ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FULL STUDY REPORT FOR THE CONSTRUCTION OF INTAKE AND CANALS FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION PROJECT - SIAYA COUNTY, UGENYA SUB COUNTY-SIHAY LOCATION.

Proposed Irrigation scheme: Source Fieldwork, September 2022

PROJECT PROPONENT:	**NEMA LEAD EXPERT:**
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DECEMBER 2022

CERTIFICATION

This EIA study report was prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental (Impact Assessment) and Audit Regulations 2003 which requires that every development project must have an EIA report prepared for submission to the National Environmental Management Authority (NEMA).

The following EIA Lead Expert conducted the study and prepared this report.

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Date: _____

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For and on Behalf of:

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EXECUTIVE SUMMARY

Introduction

The importance of environmental protection and conservation measures has been increasingly recognized during the past two decades, world over. It is now generally accepted that economic development strategies must be compatible with environmental goals. This requires the incorporation of environmental dimensions into the process of development. It is important to make choices and decisions that will eventually promote sound development by understanding the environment functions. Irrigation projects invariably result in many far- reaching ecological changes. Such changes benefit human population, while others threaten the long-term productivity of the specific irrigation project, as well as the water source resource base. The undesirable changes are not solely restricted to increasing pollution or loss of habitat for native plants and animals; they cover the entire range of environmental components, such as soil, water, air, energy, and the socio-economic system.

The Proposed Project

The proposed Anyiko-Ujwanga Expansion Irrigation Project straddles nineteen (19) villages, three (3) Sub-locations namely: Kathieno C, Kathieno B and Sihayi located in North East Location, East Ward, Ugenya Constituency, Ugenya Sub-County of Siaya County. The project area is located about 26km from Siaya town and 12km from Ugunja town. The intake structure will be constructed across river Nzoia at Indaglasia, Kakamega county and water conveyed through canals to the irrigation scheme downstream to the farms in Ugenya Sub county of Siaya County.

The project area rainfall is bimodal with the long rains from March – May and short rains in August – November. The average reliable annual rainfall amount is 1,203 mm. The driest months are December, January and February.

Annual mean temperature ranges between 14.6- 29.7oC. The absolute minimum and maximum temperatures are 13.8oC and 31.5oC respectively. The hottest months are December - February, while July is the coldest month.The annual potential evapo-transpiration for the area is 1,414 mm. Monthly potential evapo-transpiration values exceed the monthly rainfall amounts in all months except in April, May and August which coincides with the start of the long and short rains.

Rationale for ESIA

The Kenya Government policy on all new projects, or activities requires that an environmental impact assessment be carried out at the planning stages of the proposed undertaking to ensure that significant environmental and social impacts are taken into consideration during the planning/design, construction, operation and decommissioning of the facility. The project underwent screening process which identified the proposed Anyiko Ujwanga Kathieno Irrigation project per the 2nd schedule of Environmental Management and Coordination Act (EMCA Cap 387) – amendment via legal notice no. 31 – April 2019 to require EIA. Additionally, the project also falls under category 2 of the Africa Development Bank Environmental and Social Safeguards Policies as defined in the Bank's Operational Procedures. The project does not lead to displacement of Project Affected Persons. This Comprehensive Project Report has been prepared for submission pursuant to Regulation 7 (4) of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019.

ESIA Methodology

The assessment approach and methodology for this exercise was structured such as to cover the requirements under the EMCA, 1999 and its subsequent regulations and Africa Development Bank (AfDB) environmental safeguards. The scope of the assessment covered impacts directly or indirectly associated with the construction, operation and the decommissioning phase of the project. The lead expert used both conventional and participatory approaches in identifying the potential environmental impact and mitigating measures for the proposed project.

It involved largely an understanding of the project background, the preliminary designs and the implementation plan as well as commissioning. In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, public consultation (which included discussions with local administration and the community), photography, as well as discussions with the Proponent. Some of the key stakeholders included representatives of Ministry of water sanitation and irrigation, the local administration, the religious leaders among others. The process culminated in the preparation of an ESIA report encompassing the details specified in the Environmental Impact Assessment/Audit Regulations (2003) and subsequent amendments (2015 &2019).

Impacts and Proposed Mitigation Measures

Although there are a number of justifications of why the project should be developed in the area, there are various negative impacts raised that affect the environment and social wellbeing and therefore the proposed mitigation measures will reduce the adverse impacts. The project will come with numerous positive impacts that include improved crop production for Anyiko Ujwanga Kathieno Irrigation farmers, reduced crop failure and animal deaths from droughts, reduced post-harvest losses, employment creation among others. Some of the major negative impacts anticipated include de-vegetation, occupational health and safety risks throughout the project, dust emissions from construction and earth works, minimal soil disturbance, possible spread of COVID-19, HIV/AIDS and STDs, likelihood of conflicts in gender relations as a result of income from irrigation water use and group leadership wrangles as a result of the accruing incomes. The mitigation measures for the negative impacts have been detailed in this report. They include but not limited to provision of appropriate PPEs, strict adherence to Ministry of Health guidelines on COVID-19 prevention, continuous capacity building to management team.

Environmental and Social Management Plan

An environmental and social management plan has been developed in this report to assist the proponent in mitigating and managing environmental and social impacts associated with the life cycle of the project. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the ESMP. As such, the ESMP should be subjected to periodic review for improvement purposes.

It worth noting that the key responsibilities regarding compliance to the proposed ESMP during the construction period rest on the Contractor whereas those in operation stage will be the responsibility of the scheme members. It is important that the project proponent ensures adequate monitoring and evaluation for the Contractor for non-conformances and adequate resources are allocated for operational stage.

Conclusion and Recommendation

The positive impacts will benefit all stakeholders' especially local residents. The project proponents have promised to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities (That is, water test and soil testing) and have qualified and adequate personnel to

implement the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements. All the necessary test like for water and soil done by authorized institution. They should therefore be licensed to implement this project subject to adherence to the environmental and social management plan proposed in this report and the statutory requirements.

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LIST OF ACRONYMS AND ABBREVIATIONS

BOD	Biological Oxygen Demand
ESIA	Environmental and Social Impact Assessment
EMCA	Environmental Management Coordination Act
ESMP	Environmental and Social Management Plan
ERS	Economic Recovery Strategy
ESIA	Environmental & Social Impact Assessment
GIS	Geospatial information system
Ha	Hectares
IMT	Irrigation Management Transfer
MOWSI	Ministry of water sanitation and irrigation
NCST	National Council for Science and Technology
NEAP	National Environmental Action Plan
NEMA	National Environmental Management Authority
PAP	People Affected by Project
PAP	Project Executing Agency
PSI	Population Services International
SRA	Systems Research Applications
ToR	Terms of Reference
WRA	Water Resources Authority
WRUA	Water Users Association

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CHAPTER 1: INTRODUCTION

1.1 Background Information

Agriculture, the mainstay of Kenya's economy, currently contributes 26 per cent of the GDP directly and another 25 per cent indirectly. The sector also accounts for 65 per cent of Kenya's total exports and provides more than 18 per cent of formal employment. More than 70 per cent of informal employment is in the rural areas.

The land currently under agriculture is deteriorating due to inappropriate planning, implementation, and management. Natural resources, particularly soil and water, are being seriously affected. Soil erosion, desertification, salinization and water logging reduce productivity and jeopardize long-term sustainability. Agricultural expansion programs have often encompassed marginal land in many parts of the world. Wise management of the environment requires an ability to forecast, monitor, measure and analyse environmental trends and assess the capabilities of land and water at different levels, ranging from a small- irrigated plot to a catchment. Adoption of environmental and social impact assessment (ESIA) will enable to plan water and land use in an integrated manner, avoiding irreversible environmental damage. Contrary to common perceptions, this would lead to higher economic benefits and sustainable resource use.

Irrigation projects invariably result in many far-reaching ecological changes. Some of these changes benefit human population, while others threaten the long-term productivity of the irrigation projects themselves, as well as the natural resource base. The undesirable changes are not solely restricted to increasing pollution or loss of habitat for native plants and animals; they cover the entire range of environmental components, such as soil, water, air, energy, and the socioeconomic system. There is therefore need to safeguard such.

In order to predict environmental impacts of any development activity and to provide an opportunity to mitigate against negative impacts and enhance positive impacts, the environmental impact assessment (EIA) procedure was developed in the 1970s. An EIA being; a formal process to predict the environmental consequences of human development activities and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive effects.

Since the 1950's, but gaining momentum mainly in the 1970's, the growing environmental awareness increasingly focused attention on the environmental impacts of development projects. In many developed nations this resulted in the demand that environmental issues should be

explicitly be taken into account in the decision making process. This situation is now present in many developing Countries. The purpose of Environmental Assessment is to determine and present the environmental impacts of a proposed project, plan or policy in such a way that a rational decision can be made about its implementation. Furthermore, the EIA contributes to the reduction or mitigation of adverse impacts by generating a number of project alternatives.

These alternatives may comprise alternative sites, alternative processes or alternative implementation schedules. When executed in an early phase of the planning process, EIA may contribute to an optimization of the project design, from both economic and environmental point of view. When applied this way an EIA may also contribute to the sustainability of the resources use and environmental soundness of the executed projects.

1.2 Justification for EIA

Worldwide, the need to pursue Sustainable Development guided by environmental, social, cultural and ethical considerations is fast becoming a norm. The goal of Sustainable Development cannot be achieved without significant changes in the way development initiatives are planned, implemented and managed. In order to achieve these changes, humanity has to consider as a matter of priority environmental conservation, protection and security as essential elements of this entire process of Sustainable Development.

In recognition of the requirements of the Environmental Management and Coordination Act (EMCA) CAP 387, second schedule part 4 and 8, projects relating to Dams, Streams, and Water Resources such as construction of piers and those relating to Irrigation are classified as those requiring an Environmental Impact Assessment carried out before implementation.

It is against this backdrop that this EIA was undertaken in accordance with the regulations and guidelines set out by the National Environmental Management Authority (NEMA), as stipulated under sub-section 31-39 of EMCA CAP 387. The EIA done was to determine the current status of the environment, environmental considerations for the project in the design phase, operation phase and the decommissioning phase.

The EIA evaluated the effectiveness of the environmental considerations undertaken by the project proponents in safeguarding the environment to ensure its sustainability and reduce conflicts with the stakeholders. To this end, questionnaires were administered to gather information on the biophysical and socio-economic aspects of the project. This was also done to determine whether any pollutants are likely to be discharged into the water system from the individual farmlands during the operation phase of the project.

1.3 The Objectives of the ESIA

The main objective of Environmental & Social Impact Assessment is to ensure that the social and environmental concerns are integrated into all proposed development activities with an aim of contributing towards sustainable development. The specific objectives of the study are:

- To identify the potential environmental and social impacts arising from the proposed development project.
- To assess the significance of the identified impacts
- To evaluate the relative importance of the impacts of alternative plans, designs and sites.
- To recommend measures to alleviate the adverse impacts.
- To generate baseline data to be used in monitoring and evaluating how mitigating measures are to be implemented throughout the project cycle.
- To prepare the ESIA report that would guide in making informed decision before issuance of license by NEMA.
- To ensure compliance with the requirements of Environmental Management and Coordination Act,1999 and Environmental Regulations (Assessment and Audit), 2003.

1.4 Objectives of the Irrigation Project

The main objectives of Anyiko-Ujwanga Irrigation Project are to:

- Ensure food security;
- Create employment;
- Generate income;
- Contribute to the supply of raw materials for agro-based industries; and
- Contribute to foreign exchange generation through export surplus crops at the local and national levels.

1.5 Methodology Deployed in the Assessment

To ensure that the project proponents comply with EMCA CAP 387 the following steps were deployed during the assessment:

- Preliminary visits to the site,

- Extensive literature review pertaining to the current study and desktop studies,
- Legal assessment to determine whether the project required an EIA study
- Scoping, which determined the environmental risk posed to the environment in setting up the irrigation project in the area.
- Interviews with the local community, the project proponents, other stakeholders, and administration of questionnaires.
- Subsequent visits and inspection of the project site and a reconnaissance survey to determine the biophysical and socioeconomic aspects of the area and its environs.
- Preparation of a final EIA report.

1.5.1 Field study approach

A systematic approach was followed to determine the extent to which the site will be impacted and has been impacted upon, by construction and survey work and the future operations of the project. This helped in determining the positive and negative environmental attributes of the project. The phases included:

- Desktop study
- A site visits to the proposed intake area.
- A site walk survey was conducted along the river course and the surrounding affected farming areas. This involved a systematic inventory survey of likely impact indicators
- Existing sensitive potential pollution sources
- Likely pollution from the irrigated area during operation phase of the project
- Identification of land use within the project site and vicinity
- System of management to be put up for managing the irrigation project
- Local capacity built by the management committee to manage the project after the ministry hand over of the site during operation phases of the project.
- Likely on-site migration and immigration from other areas onto the area due to rise in agricultural potential of the area

The EIA process evaluated all the relevant processes associated with the infrastructure and

operations of the irrigation project. The developed terms of reference were used to steer and guide the EIA process, which ensured that all the environmental concerns were addressed.

