is suffering from an infectious illness.

If children are brought on to the site the parent or guardian shall ensure the child is supervised and other users of the site are not inconvenienced by the children's presence. Parents and guardians hold ultimate responsibility for the health and safety and the management of behaviour of the children in their care.

8. INDUCTION

8.1 Employee Induction

Purpose

Ministry of Water and Environment shall ensure systems are in place to provide a reasonable, appropriate and efficient induction for all employees, subcontractors and visitors so they are able to perform their duties safely or use the site in accordance with MW&E's safe working procedures.

The Procedure

All new employees and subcontractors will have an induction before commencing any duties on the site.

Visitors will have an abbreviated induction within their visitor's information sheet and are to be supervised by the hosting party at all times while on site.

It is the responsibility of the supervisor of the new employee or subcontractor, or the person the visitor is with, to ensure induction has taken place.

Induction will only be performed by employees of the company deemed competent to do so by the Safety Officer.

A handout containing the same information presented at the induction will be provided to all at the end of their induction session.

The inductee at the end of the induction will sign a register of all that have attended induction, and those who receive a copy of the induction handbook. The induction checklist will be signed and kept on each employee's personal file.

Employees

Ministry of Water and Environment shall induct all employees on the following relevant safety and communication issues on the site:

Introduction to the organizational structure of the Ministry of Water and Environment.

Introduction to occupational health and safety personnel working for the Company.

Presentation, explanation and discussion of the overall occupational health and safety plan for the Company.

Provision of information on the Occupational Health and Safety Committee for the Company, who the representatives are and how they can be contacted.

Safety rules for the site, as well as for the area they will be working in (where practicable).

Emergency procedures for the Company, including first aid, evacuation, fire safety and any other relevant information.

Information on reporting requirements for accidents, incidents and near misses within the Company, along with associated documentation procedures.

Information on reporting systems for hazards within the Company.

A list and explanation of Company safety rules.

Introduction to safe work practices within the Company.

Information on workers compensation and rehabilitation policies for employees with work related injuries or illnesses.

Information on security requirements for the Company.

Fitting and issue of personal protective equipment.

Issue of a copy of the current position description for their new role as an employee.

Information on any other special safety requirements of the Company (e.g. requirements for lift operations, motorized vehicles, hazardous substances, etc.).

Take the new employee(s) on a walk through so they can be familiar with their site, and the location of key areas and facilities.

8.5 Induction for others

Visitors shall have restricted access and shall be under the direct supervision of an Employee of the Company for the full duration of their visit. Visitors will be asked to report to security through the main entrance where they will be issued with a reflective vest and an induction card. This shall cover, as a minimum, the following elements for visitors:

Overview of the Company and a copy of the safety rules.

Explanation of the role and introduction to responsible officers working for the Company.

Presentation of the occupational health and safety policy for the company.

Information on the Occupational Health and Safety for the company, who the representatives are and how they can be contacted.

Key traffic and general safety rules for the site.

Emergency procedures for the company, including first aid, evacuation, fire safety and any other relevant information.

Information on the reporting requirements for accidents, incidents and near misses whilst on the company site, along with associated documentation procedures.

Ensuring access to the correct personal protective equipment including reflective vests.

Information on any other special safety requirements of the ministry.

8.7 OSHW Training for Employees

Ministry of Water and Environment shall conduct regular training needs analysis so as to determine the training requirements for Employees.

9. SAFETY PERFORMANCE MONITORING

9.1 Statistics - Reporting and Recording

Ministry of Water and Environment is committed to collecting the following data to measure OSH performance:-

Risk management documentation

Number of breaches of traffic policies including equipment maintenance, over speeding, etc.

Workplace Services inspection data

Police and traffic charges

Sick leave absences

Histories of exposures to hazardous substances

Medical records (Employees only)

Results of internal and general workplace monitoring

Workers compensation records

Performance appraisals

Training records and attendance at training sessions

Number of accidents; year to date and from inception to date

Number of incidents; year to date and from inception to date

Number of near misses for the previous month; year to date and from inception to date

Number of lost time injuries for the previous month; year to date and from inception to date

Number of safety meetings held in the previous month; year to date and from inception to date

Number of workplace risk assessments completed for the previous month; year to date and from inception to date

Number of substantiated harassment/bullying claims by employees

This is not an exhaustive list of measures. Ministry of Water and Environment will implement additional measures as recommended or required.