Literature review pertaining to the kind of infrastructure to be constructed was conducted to familiarize the assessors with the operations of the irrigation project once it is complete. This included the review of the EMCA CAP 387, Environmental Impact Assessment guidelines and relevant studies, water act 2016. Reports on physical and biological data were also reviewed, as well as other relevant literature as enumerated in the baseline survey chapter.

During the initial stages of the assessment, the Proponent and the EIA assessor visited the site at Siaya county and the Intake area at Indangalasia in Kakamega county. As was evident, the likely negative impacts as perceived through physical assess during field investigations, the assessor made a reconnaissance survey of the site and the immediate neighboring lands as well as along the stream course in order to collect information on the biophysical and socio-economic aspects of the irrigation project.

1.6 Scope of the Environmental and Social Impact Assessment

The scope of the assessment study covered the physical extent of the project's site and its immediate environment, intake construction works of the proposed irrigation project, construction of the canal's channels and all other auxiliary works. The output of the study was the production of an Environmental Impact Assessment project report for submission to NEMA for the purposes of seeking approval and subsequent acquisition of an EIA license. This ESIA report is aimed at performing the following tasks:

1. Description of the proposed project scheme rehabilitation activities,
2. Compliance of the project's activities to Government environmental policies, controls, quality standards and environmental offences as contained in the Environment Management and Coordination Act, of 2015,
3. Evaluation of project alternatives,
4. Identification of potential environmental impacts and risks in the project area,
5. Proposing ways in which potential adverse environmental impacts, if any, will be avoided, minimized, mitigated or compensated.

CHAPTER 2: PROJECT DESCRIPTION

2.1 Introduction

The Project is Implemented by the Ministry of Water, Sanitation and Irrigation and is financed fully by the Government of Kenya and is to benefit the farmer group of the Anyiko-Ujwanga-Kathieno Cooperative Society in Ugenya Sub County.

The implementation of the project is to be carried out in phases starting from intake works through conveyance system to distribution and tertiary and drainage canals at farm level. The farmers are expected to irrigate their farms using water from the tertiary canals that are directed to their farms to improve on water use efficiency. Water is to be abstracted from river Nzoia in Kakamega county and transmitted downstream through canals.

The Anyiko rice growing Irrigation scheme was started in 1977 by the Ministry of Agriculture as an experiment using simple check structures. Encouraged by what they saw, a few farmers started growing rice by tapping water from the wetland at the upper part of the scheme for the purpose of irrigating rice and obtained reasonable yield.

2.2 Location of the Irrigation Project

The proposed Anyiko-Ujwanga Expansion Irrigation Project straddles nineteen (19) villages, three (3) Sub-locations namely: Kathieno C, Kathieno B and Sihayi located in North East Location, East Ward, Ugenya Constituency, Ugenya Sub-County of Siaya County. The scheme boundary falls between latitude 0º 15’ E and longitude 34º 15’ N and is located approximately 26km and12km from Siaya and Ugunja towns respectively.

The water intake and sedimentation basin will be constructed in Indaglasia, Kakamega county coordinates (0.323527, 34.41477) UTM.

An approximate location of the project area within the Country (Kenya) is as shown in Figure 1-1

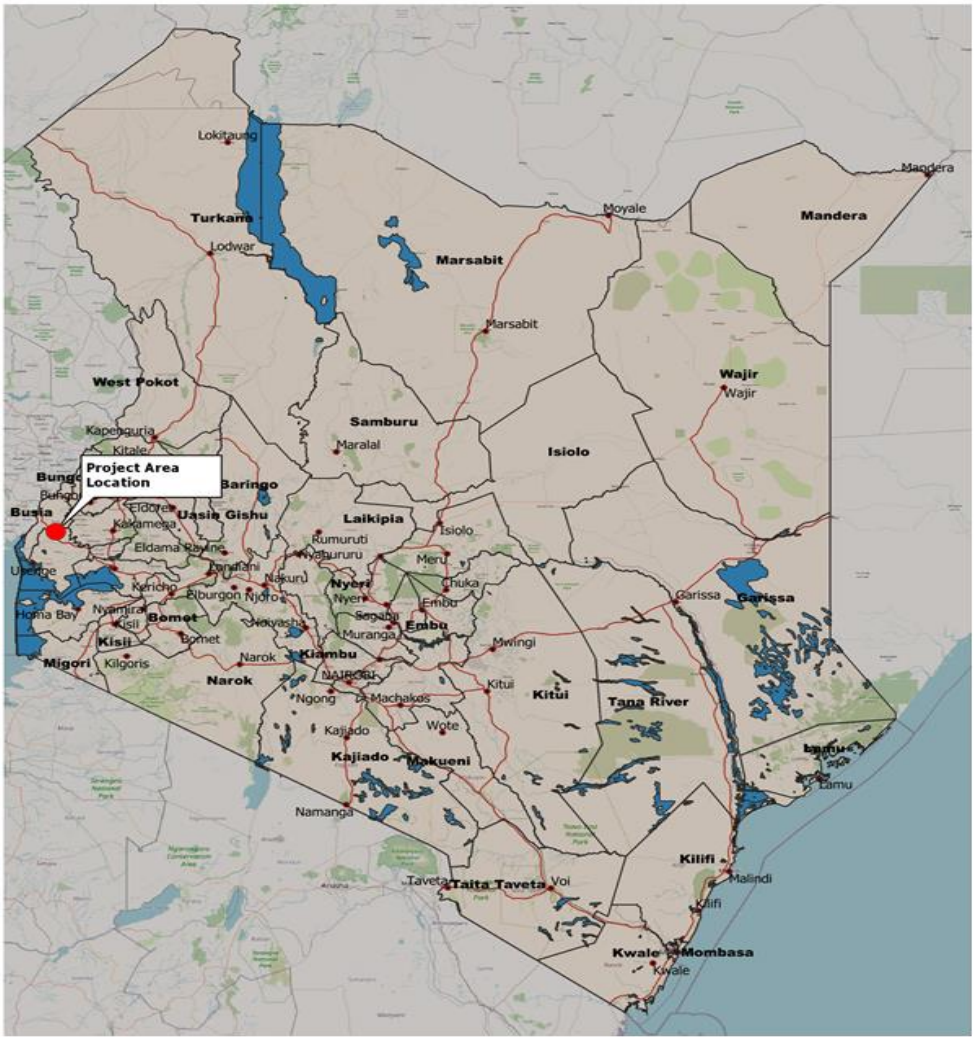

Figure 2. 1: Map of the project area

2.3 Project Description and Layout Design

Project description

The proposed irrigation development plan includes the following components:

- Irrigation area covering 934 ha in gross out of which 600ha (1,500acres) will be developed (Net area);
- 5 No. Irrigation Blocks;

- 1 No. Headworks - 40m wide, 2.5m high across river Nzoia;
- 1 No. Sedimentation Basin - 13m long, 2m wide and 1.5m high;
- 1 No. Main canal – 14.5km;
- 1 No. Secondary/Branch canal (SC1) – 7.1km;
- 6 No Tertiary canals – 6.6km;
- 28 No. Field canals – 23km;
- 13 No Field drains – .11km;
- 23.6 km of Service and Access roads.

Project Layout design

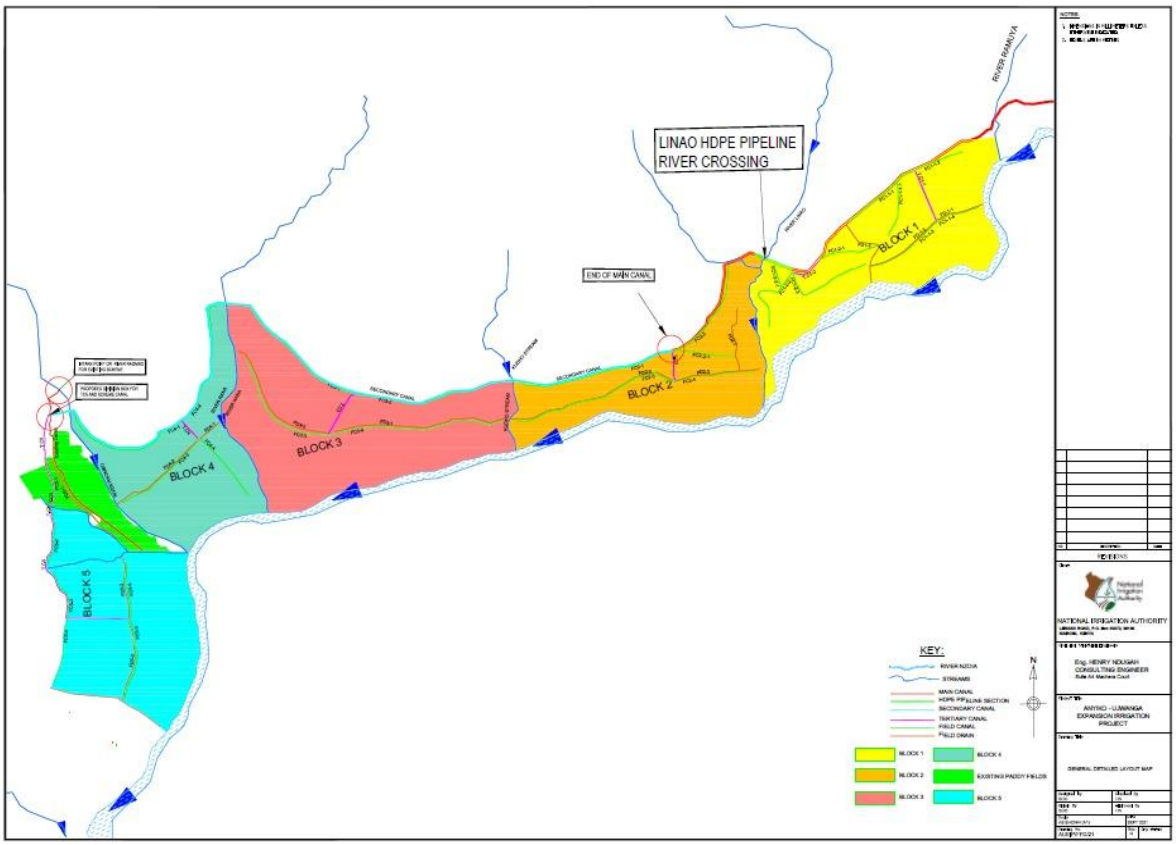

Figure 2. 2: Anyiko Ujwanga Kathieno irrigation scheme design Layout

2.4 Project Justification

Any project aimed at poverty eradication is likely to lead to a multiplier effect of enhancing environmental stewardship. There will be improved livelihoods and ability to counter the events of low incomes and lost opportunities.

There will be increased farm productivity in the area, through enhancement of capacity of the

local farmers to do intensive land use through provision of water for irrigation. There will also be increased farm incomes for the beneficiary members/community and subsequently, poverty alleviation will become a success. Through the activities associated with this project, namely farming and commerce activities, there will be creation of employment for the youth in the project area, which will lead to other multiplier effects.

2.5 Main Project Activities

The proposed projects' activities can generally be divided into four stages, namely: preconstruction/project design; construction; operation; and eventual decommissioning of the Irrigation scheme as described below.

2.5.1 Pre- Construction Stage

As part of the pre-construction stage, the project proponent has commissioned environmental lead expert to conduct an ESIA having identified the need for irrigation project in Siaya County. A preliminary design has been developed and will be taken forward for detailed design and implementation. This ESIA report forms part of the conceptual design. The procurement of the various goods and services and contracting of the construction firm and other consultants will begin after the completion of the ESIA process and development of the detailed design for the project site.

2.5.2 Construction

The construction of the intake and canals for the Irrigation project may require the creation of some temporary access roads to the construction sites. The construction of project will also require localized vegetation clearance for the construction of canals. Materials arising from the excavation of canals would either be spread in appropriate areas surrounding the line or disposed off appropriately after considering the necessary permits.

The construction of the Irrigation project will require the creation of permanent access roads connecting to the local / national road network. The sites will first need to be cleared of vegetation and excavated. Civil works would then start including creation of onsite roads, drainage, digging of foundations, pouring of concrete and creation of areas of hard standing. Sedimentation basin will require regular maintenance to remove the settled silt.

2.5.3 Operation and Maintenance

Once constructed, the Conveyance System will require minimal maintenance. Annual visual inspection of the line is expected. After a period that will be established in the operation and maintenance manual, the entire system would need a detailed survey and overhaul. There may be a requirement for occasional visits to remove tree or branches where they start to grow too

close to conveyance corridor and affect maintenance activities. Access rights may need to be retained to allow for maintenance works in the future.

The intake works will require periodic maintenance of the intake chamber and of the site infrastructure (screens, gates, roadways etc.) resulting in the generation of minimal waste.

2.5.4 Decommissioning

The Intake and canals are planned to serve the irrigation water requirements, local human and animal population. Even after the design period, the project could be expanded to increase its operational life. As such, the precise year of decommissioning may not be precisely defined at this stage. As such, decommissioning could be triggered by a range of factors which will be determined through a study at the appropriate time. Nonetheless, decommissioning works would include dismantling the irrigation system and farm restoration. The process of decommissioning would ensure that it restores the affected environment to conditions acceptable to NEMA. Environmental and Social impacts associated with the decommissioning process would be minimized through the implementation of an environmental and social management plan (ESMP) that will be prepared in the projects ESIA study report.

2.6. Project Construction Materials

The construction materials will consist of alignment soils, sand, concrete stones, ballast, hard stones, cement, crashed and graded stones, timber, reinforcement steel and ancillary, gravel concrete poles and water pipes. Water, paints and solvents will also be in use. It is recommended that all the construction materials where possible be sourced locally and be those that will be environmentally friendly.

2.7. Project's Inputs

For the proposed project to be successfully implemented the following inputs will be required

- Financial resources that will be used in the purchase of construction materials, payment for the works done and for the monitoring and evaluation activities of the project.
- Manpower both skilled and unskilled. The skilled workforce that comprises of irrigation and civil engineers, surveyors, Geographical Information Systems (GIS) experts and NEMA Lead experts whose main responsibility is provision of professional skills such as preparation of designs, bills of quantities, production of GIS maps and undertaking of Environmental and Social Impact Assessments and preparation of the ESIA reports and executing of technical works. The unskilled workforce (comprising

of casual labourers, supervisors and foremen) who should be sourced locally will be engaged in the undertaking of manual works.

- ❖ Licensed material sites such as quarries and borrow pits
- ❖ Construction materials such as cement, sand, aggregate, ballast, crushed and graded stones, concrete poles, water and timber.
- ❖ Machinery and equipment such as excavators, compactors, concrete mixers, poker vibrators and lorries, trucks and vehicles that will be used in the construction works and other associated activities such as quarrying in order to get construction materials and for hauling them to the construction sites.
- ❖ Construction materials such as sand, gravel, bitumen, hard stones, timber for works and concrete blocks that should be sourced locally and should be of acceptable standards such as being environmentally friendly
- ❖ Energy to power to run machines either electrical and diesel or petroleum powered
- ❖ Water that will be used in mixing of the construction materials and watering of dusty surfaces

2.8. Projects Output

The principle output of the project will be 1,600 acres of land put under irrigation. With the construction of intake structure and sedimentation basin, conveyance canal, 14.5kms of main canal, 7.1kms of secondary canal,6.6kms of tertiary canal. 23kms of field canal,11kms of field drains and 23.6kms of service roads.

2.9. Project's by Products and Waste

It is anticipated that a significant amount of waste will be generated during construction and decommissioning phases of the project due to the level and magnitude of the activities that will be undertaken. Upon completion, it is expected that a limited amount of waste will be generated as a result of the use of the irrigation facility and the routine repair and maintenance activities that will be carried out along the canals and the intake structure. The classification of the waste will be dependent on the waste streams or its source such as construction waste, commercial and demolition waste.

Whereas a large amount of this waste is expected to be solid in nature, a proportional amount of liquid waste will be generated. This will emanate from site offices, flows from washing of vehicles and machinery that will be used in construction activities.

2.10. Project Cost

The total cost of the proposed project is estimated to be Kenyan Shillings Four hundred and eight million, five hundred and ninety-two thousand, one hundred and five and fifty cents (KES. 408,592,105.50) as per the attached summary Bills of Quantities (BoQ) attached to this report as Appendix four.

CHAPTER 3: BASELINE ENVIRONMENT

3.1 Baseline Physical Environmental Conditions

3.1.1 Land Use Patterns and Socio-Economic Activities

Currently the majority of the farmers in Kathieno "C", Kathieno" and section of Sihay areas practice rain-fed agriculture and livestock keeping whilst very few farmers in close proximity to the rivers / streams practice some irrigated farming. Paddy rice cultivation is ongoing in parts of Ujwang'a village.

Rain-fed crops include pawpaw, bananas, sugarcane, arrow roots, maize, beans, cassava, millet, sweat potatoes, ground nuts and sorghum. Irrigation is mainly for paddy rice, horticultural crops such as kales, onions and tomatoes.

Land tenure in the target area was demarcated by the then Ministry of Lands and Settlement now known as the Ministry of Lands and Physical Planning and farmers even though title deeds have not been issued. Farmers have official search letters of their respective land portions.

The land sizes range between 0.5 – 1 acre within the existing scheme while the average land holding size for areas outside the scheme in Kathieno "C", Kathieno "B" and Sihay Sub-locations ranges between 1 acre – 5 acres.

3.1.2 Topography

The topography within the project area is generally undulating and a bit flat in some sections. The slopes on the upper areas of the irrigation blocks ranges from 1 – 1.6% while the slopes on the lower side of blocks 3 – 5 have slopes ranging from 0.3 – 0.4%.

Along the proposed main canal alignment/route and along the river bank, the topography varies from steep to less steep with slopes ranging between 2-4%.

3.1.3 Geology and soils

The soils within the project are mainly loam, clay, clay loam and sandy clay loam. Generally, the soils within the project area are a complex of deep to moderately deep and poorly to moderately well drained.

Over 70% of the project area have soils of medium acidic PH levels. Some areas however have acidic soils especially in sugarcane farms owing to the chemicals applied on the sugarcane during

the growth stage.

3.1.4 Rainfall and climate

The project area rainfall is bimodal with the long rains from March – May and short rains in August – November. The average reliable annual rainfall amount is 1,203 mm. The driest months are December, January and February.

Annual mean temperature ranges between 14.6- 29.7oC. The absolute minimum and maximum temperatures are 13.8oC and 31.5oC respectively. The hottest months are December - February, while July is the coldest month.

The annual potential evapo-transpiration for the area is 1,414 mm. Monthly potential evapo-transpiration values exceed the monthly rainfall amounts in all months except in April, May and August which coincides with the start of the long and short rains.

3.2 Baseline Biological Environmental Conditions

There are no environmentally sensitive areas within the project location. There are no sensitive ecosystems that will be affected by the proposed Anyiko Ujwanga Kathieno Irrigation Scheme. The water will be obtained from river Nzoia. There are no protected areas in close proximity to the proposed project. Additionally, there were no known flora or fauna listed in International Union for Conservation of Nature (IUCN) red list that are likely to be affected by the proposed project.

3.3 Baseline Socioeconomic Environmental Conditions

3.3.1 Market and urban centres

There are several market centres serving the households within the proposed project area such as Ligega, Got Nanga, Bondo Masiro, Ouru, Sihay, Luanda Konyango, Kodongo, Luthehe, Konya and Indangalasia. Major towns within close proximity to the project area are Ugunja, Busia, Sega, Bumala, Busia, Kakamega, Mumias, Siaya, Bondo, Luanda and Kisumu.

3.3.2 Demography

As per the population census of 2019; the three Sub-locations have a total population of 15,918 persons with male population being 7,483 persons and female population being 8,434 persons. The total number of households is 3,851 and the average population density is 332 persons per square kilometre

3.3.3 Membership and Organization

There exist a registered Anyiko – Ujwag'a Cooperative Society with over 200 members. The Cooperative has elected officials who controls and manages the operations of the society and the scheme. The Cooperative Society has a physical office which also doubles as storage and milling facility for paddy rice.

With the expansion of the scheme area from the current 130 acres to 1,500acres (600ha), the new membership is expected to be at least 1,000 farmers drawn from the three (3) Sub-locations.

3.3.4 Crops and Livestock production

The main economic activity within the project is agriculture at 80% where both rain-fed and irrigated agriculture (Anyiko – Ujwang'a rice and small holders along the river banks) and livestock keeping is practiced. Other sources of income are employment, fishing, sand harvesting, casual labour, business and pensions.

Figure 3. 1: Rice farm

3.3.5 Health, Health Services and Nutritional Status

Common illness within the project area and the surrounding includes Malaria, HIV/AIDS, diarrheal, respiratory infections and Tuberculosis (TB). As per the Kenya Malaria indicator survey, prevalence rate in 2010 and 2015 was at 38 per cent and 27 per cent respectively for the Lake endemic region, that notwithstanding it contributes to 38 per cent of morbidity cause

There are a total of about twelve (12No) Government dispensaries and about five (5No) private hospitals in Ugenya Sub-County. The community within the project area occasionally visit the hospitals closer to them when sick

Although nutritional indicators have improved, malnutrition is still one of the contributing factors to morbidity and mortality especially in infants, children, maternal, geriatrics and people living with HIV/AIDS and TB. The 2014 Kenya Demographic and Health Survey indicate that the nutritional situation of the county is still wanting.

Poor infant and young child feeding practices continue to prevail with low rates of exclusive breastfeeding against the National target of 80% of children under the age of six months in 2017 due to late introduction of complementary food and poor dietary diversity.

3.3.6 Housing

Housing forms a basic aspect at household level since it gives both shelter and security to the household members. Majority of the households (70%) within the project area have mud houses with earth floor while about 30% have cemented floors. About 80% of the households have corrugated iron sheet roofing and 20% have makuti/grass thatched roofs. Most homes have basic infrastructure of main house, kitchen and pit latrines.

3.3.7 Education

Education enhances employment opportunities, promotes gender equality and enables realization of social development such as better income and wealth status, among others. Level of education influences training needs of an individual. Training plays a critical role in socio-economic development, which is key to the Programme especially for on adoption of climate-smart agricultural practices.

There are a number of primary, secondary and tertiary learning institutions around and within the project area, which includes; Sihay Primary School; Konya Primary School, Konyango Primary School, Ukela Primary School, Uring Primary School, Sihay Secondary School, Ugenya Medical Training College, Ugenya Teachers Training College and Ugenya Institute.

3.3.8 Water and Sanitation

Most of the households fetch water from the springs, local streams and rivers while a few of the households is served by piped water from SIBOWASCO which is the major Water Service Provider in the region. Water is also harvested from the corrugated iron sheets roofs by majority of the households and a few rely on sunken boreholes. Access to pit latrines is estimated at 85%.

3.3.9 Energy

There is a fair distribution of electricity network within the project area as a result of the rural

electrification program. However, majority of the households still uses paraffin lamps for lighting with a few others using solar powered lamps. Cooking is mostly done using fuel wood/fire wood while others use charcoal and a few uses LPG gas cylinders.

3.3.10 Transport and Road Infrastructure

The road networks within and out of the project area are of well-maintained and graded murram surfaces which are motorable throughout the year even during high rainfall season. There are several road networks connecting the local market centres and the surrounding towns such as Ugunja, Busia, Siaya, Bondo, Kakamega, Mumias and Kisumu.

There is one major tarmac road from Ugunja – Uganda which is a very busy highway.

Farmers normally transport their products on motor cycles (Boda Boda) which are a very common means of transport. Other modes of transport include bicycles, lorries and wheelbarrows.

3.3.11 Information, Communication and Technology (ICT) Development

ICT is important in general management of health, education, women empowerment, youth empowerment and poverty reduction, because people get to access the knowledge and information with ease. The mobile telephone network is well developed with several service providers in operation. Other services available include internet services and radio waves.

3.3.12 Financial Services

Banking facilities are available at Ugunja town, Siaya, Busia, Bondo and Mumias towns not so far away from the projects area where all the major banks are represented. Additionally, there exist mobile money transfer services and micro financial institutions within the area.

3.3.13 Poverty Level

As per the KNBS, 2019, the Poverty level within the County of Siaya and by extent the project area is 47.56% compared to the 43.37% at the national level. The poverty level is very high in rural areas standing at 58% compared to 38% in urban areas (GoK, 2017).

The poverty level within the project area is well above the national level hence the people wellbeing is considered as bad

3.3.14 Sources of Income

The main economic activity within the project is agriculture at 80% where both rain-fed and irrigated agriculture (Anyiko – Ujwang'a rice and small holders along the river banks) and livestock keeping is practiced. Other sources of income are employment, fishing, sand harvesting,

casual labour, business and pensions.

CHAPTER 4: POLICIES, LEGISLATIONS AND REGULATIONS

4.1 Introduction

According to the Kenya National Environment Action Plan (NEAP, 1994) the government recognized the negative impacts on ecosystems emanating from industrial, economic and social development programmes that disregarded environmental sustainability. Following this, the establishment of appropriate policies and legal guidelines as well as harmonization of the existing ones have been accomplished and/or are in the process of development. The NEAP process introduced environmental assessments in the country with the key stakeholders being industrialists, business community and local authorities. This culminated into the development of the Policy on Environment and Development under the Sessional Paper No. 6 of 1999.

This chapter highlights the Constitution of Kenya, relevant National Environmental Policies, National Strategic Plans, Legislations and pertinent regulations and Multilateral Environmental Agreements (MEAs), Africa Development Bank Environmental and Social Safeguards relevant to the proposed Anyiko Ujwanga Kathieno Irrigation Scheme.