9.2 Auditing of the Safety Plan

This safety management plan shall be subject to regular and ongoing reviews of progress, relevance and compliance. Audits of the safety management plan shall be conducted in accordance with the internal quality assurance auditing system of Ministry of Water and Environment. Reports from each audit will be tabled and presented at the management team meeting and at the Occupational Health and Safety Committee meetings of the company.

9.3 Safety Inspections Policy

Ministry of Water and Environment's OHS officer shall undertake regular workplace inspections in accordance with the procedure detailed below.

A formal and documented workplace safety inspection shall be conducted on the site on a half yearly basis.

At the beginning of the year, the OSHW/Facility Manager will draw up a schedule for the inspections, nominating the areas to be inspected, delegate who is to undertake the inspections and the date by which they are to be completed.

Issues identified during the inspection will be referred to top management for correction.

A copy of the completed safety inspection will be sent to the Chair of the Occupational Health and Safety Committee of APML for tabling at the monthly meeting.

Wherever possible, a member of the workforce in the area being inspected accompanies those conducting the safety inspection.

9.4 Employee Involvement

Ministry of Water and Environment actively encourages the participation of all Employees in workplace safety and hazard inspections. These shall be undertaken using the form provided in the appendix entitled 'Workplace Inspection Checklist and Record Form Ministry of Water and Environment.

Employees participating in workplace inspections shall receive training and information in the correct procedures for carrying out inspections.

The supervisor of the nominated employees shall ensure that they are made available to participate in the scheduled inspection.

10. SAFETY IN THE OFFICE

10.1 Ergonomics and Office Safety

In order to ensure the health, safety and welfare needs of all Employees and Visitors, Ministry of Water and Environment will consider office areas to be as important as all other area of our operations. All the irrigation scheme office areas will undergo regular inspections. The completed inspection checklist will be lodged with the Occupational Health and Safety Committee, for tabling at their monthly meeting. It is the responsibility of the OSH/Facility Manager to ensure corrective actions are taken.

10.2 Mobility and compound safety

Ministry of Water and Environment employees shall ensure project sites are kept clear of all objects including merchandise, rubbish, boxes and furniture, as they serve as contributors to overall accident and incident rates. Spills and wet surfaces shall be clearly identifiable through the use of clear and visible signs, if not immediately cleaned up.

10.3 Manual Handling

Ministry of Water and Environment shall ensure that manual handling tasks that may cause injury in the workplace are assessed and controlled.

An assessment must take into account the following factors:

- The actions and movements involved in the manual handling.
- The workplace layout/ergonomics.
- The posture and position that must be taken by the operator involved in the manual-handling task.
- The duration and frequency of the manual handling.
- The location of the loads and the distance they have to be moved.
- The weights and forces involved.
- Characteristics of the loads and any equipment that is used for the task.

- ❖ The work environment.
- ❖ The skill and experience of the operator.

If a manual handling task is assessed as being a risk to health and safety, Ministry of Water and Environment must take steps reasonably practicable to control the risk. In controlling these risks Ministry of Water and Environment must redesign the manual-handling task to eliminate or control the risk. Ensure that employees involved in the manual-handling task receive appropriate safe manual handling training and appropriate supervision.

Where redesign is not reasonably practicable the use of trolleys or mechanical aids, personal protective equipment or a lifting team may be appropriate. The irrigation scheme management must also ensure that employees receive appropriate training and supervision in the correct use of any mechanical aids, personal protective equipment or team lifting procedures supplied or introduced.

For lifting loads, lowering or carrying loads the subsequent guidelines should be followed:

a. In seated position do not lift loads in excess of 4.5kgs
b. The risk of injury increases with loads above 16-20kgs, therefore from a standing position it is advisable to keep loads below that level.
c. As weight increases from 16 to 55kgs, the percentage of healthy adults who can lift, lower or carry the weight decreases. Therefore, more care is needed for weights over 16kgs and up to 55kgs. Mechanical aids or team lifting arrangements should be provided to reduce the risk of injury.
d. Generally no person should be required to lift, lower or carry loads above 55kgs unless mechanical aids or lifting teams are used.
e. When lifting, lowering or carrying objects avoid bending, twisting or jerking the load. Place your feet shoulder length bend at the hips and knees. Grip the load firmly and keep it close to your body. Use the strong muscles of your legs to lift and keep your back straight for the entire lift.
f. Avoid lifting with one hand and lifting the load over your head.
g. Make sure pathways are clear when moving items.
h. Use mechanical aids to lift objects wherever possible.