4.2 National policies, Plans and Strategies guiding irrigation projects

The following national policies are of relevance to the operations of the existing irrigation schemes:

Table 4. 1: National Policies Plans and Strategies

National Policies, Plans and Strategies	Requirements	Compliance status
The Constitution of Kenya, 2010	• Every Kenyan has a right to a clean environment and this right includes protection from nuisances that may arise as a result of unsustainable utilization of environmental elements. • Ensuring sustainable exploitation, utilization, management and conservation of the environment and natural resources, • Encouraging public participation in the management of, protection and conservation of the environment	The Irrigation management committee has complied with the provisions of the constitution by ensuring that all activities are done in compliance with existing laws and regulations.

National Policies, Plans and Strategies	Requirements	Compliance status
	and establishing systems of environmental impact assessment, environmental & Social Impact Assessment and monitoring among others.	
Environment and development policy (Sessional Paper No.6 of 1999)	To harmonize environmental and development goals so as to ensure sustainability.	The Irrigation management committee to apply proposed mitigation measures to ensure balanced coexistence of the irrigation farms and the neighboring land uses.
The National Environmental Action Plan (NEAP).	Integrate environmental considerations into the country's economic and social development through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources are an integral part of societal decision making.	The Irrigation management committee to ensure that the scheme which is located along the River Nzoia , with a lot of competing interest in water needs and its operations maintains environmental integrity for the benefit of downstream users.
National Policy on Water Resources Management and Development 1999	Development of appropriate sanitation systems to protect people's health and water resources from all forms of pollution.	The Irrigation management committee to coordinate the management of wastes arising from their activities in environmentally sound manner and ensures that acts of pollution that may go against provisions of this policy are avoided. Management of wastewater and solid waste is undertaken in the scheme.
HIV/AIDS **Policy of 2009**	▪ The policy identifies HIV/AIDS as a global crisis that constitutes one of the most formidable challenges to development and social progress. ▪ The Pandemic heavily affects the Kenyan economy through loss of skilled and experienced manpower due to deaths, loss of man hours due to prolonged illnesses, absenteeism, reduced	It is anticipated that there will be influx of workers, albeit on a smaller scale involved in the proposed project. HIV/AIDS has been considered as one of the proposed impacts for projects of such a scale, hence adequate mitigation measures will require to be proposed to that effect.

National Policies, Plans and Strategies	Requirements	Compliance status
	performance, increased stress, stigma, discrimination and loss of institutional memories, among others.	
Agricultural Sector Development Strategy 2010 - 2020	Agricultural Sector Development Strategy 2010-2020 is the overall national policy document that guides all agricultural stakeholders and ministries in Kenya. It outlines the characteristics, challenges, opportunities, vision, mission, strategic thrusts and the various interventions that the ministries will undertake to propel the agricultural sector to the future. The policy document advocates for improved management of the environment and natural resources, improved environmental conservation and improved pollution and waste management.	The proposed Anyiko Unjwang'a Kathieno Irrigation Scheme in Siaya County must ensure sustainable management of waste generated from agricultural produce during the construction and operation phases.
The National Climate Change Response Strategy (NCCRS), 2010	▪ NCCRS has the following key recommendations: adaptation and mitigation measures in key sectors; necessary policy, legislative and institutional adjustments; enhancing climate change awareness, education and communication in the country; capacity building requirements; enhancing research and	The proposed Anyiko Unjwang'a Kathieno Irrigation Scheme in Siaya county will be set up in an area with limited water resources. The project implementation will ensure sustainable use of land and water resources through efficient water use and protection of the project area
National Policy on Gender and Development (NPGD), 2019	▪ The Policy spells out a policy approach of gender mainstreaming and empowerment of women and clearly states that it is the right of women, men, girls and boys to participate in and benefit equally from the development process.	The proposed Anyiko Unjwang'a Kathieno Irrigation Scheme in Siaya county should hence ensure gender concerns are mainstreamed into the development to ensure that the needs and interests of each gender are addressed.

National Policies, Plans and Strategies	Requirements	Compliance status
	▪ The NPGD provides a framework for mainstreaming gender in all policies, planning and programming in Kenya and puts in place institutional mechanisms to ensure effective implementation.	
Sessional Paper No. 1 of 2017 on National Land Policy	▪ The overall goal of the national land use policy is to provide legal, administrative, institutional and technological framework for optimal utilization and productivity of land related resources in a sustainable and desirable manner at national, county and community levels. ▪ Amongst the key principles envisioned by the policy include; ➢ Land use planning, resource allocation and resource management for sustainable development to promote public good and general welfare; ➢ Environmental management and sustainable production in the utilization of land resources;	The proposed project will need to be consistent with the provisions of this Policy in order to avoid conflicts. Among the issues that will have to be addressed, is land use planning and resource management for sustainable development to promote public good and general welfare.
Sessional Paper No. 10 of 2014 on the National Environment Policy	▪ The policy seeks to provide the framework for an integrated approach to planning and sustainable management of natural resources in the country. ▪ Some key objectives relating to the project include: ➢ To conserve natural resources such that the resources meet the needs of the present without jeopardizing future generations in enjoying the	The proposed project will be climate smart to ensure the activities does not lead to degradation of environment. This will be achieved by ensuring the proposed project activities does not contribute to increased GHG emissions during its project cycle.

National Policies, Plans and Strategies	Requirements	Compliance status
	same. ➢ To integrate environmental conservation and socio-economic aspects in the development process.	
Kenya Vision 2030	▪ The Vision 2030 aims at transforming Kenya into a globally competitive, newly industrialized, middle income and prosperous country. The growth objectives underpinning the Vision 2030 require a sustainable annual economic growth rate of more than 10% supported by industry, agriculture and services. ▪ In the blueprint's vision and strategy, the country aims to add value to its products and services. The country envisions adding value to agricultural products through processing before they reach the market.	The proposed project is in line with the vision 2030 as it intends to improve the supply of water for irrigation and livestock use in Siaya County, through the design and construction of the irrigation project. This initiative is part of the process in achieving the goals of Vision 2030 for residents within these locations. The proponent endeavors to protect the environment in supporting the economic pillar of the vision.
Kenya National Youth Policy 2006	▪ This Policy aims at ensuring that the youth play their role alongside adults in the development of the Country.	The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential

4.3 Legislations and regulations

There are a number of legislations and regulatory provisions that have direct bearing on the optimum operation of the irrigation schemes and they are reviewed in the table below:

Table 4. 2: Relevant Legal Framework

Law/ Regulation	Requirements	Compliance Status
The Water Act, of 2016, Cap 372 Laws of	• Prohibits the pollution of water.	• complied with this Act and the 2007 rules

Law/ Regulation	Requirements	Compliance Status
Kenya/Water Resource management rules 2007	• A water permit must be obtained before using any water resource. • WRA to impose management controls on land use falling on riparian land. • Complains can be channelled through	through observation of requirements and stipulations of various sections of the Act applicable to the operations of the scheme. • continuously monitor the efficacy of the irrigation system and also consider the livelihood of the downstream users through river flows monitoring.
Agriculture Act Cap 318	• Promote and maintain stable agriculture to provide for the conservation of soil and its fertility t • To stimulate the development of agricultural land in accordance with the accepted practices of good land management and good crop husbandry.	• Trainings on crop husbandry and capacity building of the farmers in place • continuously monitor and guide the operations of the farmers.
Environment Management and Coordination Act, 2015	Requires that all proposed new projects, plans and policies to be subjected to environmental & Social Impact Assessment.	complied by ensuring that those carrying out the Environmental & Social Impact Assessments are certified by the regulatory authority (NEMA). This is done through stringent prequalification and contract requirements.
Environmental (Impact Assessment and & Social Impact Assessment) regulations 2019.	• Stipulate how an Environmental & Social Impact Assessment (ESIA) report should be prepared and specify all the requirements that must be complied with. • The stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the whole EA report making process	• complied with provisions of this regulation on environmental & Social Impact Assessment and requirements that a qualified and authorized environmental & Social Impact Assessment conduct an environmental & Social Impact Assessment. • Environmental & Social Impact Assessment report

Law/ Regulation	Requirements	Compliance Status
		and ensures that consultants comply with this regulation while writing Environmental & Social Impact Assessment reports
Environmental Management and Co-Ordination (Water Quality) Regulations, 2006	• Prevention of water pollution. • Compliance with the standards for effluent discharge • Monitoring discharge of waste water into the environment	• observe the requirements of this regulation especially with regard to standards for sources of domestic waste and also irrigation water in the irrigation scheme. • The irrigation management committee to monitor waste water quality being discharged back to the river to avoid river pollution.
Environmental Management and Co-ordination (Waste Management) Regulations 2006	• Minimising waste generation • Collecting and segregating waste • Proper disposal of the different types of waste.	• The irrigation management committee to ensure strict observation of these regulations by all the actors in dealing with all the wastes produced in the entire project cycle. • through the regional NEMA offices to undertake water quality monitoring in the irrigation scheme to ensure that contaminants from pesticides and chemical fertilizers do not exceed the minimum levels.
Noise and Excessive Vibration Pollution (Control) Regulations. The Factories and Other Places of Work	• Should not cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or	• The irrigation management committee to comply with these regulations by ensuring that noise levels do not

Law/ Regulation	Requirements	Compliance Status
(Noise Prevention and Control)	safety of others and the environment. • Permitted noise levels that a worker should be subjected to at the workplace. • Noise prevention program where noise levels exceed 85 dB (A).	exceed those stipulated in the Regulations. • All construction works to be carried out during day time only • The scheme management to regulate operation of machines in the farms.
The Occupational Safety and Health Act, 2007, Cap 514 laws of Kenya	• Ensure the safety, health and welfare at work of all persons working in his workplace. • Informing all persons employed of: any risks from new technologies; and imminent danger; and ensuring that every person employed participates in the application and review of safety and health measures. • Safe use of plant, machinery and equipment and states that all plant, machinery and equipment shall only be used for work, which they are designed for and be operated by a competent person. • Safe means of access and safe place of employment. • Necessary precautions including warning signs, to be taken to prevent injury to employees and other persons	• The irrigation scheme to put up safety and health sub-committee that meet regularly to discuss safety and health matters and also to carry out safety patrols. • The scheme's management to commit to continuously improve the safety and health standards in all workplaces making safety concern everyone's responsibility. • Safety and health facilities to be provided in the irrigation scheme.
The Public Health Act, Cap 242 Laws of Kenya	This Act has provisions for maintaining and securing health. It defines what environmental nuisance is.	The scheme's management to comply with this Act by implementing the various provisions on Prevention and Suppression of infectious diseases by ensuring that the premises are cleaned regularly and disinfected.

Law/ Regulation	Requirements	Compliance Status
The Pest Control Products Act Cap 346	• Regulates the importation, exportation, manufacture, distribution and use of products used for the control of pests and of the organic functions of plants and animals and for connected purposes. • It also regulates against use of pest control products without due analysis from a certified analyst specialist and inspection from an appointed inspector in addition to granting due guidance on the licensing of use and storage of the said products.	The Scheme ensures use of certified seed/fertilizer and chemicals facilitated
Irrigation Act 2019	▪ The Act provides that each county government shall, for purposes of ensuring uniformity and national standards in the irrigation sub-sector, through its legislative and administrative action, implement and act in accordance with the national policy guidelines issued by the Cabinet Secretary and approved by both Houses of Parliament. ▪ (3) The county irrigation development units established under subsection (1) shall have the following functions among others: – identify community-based smallholder schemes for implementation in line with national guidelines; – mainstream irrigation related statutory obligations such as those that relate to the environment, water and	MOWSI will support capacity building for Anyiko Unjwang'a Kathieno Irrigation Scheme in Siaya county Irrigation farmers and support establishment of viable farmer organizations, and in particular irrigation water users associations to develop and manage Anyiko Unjwang'a Kathieno Irrigation Scheme

Law/ Regulation	Requirements	Compliance Status
	health; – provide capacity building for farmers and support establishment of viable farmer organizations, and in particular irrigation water users associations to develop and manage irrigation schemes including actively participating in conflicts resolution within irrigation scheme	

4.4 International Treaties and Conventions

Kenya has ratified numerous international treaties and conventions. The relevant treaties include, but are not limited to:

a) Convention on wetlands of international importance and waterfowl habitat. This dictates wise use of wetlands and their resources
b) The International Trading Rules and Persistent Organic Pollution Convention (POP's). it identifies twelve s of substances which have been either banned or whose use or production is severely restricted
c) Convention on Biological Diversity. It aims at conservation of biological diversity and sustainable use of its components, fair and equitable sharing of benefits accruing from utilization of genetic resources.

4.5 African Convention on the Conservation of Nature and Natural Resources General

The convention established an African Convention on the conservation of nature and natural resources

Main requirements

- Improved soil conservation and introduce improved farming methods, which

will ensure long-term productivity of the land.

- Control erosion caused by various forms of land use, which may lead to loss of vegetation cover.
- Prevent and control water pollution
- Protect flora and ensure best utilization and development and conserve threatened and or special scientific or aesthetic value, plant species or communities.
- For protection of fauna resources, Kenya is required to manage wildlife populations inside designated areas and manage aquatic environment with a view of minimizing deleterious effects of any water

CHAPTER 5: PUBLIC PARTICIPATION AND CONSULTATIONS

5.1 Introduction

The EMCA 1999/2015 calls for effective stakeholder participation and public consultation in the ESIA process, this case an ESIA. Public consultations and participation ensure that the views of the affected and interested parties are incorporated as the project progresses to minimize potential adverse effects to the environment. Public consultation is also very beneficial in incorporating the views of the public to adopt the best workable models and systems since the local people know best what suits them. There were extensive consultations with various stakeholders that are directly and indirectly affected by the project involving discussions with the committees, key informants, neighboring local community. Views of affected stakeholders helped to identify and to evaluate the social and environmental issues of concerns captured under this Environmental & Social Impact Assessment.

5.2 Objectives

The key objectives of the consultation and public participation for proposed Anyiko Ujwanga Kathieno Irrigation Project was to:

i. Disseminate and inform the public and stakeholders about the project with Special reference to its key components and description
ii. Create awareness among the public on the need for the ESIA for the proposed project
iii. Gather comments, suggestions and concerns of the interested and affected parties
iv. Incorporate the information collected in the ESIA
v. Build community consensus and acceptance of the proposed project.

5.3 Methodology

Public participation for the proposed project was conducted through the public consultative meetings and admission of questionnaires to allow for systematic understanding and interaction of

the project beneficiaries, neighbors, local community members/surrounding enterprises and any other would be affected/interested parties.

i. Public consultation questionnaires

ESIA questionnaires were administered, to gather information from key stakeholder and the members of the public. This was done using structured questionnaires to assess the environmental and socio-economic views of the respondents.

ii. Public consultation meetings

In seeking the views of the key stakeholders, and any other would be affected/interested parties the lead expert organized a consultative meeting targeting the Indangalasia and Ugenya community members, the administration and the proponent key staff at Counties and sub-counties level, the ward representatives. The meeting was used to publicize the proposed Anyiko Ujwanga Kathieno Irrigation scheme and the anticipated effects and benefits. The public consultation and sensitization took place in the following villages Lur, Eshirubwe, Muthiero, Maindi, Block 4, Murweyo, Ukela, Luthehe and Ngahwa.

Figure 5. 1: public consultation at Ngahwa

5.4 Stakeholders comments

Stakeholders' comments were recorded and analyzed according to the different themes under the Environmental and Social Impact Assessment. These form the key part of the Environmental and Social Impact Assessment as required for any Environmental and Social Impact Assessment undertake.

CHAPTER 6: PROJECT ALTERNATIVE

6.1 Introduction

This section analyses the irrigation project alternatives in terms of site, technology scale and project management options.

6.2 No Project Alternative

The No Project option in respect to the proposed Anyiko Ujwanga Kathieno irrigation scheme implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses to both the government and the community as a whole. The government shall continue to offer assistance through food aid, health care, unproductive population thus strain the national reserves and offer hindrances in national growth and development. The community on the other hand shall continue to rely on rain fed agriculture that has been unreliable and therefore continue to live in abject poverty. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain underutilized.
- Reduced local and national returns due to low productivity of the land.
- Reduced interaction both at local, national, and international levels.
- No employment opportunities will be created for thousands of Kenyans who will work in the proposed project area.
- Increased rural poverty and associated problems.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the people of Siaya concerning this project, Kenyans, and the government of Kenya.

6.3 Project with or without Environmental and Social Management Plan

Without

This scenario was based upon the assumption that the proposed development would go ahead without any environmental management options being implemented. The total project impact for

the scenario is on the appreciably adverse side. This shows that if the project goes ahead without ESMP, the adverse impact on the existing environment would be several times that of the impact without the project. Thus, the ESMP described in Chapter 9 will have to be implemented to minimize the potential negative impact due to the proposed activity.

With

If the environmental management strategies discussed in Chapter 9 is fully implemented, the adverse impact of the project would be reduced, and there will be an overall improvement in physical, chemical, biological and socioeconomic environment of the region. Therefore, the proposed activity will be beneficial for the environment of the area, provided the ESMP is in place.

Conclusion: It is clear from the above, that the proposed irrigation project would have negative affect without implementing certain environmental management strategies. If ESMP, as discussed in Chapter 9, is adopted and implemented, the adverse impacts will be reduced and the overall environmental quality of the area would improve.

CHAPTER 7: ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

Irrigated agriculture is crucial to the economy, health, and welfare of the local community and the country in general. However, irrigated agriculture often radically changes land use and is a major consumer of freshwater. Irrigation development thus will have a major impact on the environment. It may result in degradation. It is necessary to determine the acceptable level and to mitigate for the degradation. This degradation may extend both upstream and downstream of the irrigated area. The impacts may be both to the natural, physical environment and to the human environment. This section discusses both identified positive and negative impacts. However, it is noteworthy that most of the impacts identified are temporary and will have no lasting or irreversible consequences on the environmental state of the Anyiko Ujwanga Kathieno irrigation scheme and surrounding area.

7.2 Negative Environmental Impacts During Construction

7.2.1 Impact on flora and fauna

Some river side vegetation will be cleared for the construction of the intake weir and sand trap. Vegetation and river stability around the intake and sediment trap will be disturbed during the construction works. Although these areas are small, care must be taken to minimize the disturbance, otherwise bank erosion on the river and the local runoffs across the canals could cause damage. However, due to the vigorous plant growth along the river bank, it is expected that the vegetation will be completely overgrown within a short period.

Mitigation Measures

- Vegetate the area but it is expected that most of the vegetation will grow by the time the project is complete.
- The contractor should concentrate only on the area they are constructing the canals the rest of vegetation should not be cleared.
- Vegetation can be trimmed instead of removing them completely.

7.2.3 Noise and Vibration

During construction, noise and vibration can be expected. Sources noise and vibration pollution include the following.

- Small machinery and hand tools
- Vehicle movements
- Excavation and concreting works. There are no dangerous emissions expected from the construction activities.

Mitigation measures

- Workers should be given noise protection equipment such as earmuffs and be taught how to use them and supervised to ensure such safety procedures are being adhered to.
- In case of use of small machinery, they should be properly guarded to minimize noise.
- Working hours should be minimized to only 8 hours a day and work will be restricted to day time only.
- Observe and practice the recommended noise regulations

7.2.4 Dust and emissions

During construction, there are potential impacts associated with emissions of dust arising from:

- Exposure of soils during site clearance and construction;
- Vehicle movement over marram roads;
- Vehicles exhaust emissions;
- Exhaust emissions from diesel-powered generators used during construction;
- Transport, handling and stockpiling of friable materials required for construction.

Mitigation Measures

- Vehicles transporting the building materials should be covered.'
- Vehicles and machineries used should be regularly maintained and serviced to prevent exhaust emissions.
- Provision of dust masks to workers
- Dropping heights of materials to be minimized
- Maximize the use of manual labor and hand tools.

- Avoid spillage of loose soil to the road where it will be disturbed and blown away by traffic.
- Sensitize drivers to avoid off road driving.
- Stockpiles of sand and soil should be covered or surrounded with wind breaks.

7.2.5 Impacts on soil quality/contamination

Sources of potential soil and water pollution may include the following:

- Improper waste disposal of construction materials.
- Waste water from the construction activities
- Fuelling, maintenance and servicing activities of the construction equipment
- Agrochemical's pollution when farming

Mitigation Measures

- Waste management during construction is crucial to prevent negative aesthetic impacts on the surrounding environment.
- Ensure machinery and vehicles are well serviced to prevent oil and fuel spillages.
- Ensure vehicle and machines are fuelled at specific places that spillages can be controlled.
- Train farmers on use of recommended rates of agrochemicals use and safety measures
- Use pesticides that decompose within a short period of time.

7.2.6 Impacts of land degradation/soil erosion

Potential project activities which might result in degradation of land includes;

- Construction of canals
- Construction of intake
- Excavation of murram for road construction

Mitigation measures

- Compaction of soil to minimise erosion from wind and water
- Planting of grass and trees and allowing natural vegetation to grow
- Rehabilitation of burrow pits used for quarry

7.3 Socio-Economic and Cultural Impacts

7.3.1 Occupational Safety and Health

The construction activities will employ several persons on-site thereby increasing the chances of accidents, injuries or illnesses. The safety and health of workers should be enhanced to promote productivity and should therefore be observed highly.

Mitigation Measures

- There should be a comprehensive Health and safety policy to safeguard the health of the workers
- There should be compliance with all health and safety standards in place
- All workers should be provided with full protective gear and there should be a proper use of PPEs. These include working boots, overalls, helmets, goggles, earmuffs, dust masks, gloves among others to safeguard their safety
- There should be proper hoarding of the site to control the movement of the public into the area
- The project site should be well sprinkled with water to reduce the dust that is produced
- Establish an assembly area for all workers in case of an accident and maintain a record of all works at the site at each particular time, in addition, workers need to be sensitized on construction safety measures
- Fully equipped first aid kits should be provided at the site and first aid training given to the supervisors for handling potential casualties
- The contractor should have workmen's compensation cover to avoid liability in cases of serious accidents which can bring the construction work to a halt
- Clean sanitary facilities and clean drinking water should be provided at the site as well
- Lunch breaks will be provided; food is set to be served at the site
- Warning signs should be erected warning of construction activities and heavy

machinery at the site

- Risky areas such as deep pits should be covered or fenced off to avoid accidents

7.3.2 Increased HIV/AIDs prevalence to the community and Construction Workforce

The prevalence of HIV/AIDS in the area could increase at the construction due to the influx of people into the project areas thereby increasing the infection rates. This could be pushed up by traders and worker's interactions due to the availability of money to spend. Some workers could use this money to look for women and engage in illicit sex thereby creating avenues for the spread of the pandemic both to the community members and to the construction workforce.

Mitigation Measures

- Education and sensitization of workers and the local communities on the dangers and prevalence of the disease
- Regular sensitization campaigns and monitoring of the disease spread
- Instituting HIV/AIDS awareness among the project workers
- There should be adequate and regular passage of information regarding the spread and risk of contracting the disease
- There should be the provision of adequate prevention measures such as condoms

7.4 Anticipated Positive Socio-Economic Impacts at the Operation Phase

7.4.1 Food Security

There is set to be an increase in the quantity of food produced once the project is operationalized. Food security will be achieved both at an individual household level and the national level due to the increase in food production. Increased farming of the various crops will ultimately lead to improved nutrition for the local populations and thereby leading to improved health in the long run. There is meant to be a boost in the amount of food available for consumption to the residents thereby reducing dependence levels.

7.4.2 Economic Growth

The development of the irrigation scheme is meant to ensure there are increased yields and a reduction of crop loss due to famine. Irrigation is also meant to bring about more land under agriculture and to promote products all year round. This will boost the economic gains through the sale of farm products. The availability of more farm outputs and inputs that can be sold in markets available will lead to a reduction in the poverty levels of many households.

The increase in agricultural production will lead to a subsequent increase in the revenue for farmers within the project area and there are meant to be several positive results such as the growth and expansion of the local markets, reduction of the poverty levels in the area, improved food security and a significant rise of the living standards of the people in project areas.

7.4.3 Employment Creation

With the implementation of the project, there will be employment opportunities for not only those who will be providing manual work, but also those providing professional works and consultancy. The living standards of a significant number of people will improve due to the availability of income. During the construction phase, there will be a significant increase in the people working in the area and this will promote the economy of the country both directly and indirectly. Use of locally available construction materials is highly recommended in order to create ready market for this materials during construction phase. This would earn the local people more income and improve cash circulation within the local area.

7.4.4 Improved Infrastructure

The development of the irrigation scheme is meant to bring about other infrastructural developments such as the expansion of the roads, markets expansion and others such as recreational facilities. The availability of water both for domestic and livestock purposes during the wet and dry seasons will also play a key role in the development of the project area. The canal will ensure a reduction in the distance between the various households and the water collection points as compared to the long distances initially covered from the homesteads to the river thereby saving time used to ferry water and doing other productive work. The produce will also attract more businessmen to the centers who will end up requiring accommodation and recreational facilities.

7.4.5 Opportunities for Skills Acquisition

The implementation of the project activities will require several pieces of training to the farmers by extension officers e.g., on-farm water management and various aspects of crop husbandry to promote productivity. There is meant to be capacity building for the farmers to pass knowledge across the board. Qualified personnel will be hired and further training is enhanced to sharpen the farmer's skills in the delivery of the extension information. This is highly desirable since the farmers will be provided with the requisite information.

7.4.6 Market for Building Materials

The project will require supply of large quantities of building materials most of which will be sourced locally in and around Western Kenya area. This will provide a ready market for building materials. Some of these materials like timber, sand, building stones and murrum are found within the project area. The indigenous people will benefit from the readily created market for their products.

7.5 Anticipated Negative Socio-Economic Impacts at The Operation Phase

7.5.1 Water use conflicts

The conflicts could be: conflict for water between farmers in the project or conflict for water between upstream and downstream users.