11. ADMINISTRATION

11.1 Dissemination of the OSHP

Irrigation scheme management shall:-

a. Ensure notices, signs, records, monitoring data, emergency contact information, etc. are prominently displayed in English, and any other languages common to the workforce.
b. Provide a minimum of one Site Health & Safety Signboard upon which is posted all health and safety data and information pertinent to the project site, incident rates, man hours, etc.
c. Update information posted on notice board(s) as information changes.
d. Maintain a minimum of one (1) copy of the OSHMP of the company on site at all times.

11.2 Authorized Communication Representatives

External communications

In matters relating to OSH, particularly in the event of a workplace emergency, the Project Manager and Safety Officer are the only people mandated to speak to external parties on behalf of Ministry of Water and Environment.

Internal Communication

Competent people have been appointed to assist this company in meeting its health and safety obligations. These people have sufficient knowledge and information to ensure that statutory provisions are met and that the Occupational Health and Safety Management Plan (OSHMP) is adhered to.

The names, locations and contact details of these will be displayed on the safety notice board. Any changes will be communicated from time to time.

11.3 Implementation responsibility

The overall responsibility for implementing this policy rests with the Project Manager.

The Occupational Health & Safety Officer is responsible for initiating and driving all safety and health strategies on behalf of the Project Manager.

Safety and health issues will be dealt with in consultation with employees through the elected/appointed safety and health representatives.

The Senior Management of the proposed irrigation scheme will provide the time and resources necessary to implement this plan and will implement a strategy of hazard identification, risk assessment and develop the necessary plans and procedures to improve all aspects of workplace safety and health.

11.4 Compliance requirements

This Occupational Health and Safety Management Plan (OSHMP) apply to all sites and offices any other sites under management by the Company. For the safety of all, the Ministry's OHS officer kindly requests all to comply with this plan.

Failure to comply with the requirements of the OSHMP and any related policies, procedures, rules or legal acts or regulations of the Company may lead to disciplinary action or sanctions being imposed on the culprits. For employees and contractors of Ministry of Water and Environment, these actions could include disciplinary action up to and including termination of employment or cancelation of contracts.

11.5 Review of the OSHP

Ministry of Water and Environment will review this plan when necessary. Reviews will mainly take place in response to organizational and legislative changes. Management will undertake the reviews in consultation with the Safety Officer under the guidance of the Engineer.

1.5 Ministry of Water and Environment's Commitment

Ministry of Water and Environment is committed to ensuring the health, safety and welfare of its employees, visitors, Subcontractors and any other people who may be affected by scheme's operations. In securing workplace health and safety, the company promises to pursue best practices in Occupational Health and Safety Management (OSHM) and to fulfill its statutory obligations with regard to OSHM at all times.

12. OCCUPATIONAL HEALTH AND SAFETY MITIGATION MATRIX

Impact	Mitigation/Enhancement Commitments	Desired Outcomes	Monitoring/Performance Indicators	Responsible Party
HIV/AIDS risk	▪ Design an HIV/AIDS policy and awareness program; ▪ Provide counselling and testing services. ▪ Weekend offs for non-resident workers on pay weekends.	▪ No infections of HIV/AIDS; ▪ Treatment for STDs, malaria, diarrhea etc; ▪ Improved health of community and workers	Periodic voluntary testing at worker's camp.	MWE PSO
Increased accident rate due to scheme operations and accessing the main road	Install road signage. Coordinate with traffic police to enforce speed limits; Embark on scheme operation sensitization programme. Ensure use of PPEs Prescribe a speed limit of 40 km per hour on the access road.	Reduced or no accidents recorded.	Number of accidents recorded.	MWE Traffic Police; Local Authorities.
Air pollution	▪ Ensure that all farm inputs and outs are stored well ▪ Spray water to suppress dust where required; ▪ Cover trucks transporting construction materials, Etc.	Improved air quality	- Level of dust in the area - Number of complaints from residents and public	District Environment Officers
Increased noise levels	Schedule construction activities during day	Acceptable Noise levels	Complaints from the public	OHS officer; District Environment Officers.
Borrow Pits	Backfilling borrow pits using cut to spoil; Backfilled pits to be covered with top soil for re-vegetation;	No accidents involving livestock and community members.	Number of borrow sites restored. Number of accidents	Contractor; DEO;