Mitigation Measures

- The committee should come up with a schedule on how water will be utilized by farmers in the project.
- Sustainable use of water resources and increasing water efficiency

7.5.2 Public health Concern/Water-borne diseases

Irrigation schemes/projects are prone to water borne diseases due to people consuming untreated water from the stream meant only for irrigation, stagnating of water in the schemes creates a breeding ground for mosquitoes, which end up spreading malaria.

Mitigation Measures

- Manage irrigation efficiency to prevent water ponding.
- Training to farmer on disease prevention and control

7.6 Anticipated Negative Environmental Impacts at The Operation Phase

7.6.1 Water Pollution

Since irrigation begins in the scheme, farmers may use excessive quantities or in appropriate chemicals that are dangerous to the environment. Return flows to the river may introduce agrochemicals residues into the stream channels. Too much nitrates from fertilizers and other agrochemicals may cause eutrophication thus degrading water resources.

Mitigation Measures

- Train farmers on proper agrochemical use, handling and disposal
- Encourage farmers to use manure instead of fertilizer
- Each farmer should leave 30m buffer to the river as required by NEMA, WRA and they should plant trees in addition to crops for daily consumption.
- Water quality monitoring should be carried out on quarterly basis.

7.6.2 Waste generation

Waste generated during operation can be classified as follows: Drainage water from the cultivated areas resulting from water over-application; Drainage water from cleaning of sprayers and other chemical application equipment; Dry solid waste (e.g. empty packaging materials etc); Contamination of air, soils, ground and surface water; Vermin infestation and diseases risk; Spread of infectious and contagious diseases

Mitigation Measures

- Proper identification of all waste streams thus management to involve reduce, re-use and recycle.
- Standard Operating Procedures (SOPs) should be adopted for working in and near water to avoid water pollution from liquid waste.

7.7 Sedimentation/Siltation of the River Bed

From excavation works, for creating canals and drainage may result to erosion. The soils will be transported to the river channel causing sedimentation of reservoirs and intake structures. Increased sediment load may lead to change in the river morphology, flooding together with increased river turbidity which will affect downstream ecology.

Mitigation Measures

- Frequent de-silting the intake and irrigation canals during operation
- The contractor will be required to fill up excavated trenches and burrow pits after contraction works.
- Have an embankment upstream of the intake weir.

CHAPTER 8: PUBLIC ENTITIES IN-CHARGE OF ENFORCEMENT AND OVERSIGHT

8.1 Relevant Environmental Institutions

8.1.1 National Environment Management Authority

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee (SERC) which governs the discharge limits to the environment by the proposed project.

8.1.2 Decentralized /County Environmental Committees

The County Environmental Committees contribute to decentralized environmental management and enable the participation of local communities. These environmental committees consist of the following:

i) Representatives from all the ministries;
ii) Representatives from local authorities within the province/district;
iii) Two farmers / pastoral representatives;
iv) Two representatives from NGOs involved in environmental management in the province/district;
v) A representative of each regional development authority.

8.1.3 National Environmental Complaints Committee (NECC)

The National Environmental Complaints Committee (NECC) was established under Section 31 of the Environmental Management and Co-ordination Act, 1999. It was formerly known as the Public Complaints Committee (PCC) but its name changed in the EMCA (Amendment) No. 5 of 2015). It is an important institution in the assessment of the condition of the environment in Kenya. It plays an important role in the facilitation of alternative dispute resolution mechanisms relating to environmental matters. The NECC makes recommendations to the Cabinet Secretary and thus contributes significantly to the formulation and development of environmental policy.

The membership of NECC is drawn from key stakeholders in environmental management. The Committee consists of seven members headed by a Chairperson, who is appointed by the Cabinet Secretary and qualifies to be a judge of the Environment and Land Court of Kenya. Other members are; a representative of the Attorney General, a representative of the Law Society of Kenya, one person who has demonstrated competence in environmental matters to be nominated by the Council of Governors and who is the Secretary to the Committee, a representative of the business community and two members, appointed by the Cabinet Secretary for their active role in environmental management.

8.1.4 National Environmental Tribunal (NET)

The NET is established under Section 125 of EMCA for the purpose of hearing appeals from administrative decisions by organs responsible for enforcement of environmental standards. An appeal may be lodged by a project proponent upon denial of an EIA license or by a local community upon the grant of an EIA license to a project proponent. NEMA may also refer any matter that involves a point of law or is of unusual importance or complexity to NET for direction. The proceedings of NET are not as stringent as those in a court of law and NET shall not be bound by the rules of evidence as set out in the Evidence Act. Upon the making of an award, NET's mandate ends there as it does not have the power to enforce its awards. EMCA provides that any person aggrieved by a decision or award of NET may within 30 days' appeal to the High Court.

8.1.5 Environment and Land Court

The Kenya Constitution establishes Environment and Land Court. Article 162 of the constitution provides for the creation of specialized courts to handle all matters on land and the environment. The court has the status and powers of a High Court in every respect. Article 159 on the principles of judicial authority, indicates that courts endeavors to encourage application of alternative dispute resolution mechanisms, including traditional ones, so long as they are consistent with the constitution. Section 20, of the Environment and Land Court Act, 2011 empowers the Environment and Land Court, on its own motion, or on application of the parties to a dispute, to direct the application of including traditional dispute resolution mechanisms.

8.2 Institutional Responsibilities with Respect to Social Issues

The constitution provides for several institutions to address issues of vulnerable and marginalized groups including grievance and conflict handling mechanisms as provided for in this project ESMF

as well as in the project Implementation plans. Key constitutional mechanisms for redress of issues related to marginalization include the (a) Commission on Administrative Justice-Office of the Ombudsman; (b) National Land Commission; and (c) Committee on Revenue Allocation.

8.2.1 Commission on Administrative Justice (CAJ) – Office of the Ombudsman

Kenya has a formal Feedback and Complaints Handling Mechanism. The Commission is the national/constitutional stakeholder instrument for grievance redress. Its mandate is to receive and address complaints against public officers and public institutions to improve service delivery. Three types of complaints can be made to the office of the Ombudsman including:

1. Citizen against State/public officers and institutions;
2. Public officers against fellow public officers; and,
3. Public institutions against other public institutions.

4. Table **8. 1** below provides the steps and process for feedback and complaints redress by the Ombudsman. The Ombudsman has a three step and time bound mechanism for feedback and grievance redress, as shown below.

Table 8. 1: Feedback and Complaints Redress by the CAJ (the Ombudsman)

Step 1	Complainant fills in a Complaint Form • Complaint is assessed for compliance with CAJ Mandate; • If within mandate, CAJ commences inquiries and complainant is issued with copy of communication – CAJ 2 [Sec. 43]; • If NOT within CAJ mandate, Complainant is advised accordingly and/or referred to appropriate government agencies; • If a response is not received from the respondent after 14 working days, CAJ sends a first reminder giving the respondent 7 days to comply; • If no response is received after this, a final reminder of 7 days is sent; • If there is still no response after 28 days, summonses are issued to the respondent in line with [Sec. 27(a)].
Step 2	If after the summonses the respondent still fails to comply, the Ombudsman proceeds to: • Determines the complaint in the absence of the respondent;

	• Institutes legal proceedings against the respondent [according to Sec. 52]; • Cites the respondent as an unresponsive State or Public Office or Officer, and/or declares such State or Public Officer to be unfit to serve in the Public Service;
Step 3	How the Ombudsman undertakes grievance redress action: In resolving a complaint, the Ombudsman may: • Conduct investigations according to articles [A.59 (2)(i)] [Sec 8 b)] [A.252(1)(g)] [Sec. 53 (1)]; • Demand and obtain information or documents [S.26 (d)]; • Conduct an inquiry [A.252(1)(g)] • Undertake mediation, negotiation and conciliation [A.252 (1) (b)]; • Constitute a hearing panel; • Invite or summon any person or persons to attend to the Commission [S.26 (f)]; • Obtain orders from the Court authorizing Searches or Seizures [Sec.26 (e)]. • Obtain warrants of arrest for breach of any summons or orders of the Commission.

8.2.2 National Gender Equality Commission

National Gender Equality Commission is a constitutional Commission established by an Act of Parliament in August 2011, as a successor commission to the Kenya National Human Rights and Equality Commission pursuant to Article 59 of the Constitution. NGEC derives its mandate from Articles 27, 43, and Chapter Fifteen of the Constitution; and section 8 of NGEC Act (Cap. 15) of 2011, with the objectives of promoting gender equality and freedom from discrimination. The over-arching goal for NGEC is to contribute to the reduction of gender inequalities and the discrimination against all; women, men, persons with disabilities, the youth, children, the elderly, minorities and marginalized communities. The Agency has specific mandates including ensuring that those considered marginalized benefit from the project interventions.

8.2.3 Kenya National Commission on Human Rights

The Kenya National Commission on Human Rights (KNCHR) is an autonomous national human rights institution established under Article 59 of the Constitution of Kenya 2010. The commission has a core mandate to further the promotion and protection of human rights in Kenya. This is categorized further into two key broad mandates, namely:

- To act as a watch-dog over the Government in the area of human rights; and

- To provide key leadership in moving the country towards a human rights state.

The main goals of KNCHR are to investigate and provide redress for human rights violations; research and monitor the compliance of human rights norms and standards; conduct human rights education, to facilitate training, campaigns and advocacy on human rights; and collaborate with other stakeholders in Kenya.

8.2.4 State Department for Social Protection

The department is responsible for sectoral oversight and management of all matters concerning children, older persons and PWDs, including related policies, social development and management of statutory institutions.

The State Department has officers in all counties and most of sub-counties across the country. Since they focus on children, older persons and PWDs, the officers are key resource in the selection of beneficiaries and monitoring the project's social impacts.

8.2.5 National Council for Persons with Disabilities (NCPWD)

The NCPWD oversees all matters relating to PWDs, including:

1. Statutory responsibility for facilitation of disability mainstreaming programmes;
2. Formulating and developing measures and policies designed to achieve equal opportunities for PWDs;
3. Cooperating with the government;
4. Recommending measures to prevent discrimination against PWDs; and
5. Registering persons with disabilities and institutions and organizations giving services to PWDs.

The NCPWD has officers in all counties and a documented list of persons with disabilities that could inform implementation of the project. The officers could also support the process of translating documents and communicating with PWDs (e.g. sign language and braille)

CHAPTER 9: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

9.1 Introduction

The Environmental and Social Management Plan (ESMP) is designed to make sure that social and environmental risks and impacts that were identified during the ESIA process are successfully managed during the Project's development and operation.

The ESMP details the mitigation and management actions that the applicants and the Contractor are committed to taking, and it demonstrates how the Project will mobilize organizational resources and capacity to put these measures into action.

The ESMP also shows how mitigation and management measures will be scheduled and will ensure that the Project complies with the applicable laws and regulations within Kenya.

Environmental and social management plans have been prepared for the Anyiko Ujwanga Kathieno Irrigation project in order to avoid, minimize, and reduce negative impacts and to ensure opportunities for the enhancement of positive impacts are realized. These plans include the following:

- Noise Management Plan;
- Air Quality Management Plan;
- Biodiversity Management Plan;
- Community Health, Safety and Security Management Plan;
- Employment and Procurement Management Plan;
- Gender Development Plan; and
- Waste Management Plan

The key objectives of the ESMP are to:

- Formalize and disclose the programme for environmental and social management;
- Provide a framework for the implementation of environmental and social management initiatives. Best practice principles require that every reasonable effort is made to reduce,

and preferably prevent, negative impacts while enhancing the Project benefits. These principles have guided the ESIA process.

9.2 Roles and Responsibilities for Implementation

Key staff members responsible for implementation of the ESMP, which will include the requirements of this ESMP, are:

- HSE Officer;
- Engineering Construction Company (ECC)- Contractor;
- Irrigation water users (IWUAS)

The roles and responsibilities of key staff members are described in the overall project ESMP and summarized below in Table 9-1.

To guarantee and supervise adherence to all HSE rules, the PEA shall designate an internal HSE Officer. Additionally, the applicant shall designate a Community Liaison Officer who will always be on-site. An Engineering Construction Company (ECC) will be chosen by the PEA to handle all construction-related tasks.

A HSE Manager will be chosen by the ECC.

Table 9. 1: ESMP Roles and Responsibilities of Key Positions

Role	**Responsibility**
Project Manager/PEA	The Project Manager or his appointee is responsible for overall management of the project and ESMP implementation, and shall be responsible for: • Ensuring that the ECC contractor and ECC HSE Manager are duly informed of the responsibilities and requirements resulting from the ESMP. • Ensuring that the construction company makes provision for rehabilitation to the satisfaction of the relevant authorities, of any environmental or social damage resulting from the proposed project as well as non-compliance with the ESMP, environmental

	regulations and relevant legislation carried out by the ECC contractor.
HSE Officer	The HSE officer shall be a qualified HSE professional. The HSE officer shall be responsible for checking compliance of the contractor(s) with the requirements of this ESMP and any other relevant environmental and social legislation for all activities associated with the contract. The general duties of the HSE officer are as follows: • Being familiar with the environmental management requirements in the ESMP. • Regular auditing of the contractor(s) with the view of ensuring that all activities on the site are undertaken in accordance with the ESMP. • Issuing regular audit reports to the applicant, the Project Manager and contractor(s) regarding compliance with the ESMP. • Providing ad-hoc environmental and social advice including environmental legal requirements to the applicant, the Project Manager and the contractor(s) regarding issues that may arise during the contract. • Delivering HSE training to ECC Contractor employees and sub-contractors.
ECC Contractor	The contractor(s) must ensure that all aspects of the contract comply with both the ESMP and other relevant environmental legislation. The contractor(s) shall be responsible for: • Ensuring compliance with the ESMP at all times. • Appointing an ECC HSE Manager (on-site) officer to monitor the implementation of the ESMP (the appointed ECC HSE Manager shall be a qualified HSE professional with relevant HSE expertise). • Ensuring that the ECC HSE Manager has the resources to carry out his/her tasks.

	• Rehabilitation of or the cost of rehabilitation of any environmental and social damage that may arise out of non-compliance with the ESMP and/or environmental legislation. • Maintaining a register which keeps a record of all environmental and social incidents which occur on the site. • Ensuring precautions are taken to safeguard the lives and property of the inhabitants.
ECC HSE Manager	The ECC HSE Manager will be based on site permanently and is responsible to oversee all environmental, social, health and safety aspects of the Project to ensure continuing compliance with the ESMP. The ECC HSE Officer will be the HSE Officer's
	representative on site will report back to the applicant on all audits. ESMP responsibilities include: • Monitoring the implementation of the ESMP • Ensuring that all personnel are duly informed of the requirements in the ESMP • Ensuring that all records needed to demonstrate compliance with the ESMP requirements are obtained, filed and readily available for inspection • Consulting with the HSE Officer regarding the interpretation of the ESMP and any other aspects of the contract that may impact significantly on the environment, employees and communities • Ensuring that audits are undertaken against the ESMP, and report of audit findings to the HSE Officer
Irrigation Water Users (IWUAS)	The IWUAs act as the primary interface between the Project and the affected and indirectly affected communities. The IWUAs will be responsible for: • Implementation of Stakeholder Engagement Plan and Grievance Mechanism

	• To produce stakeholder engagement reports • To proactively maintain regular contact with affected communities through regular community visits (monthly) to monitor opinions and provide updates on activities • Ensure communication with vulnerable groups • To report grievances to the HSE Officer and ECC HSE Manager • Be present during meetings with authorities • Participate in Community Trust meetings

9.3 Implementation of the ESMP

9.3.1 Record Keeping

Through a formal procedure, the Engineering construction company Manager will be in charge of all HSE documentation, including management plans, related processes, checklists, forms, and reports.

All records will be stored locally, both in hard copy and digital form.

9.3.4 Auditing

Beyond the routine inspection and monitoring activities conducted, audits will be carried out internally by ECC Contractor to ensure compliance with regulatory requirements. The audit shall be performed by qualified staff and the results shall be reported to the Site management to be addressed.

The audit will include a review of compliance with the requirements of the EMPs and include, at a minimum, the following:

- Completeness of HSE documentation, including planning documents and inspection records;
- Conformance with monitoring requirements;
- Efficacy of activities to address any non-conformance with monitoring requirements; and
- Training activities and record keeping.

9.3.2 Grievance Redress Mechanism

The management of grievances is a vital component of stakeholder management and an important aspect of risk management for the project since grievances can be an indication of growing stakeholder concerns (real and perceived). Grievances may be verbal or written and are usually either specific claims for damages/injury or complaints or suggestions about construction or operational activities.

When a grievance has been brought to the attention of IWUAs/ ECC Contractor it will be logged and evaluated. The person or group with the grievance is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made. Where a complaint or claim is considered to be valid then steps are required to be undertaken to rectify the issue. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (e.g. government official). Stakeholders will be informed of the grievance procedure.

A six-step grievance procedure will be used for the project. These are as follows:

- Step 1: Receive and Log Grievance;
- Step 2: Acknowledge the Grievance;
- Step 3: Assess and Prioritise Grievance;
- Step 4: Investigate and Resolve the Grievance;
- Step 5: Sign-off on Grievance; and
- Step 6: Monitor.

9.3.3 Monitoring Programme

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. Monitoring parameters are included in the EMPs.

9.3.5 Corrective Action

Potential impacts and associated risks should be identified. Investigating a 'near miss' or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future.

ECC Contractor will implement a formal non-compliance and corrective action tracking procedure for investigating the causes of, and identifying corrective actions to, accidents or environmental or social non-compliances.

ECC HSE Manager is responsible for keeping records of corrective actions and for overseeing the modification of environmental or social protection procedures and/or training programs to avoid repetition of non-conformances and non-compliances.

9.3.6 Reporting

The ECC will provide appropriate documentation of environmental related activities, including internal inspection records, training records, and reports to the relevant authorities as required.

Regular reports from ECC will be submitted to MoWS&I.

ECC will inform MoWS&I immediately on any serious environmental, social, occupational health and safety, public health and safety and labour accident or incident which occurred in the project context. Contractor shall as well submit regular reports on CESMP implementation.

9.4 Environmental and Social Management plans

Table 9. 2: Noise Management Plan

No	Aspect/Activity	Management Measures	Timing	Monitoring measures	Responsibility	Performance indicator
1.	Noise Control	Measuring the intensity of noise by utilizing the noise meter.	Prior to and through out construction	Complaints relating to noise and vibration will be recorded and closed out including: • Date/ time of incident; • Name of persons involved.	ECC contractor ECC HSE Manager	• No noise related complaints received from residents during construction • Evidence of consultation and planning for atypical noise events
2.	Noise management	• Elevating the speed of work • Siting of quarries away from residential areas • Workers should be given noise protection equipment • The public should be informed that short periods of noise may be inevitable • Maximum use of manual labor and hand tools • Restrict construction activities to daytime • Schedule work to control worker's exposure to noise • Observe and practice the recommended noise regulations.	Prior to and through out construction	Complaints relating to noise and vibration will be recorded and closed out including: • Date/ time of incident; • Name of persons involved.	ECC contractor ECC HSE Manager	• No noise related complaints received from residents during construction • Evidence of consultation and planning for atypical noise events • No. of manual laborers employed

3.	Reducing Noise generated from machinery	• The quietest available machinery should be used. • All equipment should be maintained in good mechanical order and fitted with the appropriate silencers, mufflers, or acoustic covers where applicable. • Insulating engines which create noise. • Eliminating worn out machinery. • Pneumatic drills and other noisy appliances should not be used after normal working hours.	Prior to and throughout construction	Complaints relating to noise and vibration will be recorded and closed out including: Date/ time of incident; Name of persons involved.	ECC contractor	No noise related complaints received from residents during the construction Evidence of consultation and planning for atypical noise events

Table 9. 3: Air Quality and Dust Management plan

No	Aspect/activity	Management Measures	Timing	Monitoring Measure	Responsibility	Performance indicator
1.	Site Clearing and Earthworks	The smallest possible area for cleared ground for work will be exposed, and where practically feasible, dampening techniques will involve sprinkling water by use of water trucks, handheld sprayers and automatic sprinkler systems.	Inspection and visual observation	Throughout construction	ECC Contractor	Visual observations and dust complaints
2.		The approach to site layout, site clearance, and topsoil management will be in accordance with the mitigation/ management measures provided, which also reduce dust emissions.	Timely clearance and collection of overburden	Throughout construction	ECC Contractor	Method Statement defining site layout and clearance

3.		Covering of vehicles that will carry loose construction material to ensure emission of dust is at minimal.	Inspections during material delivery and construction; Observing speed limits.	Throughout construction	ECC Contractor	Visual observations and dust complaints
4.		The Contractors will be advised to provide dust masks to the workers on site.	Inspection and monitoring use of Personal Protective Equipment (PPE)	Throughout construction	ECC Contractor	Visual observations and dust complaints
5.	Grievances	The Project will develop and implement a grievance procedure for the effective management of Project grievances including those related to air quality and dust.	Grievance logbook	Start of construction	ECC Contractor and PEA	Grievance Procedure; Number of complaints.
6.		The residents will be informed of the nature of works to be carried out, the duration, as well as contract details for a Project representative that be contacted in the event of a complaint. All complaints will be managed as part of the Project's external feedback and grievance mechanism .	Grievance logbook	Throughout construction	ECC Contractor and PEA	Engagement records and grievance procedure
7.		The Project will make efforts to prevent grievances by monitoring conditions and surroundings and		Throughout construction	ECC Contractor	

		taking action to prevent dust emissions off the Project site.				
8.	Vehicles Management	Impacts associated with construction road traffic during the construction phase will be mitigated by treating (dust suppression) unpaved road, to prevent or minimize dust emission from construction vehicles.	Inspections during material delivery and construction; Observing speed limits.	Throughout construction	ECC Contractor	Visual observations and dust complaints
9.		Speed limits will be reasonably set on unpaved roads to minimize dust generation.		Throughout construction	ECC Contractor	
10.		Work vehicles will be kept sufficiently clean to avoid tracking dirt around and off the site.		Throughout construction	ECC Contractor	
11.		Work vehicles transporting friable materials will be kept adequately covered to prevent materials being spread around and off the site.		Throughout construction	ECC Contractor	
12.		Where feasible and reasonable, vehicles that are compliant with recent emission standards will be used. These vehicles will be maintained in reasonable working order.	Vehicle inspection checklist	Throughout construction	ECC Contractor	Vehicle inspection records
13.	General	Drop heights of material will be minimized.	Inspection of works	Throughout construction	ECC Contractor	Visual observations and dust complaints
14.		Where feasible and necessary, windbreaks (perpendicular to the prevailing wind direction and at a height of approx.	Inspection of works	Throughout construction	ECC Contractor	

		0.5m) will be erected around the Project Site including stockpiles, Construction Camps and associated Plants.				
15.		A "no unauthorized burning" policy will be implemented.	Site inspections	Throughout construction	ECC Contractor	
Management of Vehicle Emission						
16.	Vehicle Management	Vehicles will be regularly serviced (at least annually or in accordance with manufacturer's recommendations) and maintained in a reasonable working order to reduce emissions.	Vehicle inspection checklist	Throughout construction	ECC Contractor	Maintenance records
17.		When not in use, vehicles will be switched off, unless impractical for health and safety reasons	Inspection of vehicles	Throughout construction	ECC Contractor	Visual observations
18.		Establish exclusion zones where the offloading of Project equipment/ materials from trucks is not permitted.	Inspection of site	Throughout construction	ECC Contractor	Visual observations
19.	Generator Maintenance	Diesel generators will be subject to routine maintenance to keep the engines in optimum working order.	Maintenance checklist for generators	Throughout construction	ECC Contractor	Maintenance records
20.	Diesel Type	Diesel fuel will be sourced from stocks provided under the Kenya government's centralized open tender system to fuel Project power driven machinery/ vehicles/ equipment.	Procurement procedure and approved list of suppliers.	Throughout construction	ECC Contractor	Supplier records

Table 9. 4: Biodiversity Management Plan

No.	Aspect / Activity	Management Measures	Timing	Monitoring Measure	Responsibility	Performance Indicator
Invasive Alien Control						
1.	Alien Invasive prevention (AIP)	Development and implementation of an Invasive Species Management Plan, which will incorporate a monitoring programme and resource requirements, as well as an eradication plan, must be implemented by the Project.	Prior to and throughout construction	Regular visual inspections of identified alien invasive conducted by the Environmental Officer.	ECC Contractor; HSE Manager	No sightings or evidence of spread of weed and pest species
		• Biological control measures would only be applied if these specific measures have been approved for application in Kenya. • All alien vegetative and/ or seed-bearing material that is removed through control measures should be burnt on site to prevent the distribution of seed and fertile vegetative material, regardless of the status of the surrounding areas.	Prior to and throughout construction	Regular visual inspections of identified alien invasive conducted by the Environmental Officer.	ECC Contractor; HSE Manager	No sightings or evidence of spread of weed and pest species
		• Vehicles and construction equipment should be washed on a regular basis and should be kept clean to minimize	Prior to and throughout construction	Regular visual inspections of identified alien invasive conducted by the	ECC Contractor; HSE Manager	No sightings or evidence of spread of weed and pest species

		distribution of seeds and invasive plant material. • Tyre checks of vehicles should be conducted daily to check that seeds, thorns and vegetative material is not being distributed.		Environmental Officer.		
		Regular and ongoing monitoring of the presence of AIP should be conducted within construction and rehabilitated sites and IAP removal operations implemented according to the results, based on areas as per the above objectives.	Prior to and throughout construction	Regular visual inspections of identified alien invasive conducted by the Environmental Officer.	ECC Contractor; HSE Officer	No sightings or evidence of spread of weed and pest species
		A qualified and competent HSE Officer should be appointed with sufficient authorization to ensure throughout inspections prevention protection of the environment is prioritized.	Prior to and throughout construction	Regular visual	HSE Manager	
		Measures should be taken at the planning stage to determine the minimum required area for all equipment laydown sites, construction vehicle parking, erection of staff toilet facilities, construction viewing sites and other activities not listed here.	Prior to and throughout construction	Regular visual inspections	ECC Contractor; HSE Manager	Visual observations and audit reports