Impact	Mitigation/Enhancement Commitments	Desired Outcomes	Monitoring/Performance Indicators	Responsible Party
		Original landscape restored; No disease vectors from abandoned/improperly re-instated borrow pits;	recorded at abandoned borrow sites Complaints from the public; Level of water ponded at the restored site.	NEMA
Access roads to borrow or quarry sites.	Install speed humps. ; Dust control through water sprinkling; Scarify and vegetate service routes after decommissioning.	Accident free roads. No pollution arising from excessive dust.	Number of accidents involving construction Area scarified and vegetated; Number of complaints from residents.	
Storage of fuel	Provide buried tanks for fuels storage; Fence off fuel storage and dispensing point; Install fire suppression systems.	Ensure worker safety at all times in the warehouse.	Regular fire audit to ensure worker safety and performance of pollution control systems; Perform audits every 3 months.	Site OHS officer; District Environment Office
Occupational Health and Safety	MW&E will provide work force induction training to all workers on OSH; MW&E's OHS officer to conduct weekly safety talks; Prepare occupational health and safety action plan; MW&W to provide all workers with PPE; Institute safety monitoring on site;	No injuries to workers. Reduced risks to the Contractor's work force. A safe and productive work environment.	Number of injuries reported in every month.	MWE; Environmental Officers.

Impact	Mitigation/Enhancement Commitments	Desired Outcomes	Monitoring/Performance Indicators	Responsible Party
	Install housekeeping posters in all work places; Hire safety officer. Report accidents to police and supervising engineer; Design an HIV/AIDS policy and strategies for awareness, counselling and support.			
Quarry: Safety,	If contractor will operate a rock quarry, the following should be ensured; ▪ Undertake independent Environmental studies on these facilities. ▪ Rock blasting schedule should not disrupt nearby residents activities; ▪ Use sirens or drive-by warning systems to warn residents of impending blasting activity; ▪ Cordon off the safety limits before blasting; ▪ Physically verify that all residents are outside the blasting zone before blasting; ▪ All explosives should be handled by licensed blasters and stored at a local police station. ▪ After each blasting session, inspection shall be done to retrieve unexploded explosives which will be returned into Police custody.	▪ No disruption of community activities during rock blasting ▪ Affected houses during rock blasting inspected and compensated ▪ Unexploded explosives retrieved and returned into Police custody	▪ Number of people affected during rock blasting ▪ Number of people Compensated after rock blasting ▪ Complaints from the public	MWE Police; District Environment Officer; NEMA

Appendix 3: List of Stakeholders consulted

Stakeholder consultation sheet for the proposed construction of irrigation scheme infrastructures and facilities Lot 2: in Ngenge, Kween district. Contract No: MWE/CONS/16-17/00040/2

Name	Contact/Designation	Signature
CHEMUSTO SAMUEL	arapgiogisam@gmail.com 0772459166 - DNRO	[signature]
Anguria Albert	alkguria@yahoo.com 0772646460/0755646060 BWD	[signature]
KAPTING IRENE (DAO)	0777256134/0787444860 irenechemaongel@gmail.com	[signature]
CHEMUTAI PATRICK	0755577213/0773712669 DISTRICT FISHERIES OFFICER	[signature]
SONGOK DANIEL	0788278935	[signature]
	P/CHIEF KAPKWOT	
	NGENGE S/C	
Bamgahire Vincent	PWSO/WMD-0774434969	[signature]
BENON LWANGA	SENIOR ENGINEER/MAAIF	[signature]

Ministry of Water and Environment

Stakeholder consultation sheet for the proposed construction of irrigation scheme infrastructures and facilities Lot 2: in Ngenge, Kween district. Contract No: MWE/CONS/16-17/00040/2

	Name	Contact/Designation	Signature
1	WALUYE SULAI	0779464396	
2	MATHIAMU HABIBU	0781310565	
3	ZIKIRA MUTUAZIBU	-	
4	AMINA SULAIMAN	0771233468	
5	NUSURA MWAJE	-	
6	ZAINA KORGNY	-	
7	CHEBET FATINA	-	
8	AZISA NABIFWO	-	
9	LABU TAFALA	0784348826	
10	KAPKURUYO Shaban mebei	--	
11	MWANAIDI YAPSALEH	--	
12	SIKOWA YASHIRAF	-	

Ministry of Water and Environment

Stakeholder consultation sheet for the proposed construction of irrigation scheme infrastructures and facilities Lot 2: in Ngenge, Kween district. Contract No: MWE/CONS/16-17/00040/2

	Name	Contact/Designation	Signature
13	MAKWAÍA MOSES	DFS-Kween DLG 0783536490	
14	CHESPIOS [illegible]	PAS - Kween DLG 0772668	
15	AYEBA YASIN	C/P PACC 0782038221	
16	KIWIKA YASIN	0773604846	
17	ZANA KARANYI	—	
18	CHEBET ĀIM	0778638263	
19	CHEMONGES RAMAZAN	KWEEN 0782007908	
20	KAKWIRA Salimo Asadi	0779743019	
21	KAIJIMU MUSA	0744577068	
22	SIKOJA ASHRAF	0756271860	
23	MWIMA MUSA TAHSIATHEH MUHAMMAD	[illegible]	
24	ZAHIRA IBRAHIM	0756-402852	

Ministry of Water and Environment

Appendix 4: SITE DAILY INSPECTION CHECKLIST

Date ……..

Project Sub-component	Time of Inspection	Environmental/social issues	Applied mitigation measures	Comments
	7:00am to			
	8:00am			
	8:00am			
	9:00am			
	9:00am			
	10:00am			
	10:00am			
	11:00am			
	Etc			

Contractor's Name…… Consultant's Name……

Signature……..…….…. Signature…….……..

NB: Environmental issues to be monitored include; dust pollution, debris mgt, garbage/solid waste management, PPEs, traffic mgt, EHS-meetings, manual handling, open excavation mgt, oil spillage, soils erosion, drainage systems, water ponding, cut spoil mgt, vegetation protection, water resources management, noise pollution, private property damage, social issues, site inspections, waste water management, labour employment, fuelling, servicing of machines and others as will be specified.

Appendix 5: DAILY WORKING CONDITIONS ASSESSMENT REPORT

Project Name……..

Date …….. Report No……

Section…… Department……..

<table>
<tr><td colspan="3">ENVIRONMENT, SAFETY AND HEALTH MONITORING ON SITE(tick where applicable)</td></tr>
<tr><td rowspan="2"><u>CLIMATE</u>
Wet
Dry
Hot
Cold
Windy
Others
(specify)</td><td><u>LIGHTING</u>
Good
Poor
Natural
Artificial</td><td><u>WORKING SURFACE</u>
Even
Uneven
Slippery
Rough</td></tr>
<tr><td><u>SITE ACCESSIBILITY</u>
Access Limit
Easily accessible</td><td><u>SURFACE CONTAMINATED BY</u>
Water
Oil/Bitumen
Dust
Paint
Sludge
Cement
Primer
Fuel
Solid Wastes
Sewage</td></tr>
<tr><td colspan="3">POTENTIAL SAFETY HAZARDS</td></tr>
<tr><td colspan="3">Traffic Visibility
Falling debris Fall
Suffocation Disease outbreak
Fire Outbreak Skin irritation</td></tr>
<tr><td colspan="3">Others (specify)</td></tr>
<tr><td colspan="3">ENVIRONMENTAL ISSUES</td></tr>
</table>

Dust	Consultation with PAPs
Temporary access roads	Borrow pit management
Soil erosion	Dump site management
Uncovered vehicles with dry materials	Mobile toilets on site
Cut to spoil management	Manual Handling
Open excavation	Temporary side drain
Stagnant water on site	Tidiness of the site

Cleanliness at the camp	Workers by Gender on site	
Information sign post on site	Male	
Changing rooms for workers		
Drinking water	Female	
Site arrangement		

Other environment and social issues (specify)

PERSONNEL PROTECTIVE GEAR

Overall	Safety footwear
Helmet	Gloves
Dust mask	Reflector Jacket

Others (specify)

Number of workers on site…….	With reflector	Helmet	Dusk Musk	Gloves	Safety footwear	Gaggles

COMPLIANCE TO ENVIRONMENT HEALTH, SAFETY MEASURES AND STANDARDS

Lay out of traffic management tools (e.g. sign posts, traffic cones)

Availability of trained flag personnel and first aiders

Accessibility to first aid facilities

Availability of fire-fighting equipment

Accessibility of community properties

Dust free environment (watering 3x a day) Availability of solid waste collecting materials Availability of drainage channels Manual handling not beyond 25kgs Accessibility of ESMP and EMP, OHSMP TMP. Dumping of cut to spoil at designated site Covered trucks No contamination of soils and water
OTHERS Specify
Any accident or arising Environment and Social issue
General Remarks
Section Head……. Environment/Safety Officer…….. Signature …… Signature …… Supervising Engineer…….. Signature ……..

Appendix 6: ENVIRONMENTAL MONITORING CHECKLIST

(NC=NON-COMPLIANCE, C= COMPLIANCE, NA= NOT APPLICABLE)	
Environmental issues	**Rating**
Vehicular movement of construction vehicles	
Vegetation Clearing	
Protection of Fauna	
Soil Erosion control	
Slope protection	
Leveling	
Dumping of wastes to designated dumping sites	
Servicing and refueling of construction vehicles	
Liquid waste management	
Fire fighting	
Dust control	
Community sensitization	
Employing local personnel	
OSH meetings	
HIV/AIDS testing and counseling	
De-silting of drainage channels	
Protection of water bodies from pollution	
Disposal of solid wastes	
Flood control measures	
Traffic management	
Slope protection	
Compensation	
Drinking water for workers and visitors	
On call doctor	
Emergency contacts displayed	
Gender balance	
Induction of workers	
PPEs issued	

Workers in PPEs	
EMP displayed	
Compound talk	
No alcohol and smoking	
Dump site management	
Site cleanup and rehabilitation	
OTHERS	

Remedial Action on non-compliance (Action and time)	
Contractor's comment	Consultant comment
Contractor Name …….. Date Signature ……	Consultant Name …….. Date Signature …….

Appendix 7: ENVIRONMENTAL INDUCTION REGISTER

Employee Name		Date		
Designation				
Department/Section				
Contact Number		Trained by		
Reporting to				
TOPICS COVERED				
No.	Details			
1	Name and scope of the project			
2	Site environmental and safety chart			
3	Site Environmental Health and Safety rules and regulations			
4	Work related hazards, risks and control measures			
5	Contractor's EMP			
6	PPEs importance and usage			
7	Un safe acts and Unsafe conditions			
8	ESMP trainings			
9	Tool Box talks			
10	Site cleanup and good house keeping			
11	Drugs and alcohol Abuse			
12	Company Environmental Policies, mission and vision			
13	Company organizational structure			
14	Client and consultant			
	SELF-DECLARATION			

	I have clearly understood the environmental health and safety requirements of the project and			
	I shall abide to all EHS rules. I am responsible for all consequences arising from my failure.			
Employee Signature		Site In charge		

Appendix 8 WASTE REGISTER

Project Name:						
Date:						
Report Number:						
Site where wastes are to be disposed:						
Carrier:						
Types of wastes generated	Re-used		Recycled		Deposited	
	On site	Off site	On site	Off site	Land fill/ dump site	Off Land fill/ dump site
Inert						
Non-hazardous						

Hazardous						

Appendix 9 PERSONAL PROTECTIVE EQUIPMENT ISSUE REGISTER

SAFETY GEAR ISSUER……..

EMPLOYEE NAME……

DATE……

No.	Department	PPE type	1st issue	2nd issue	Receiver signature	In charge signature	Remarks

Appendix 10 ACCIDENT REPORT FORM

To: Environment and Safety Officer
ATSGSL Date:_____

Accident No._____ Vehicle Reg. No……

Description of incident (Additional sheet may be attached if required) include the location _____ _____ _____
Find comments and recommendation of Manager, OHS Name ……..signature …… date……. Attach the photos

Appendix 11: Code of Conduct and Ethics

Introduction

This code of conduct applies to all workers at the construction site. Ethical behaviour and conduct is important in providing a safe environment and enjoyable experience for everyone at work place.

A. Core values

As part of the assignment, the number of contracted labour force and contractor(s) should work together to uphold their values. This will drive decision making, behaviour and how to work and interact with each other for a common goal.

B. Workforce Expectations

People who will work at the proposed scheme in the respective sub-counties are entitled to expect a working environment in which they will:

- Be treated fairly, with respect and without discrimination;
- Be provided with a safe work environment;

Work in a harmonious and productive environment.

- Have their professional expertise respected by their co-workers;
- Be provided with opportunities to learn and develop in their roles. Receive open, inclusive and honest communication.

Be treated in a professional, helpful and courteous manner.

C. Personal responsibilities

The contracted company has a responsibility to provide its workers with access to rules and regulation procedures that they are required to comply with.

As a member of staff you (worker) have a responsibility to familiarize yourself with these rules and regulation procedures and to cooperate in implementing them. You also have a responsibility to make enquiries on your own behalf if you are unsure about what actions to take. You must act in a way that promotes your trust and confidence in whatever you're doing. You need to be aware that your reputation can be affected by your actions at work and, in certain circumstances, by your conduct outside the workplace.

You are required to:

- Behave in a lawful manner;
- Conduct yourself in a professional and ethical manner at all times while at work and in the public;
- Ensure you present an image of professionalism for instance what you wear to work is suitable for your duties on the site;
- Be prepared to take personal responsibility and be accountable for your own conduct, actions or omissions;
- Disclose to your manager or supervisor any challenges that may impact on your capacity to carry out your duties (e.g. lack of PPE, salary issues).

D. Manager and supervisor responsibilities

An essential function of all managers and supervisors is the fair and effective management of their staff.

If you are a manager or supervisor you are expected to demonstrate ethical conduct, fairness and equity, and to lead by good example. You are required to:

Be accountable for your own actions or omissions.

- ❖ Carry out activities in ways that are lawful, fair, ethical, reasonable and professional;
- ❖ Ensure your staff is held properly accountable for their conduct and performance;
- ❖ Be aware of acts or omissions that are sufficiently serious, repeated, or widespread enough that you should have been aware of and corrected them.

Be fully informed about the matters you deal with.

- ❖ Record and give reasons for your decisions and actions to those people who are affected;
- ❖ Ensure your staff is informed of their duties and responsibilities, and receive adequate information, instruction and training to perform them effectively, efficiently and safely.

E. Respect for each other

The contractor should be committed to create an environment where all workers can enjoy rewarding and fulfilling professional working relationships and where differences are respected.

The decisions should be based on sound management principles and on respect for each other. As a staff member you are required to:-

- ❖ Respect the professional expertise of other staff member;
- ❖ Ensure you do not discriminate against, harass, intimidate, bully or threaten any of the staff members;
- ❖ Commit to resolving personal or work-related disputes or differences in a constructive, co-operative and timely manner;
- ❖ Be sensitive to and respect the ethnic and culture of any of the staff member;

Harassment or discrimination on the grounds of sex, marital status, pregnancy, age, race, social origin, careers' responsibility, religion, disability or illness, political opinion, transgender status (actual or presumed), or sexual preference (actual or presumed) may be an offence and might lead to dismissal. In addition, staff must not harass or discriminate against others on the grounds of political or religious conviction. Report instances of discrimination, intimidation, victimization, harassment or workplace bullying to the respect supervisors.

I have read, understood and agree to comply with this code of conduct. I understand that if I do not meet the standards outlined in this code of conduct, the following may happen:

- ✓ *I may be subject to disciplinary action appropriate to the situation;*
- ✓ *My employment or services as a worker may be terminated and I may be asked to leave the workplace or campsite immediately.*

Management

Name:……..

Signature:…….

Date:……

APPENDIX 12: LAYOUT PLAN