2	Habitat Loss and fragmentation prevention – buffer zones	Establish buffer zones to prevent adverse impacts on adjacent sensitive areas for activities outside of the revised project footprint. Buffer zones with a width of 150 m are to be maintained around wetlands and estuaries.	Prior to and throughout construction	Regular visual inspections	Planning Engineers; ECC Contractor; HSE Manager	Visual observations and audit reports
3	Habitat Loss and fragmentation prevention - pipelines	Design and installation of canals if required outside of the direct plant footprint, will be managed to minimize the impacts to lesser fauna	Prior to and throughout construction	Regular visual inspections	Planning Engineers; ECCs; HSE Officer	Visual observations and audit reports
4	Protection of important Species	An Environmental Officer, or a member of his/her staff should be able to recognize these species and scan areas prior to the start of construction activities to determine if present or potentially present (in the case of animals), and take appropriate steps based on the species involved.	Prior to and throughout construction	Regular visual inspections of identified important individuals conducted by the HSE Manager.	ECC Contractor; HSE Officer; ECC HSE Manager	Visual observations
Aquatic Habitat						
Aquatic Habitat Loss and fragmentation – weirs	Avoid, as far as reasonably possible, increasing length as possible to meet the proposed abstraction		Prior to and throughout the construction	Approval plans by relevant authority	ECC Contractor	Relevant plans in place with
Aquatic Habitat Loss and	• Clearing of vegetation will be limited to limit erosion and the loss of riparian		Prior to and throughout	Regular visual inspections	ECC Contractor; HSE Officer;	• Evidence of implementation on site through HSE Officer

fragmentation – erosion and sedimentation	habitat and will only take place immediately before construction commences; • Construction activities should make use of the dry season construction window as far as practical; • Construction activity will implement good sediment control to prevent silting up of downstream channels and excessive muddying of the water;	the construction	conducted by the HSE Manager.	ECC HSE Manager	checklists and weekly reports. • Evidence of erosion due to project activities.
Aquatic Habitat Loss and fragmentation – environmental flows	• Instream construction will make use of temporary culverts to avoid dewatering and to facilitate some ecological flow downstream of instream construction activities;	Prior to and throughout construction	EFR to be monitored throughout operation.	ECC Contractor; HSE Officer; ECC HSE Manager	Flow readings
Aquatic Habitat Loss and fragmentation – water quality/spills	• Accidental spills will be prevented. This will require suitable chemical storage and refueling practices • Accidental spills or any contaminated water will be isolated and treated as soon as possible; • An emergency spill procedure will be versed in	Prior to and throughout construction	Water quality be monitored upstream and downstream of construction activity	ECC, HSE Manager	Evidence of implementation on site through HSE Officer checklists and weekly reports.

	identifying and responding to accidental spill events; • No dumping of any building rubble, soil, litter, organic matter, or chemical substances will occur within water courses. • Contaminated or potentially contaminated water or runoff will be managed in a controlled way through the storm water management plan;				

Erosion control						
	Removal of Vegetation	• The removal of vegetation and soil cover will be restricted to only those areas necessary for the development; • The removal of vegetation and soil cover will be undertaken during agreed working times as permitted by suitable weather conditions. • Disturbed areas will be rehabilitated as soon as possible to prevent erosion. Revegetation must be consistent with the	Prior to and throughout construction	Regular inspections by HSE officer and HSE Manager that erosion, sedimentation and pollution not evident and water quality remains at baseline conditions.	ECC Contractor/ ECC HSE Manager	• Relevant plans in place with required provisions. • Evidence of implementation on site through HSE Officer checklists and weekly reports. • Evidence of erosion due to project activities.

		vegetation community present at the rehabilitation site.				
	Soil Erosion Mitigation	• Vehicles will remain on designated and prepared compacted access roads. • Soil conservation measures will be implemented such as stockpiling topsoil or gravel for the remediation of disturbed areas where conservation value is identified. • Construction activity will implement good sediment control to prevent silting up of downstream channels and excessive muddying of the water; and • Non-erodible materials should be used for the construction of any berms, cofferdams or other isolation structures. • Rehabilitation of open pits once the construction activities are completed • Have separate ESIA conducted for borrow pits and quarrying sites	Prior to and throughout construction	Regular inspections by HSE officer and HSE Manager that erosion, sedimentation and pollution not evident and water quality remains at baseline conditions.	ECC Contractor; HSE Officer; HSE Manager	• Relevant plans in place with required provisions. • Evidence of implementation on site through HSE Officer checklists and weekly reports. • Evidence of erosion due to project activities. • Number of borrow pits rehabilitated

Table 9. 5: Waste Management Plan

No.	Aspect / Activity	Management Measures	Monitoring Measure	Timing	Responsibility	Performance Indicator
Waste Management Method Statements						
1.	Method Statements	Method statements shall be prepared covering all waste activities at active work areas prior to the start of waste-generating activities. The Waste Management Method Statements will need to include methods associated with waste handling; waste transport; waste storage and segregation; and waste/ disposal/ treatment/ recycling/ reclamation options identified for the proposed project.	Waste management procedure	Prior to construction	ECC Contractor	Waste method statements
Waste handling						
2.	Waste Segregation	Waste will be segregated according to its composition, source, and type at source and contained in appropriately labelled and/ or colour-coded waste containers or waste skips.	Labelling of waste bins; waste management procedure	Throughout construction	ECC Contractor	Proper segregation of waste in appropriately labelled waste containers
3.	Waste Containers	Appropriately labelled bins will be located in all locations onsite where waste is generated and will make provision for the sorting of solid waste.	Inspection	Throughout construction	ECC Contractor	Adequate number of bins
4.		All bulk waste containers on site (skips, bins, drums etc.) shall be appropriately labelled to show what	Labelling bins, inspection	Throughout construction	ECC Contractor	Appropriately labelled waste containers

		class and type of waste can be disposed of in them.				
5.		Waste containers will be appropriately designed in terms of volume, composition, and shape. Containers that may react with the waste to produce a harmful substance will not be used.	Purchase of adequate waste containers, inspections	Throughout construction	ECC Contractor	Provision of adequate waste containers
		Only one class or type of waste will be stored in each container.	Inspection of waste bins	Throughout construction	ECC Contractor	Waste separation
		All waste containers located in the main waste handling facility (located at the Construction Camp) will be closed with a lid and enclosed in an area that is fenced and access will be restricted.	Inspection of waste management	Throughout construction	ECC Contractor	Enclosed waste containers in accessed controlled area
8.	Mixing of Wastes	Solid and liquid wastes will not be mixed.	Waste containers, drainage channels, inspections	Throughout construction	ECC Contractor	Segregation of solid and liquid wastes
9.	Waste Handling and Training	All waste will be handled in accordance with its class (hazardous or non-hazardous) and all personnel collecting, handling, transporting or disposing of waste will be trained in the proper procedures for dealing with the said waste class.	Inspection and trainings on waste management procedures	Throughout construction	ECC Contractor	Training records
10.	Waste Management	To promote the "4Rs" (Reduce, Reuse, Recycle and Reclaim) waste management concept, all waste will	Inspection and visual checks	Throughout construction	ECC Contractor	Waste logs

		be sorted and managed as appropriate, either for reuse, recycling or disposal.				
11.	Concrete Waste Management	A concrete washing area will be set aside for concrete trucks, to avoid the build-up of waste concrete in site areas.	Waste collection contractor, inspection and visual checks	Throughout construction	ECC Contractor	Concrete washing area. No build-up of waste concrete on site
Waste Transport Waste will be transported from the source to final disposal sites, in an appropriate manner, taking the following into account:						
12.	Transport Containers	The nature, composition and integrity of transport packaging and containers will be appropriate to the type and class of waste being transported.	Inspection and visual checks	Throughout construction	ECC Contractor	Designated and equipped waste transport vehicles
14.	Transport Vehicles	Transport vehicles will cater for the type, class and quantity of waste being transported in terms of its composition, load capacity, covering etc.	Inspection and visual checks	Throughout construction	ECC Contractor	
15.		All transport vehicles will be equipped with suitable materials or equipment to contain, manage and remove accidental spillages.	Inspection and visual checks	Throughout construction	ECC Contractor	
16.		Vehicles carrying hazardous wastes shall be labelled appropriately.	Inspection and visual checks	Throughout construction	ECC Contractor	Labelling of waste trucks
17.	Waste Loading and Unloading	Loading and unloading procedures to avoid waste loss will be followed.	Inspection and visual checks	Throughout construction	ECC Contractor	Training records, site inspection
18.	Training	Employees associated with the transport of waste will be trained in the correct procedure to address accidents and emergencies.	Training programs	Throughout construction	ECC Contractor	Training records

Table 9. 6: Community Health, Safety and Security management plan

No.	Aspect / Activity	Management Measures	Timing	Monitoring Measure	Responsibility	Performance Indicator
Traffic and Road Safety						
1.	Traffic management and incident prevention	A Traffic Management Plan (TMP) will be developed and implemented including consideration of: • Construction traffic driving rules • Driver qualifications and driver selection interviews and references. • Delivery routes to and from the project site considering community safety as well as traffic impacts. • Regulation of traffic flow and signage to manage the build-up of traffic and mitigate incidents. • Vehicle safety equipment standards • Vehicle inspection and maintenance • Accident/ incident reporting and investigation process and requirements.	Prior to and throughout construction	Traffic incident log that includes: • Date/time of incident; • Name of persons involved; • Nature of the incident; and • Lessons learnt/future mitigation. • Vehicle maintenance • logs	ECC Contractor	• TMP prepared and available for review prior to construction, compliance assessed in site inspection reports and periodic audits. • Number of incidents recorded. • Number of vehicle maintenance logs prepared.

		• Emergency preparedness and response procedures. • Disciplinary procedures.				
		Traffic safety requirements will include: • Installation and maintenance of traffic management signage, signals etc. to regulate traffic. • Setting of speed limits for traffic. • Maintenance of construction traffic routes, including potholes and road reserve areas etc. • Construction of roadside rest areas at key strategic locations to encourage driver breaks to minimize fatigue. • Installation and maintenance of measures to reduce livestock/ wildlife collisions (e.g. use of signs to alert drivers on road segments at key animal and herding crossing points.	Prior to and throughout construction	Road and signage maintenance records	ECC Contractor	• Presence of road signage. • Number of incidents recorded.
		The Project will ensure that all driver candidates meet specific requirements, including but not limited to:	Prior to and throughout construction	• Review of driver files • Traffic incident log	ECC Contractor	• Employment record, training record, observation. • Number of incidents recorded by driver.

		• Possessing a valid licence to drive each type/class of vehicle required. • Sufficient driving experience. • An incident-free driving record. • Pass an eye chart exam.				
		During the construction phase, arrangements and routes for unusual/ wide loads (if required) will be agreed in advance with the National Transport and Safety Authority (NTSA), and the appropriate permit will be obtained for the use of public roads.	Prior to and throughout construction	Permit log to track and maintain those required	ECC Contractor, HSE Manager	• Agreements with NTSA in place for wide load permits, etc. • Presence of valid permit.
4.	Pedestrian Safety	A traffic safety awareness campaign will be carried out prior to construction and during the construction period in communities within the Project sites and in schools. Training will include details on safe pathways to key areas, crossing points and rules (e.g. stop, look, listen), incident reporting, signage, and rules regarding driver behavior such as speed requirements and sexual harassment.	Prior to and throughout construction	Training log that captures the time, date and purpose of training programmes	ECC Contractor, HSE Manager	• Records of stakeholder engagement meetings, including registers and photos. • Training/ awareness materials.

Community Safety and Security						
5		Protect and ensure that safeguarding of personel and greivances redress PEA and ECC that construction mechanism contractor accidents during and security or minimizes risks to community safety and security; and to Ensure there is a way for communities to communicate grievances/concerns about risks.	Throughout construction	No road traffic or site based	Community Safety	• property is conducted in a manner construction involving construction workers or community members or assets created by Project activities • Number of grievances received related to the community security or to site assets.
		High-risk areas of construction intake sites will be secured to minimize the risk of trespass and robbery. In addition, clear and visible signage will be put in place where appropriate in English and Swahili to advise community members of such risks.	Throughout construction	Security Management Plan	ECC Contractor, HSE Manager	• Fencing and signage in place in English and Swahili. • All site trespass and theft will be investigated and corrective actions implemented.
		Sensitize local community members prior to the commencement of the construction so that they are aware of the presence and role of security guards. This includes holding meetings with male and female community leaders to establish ways of ensuring	Prior to and throughout construction	Security Management Plan	ECC Contractor, HSE Manager	• Meeting minutes, attendance registers and photos. • Stakeholder engagement log.

		trespass and attempted robbery are minimized.				
Gender Issues						
6.	Community-Workforce Relations	Relationships involving the withholding/promise of actual provision of a benefit (monetary or non-monetary) to community members in exchange sex, such sexual activity is considered "non-consensual". Penalties and/ or termination of employment will be implemented if a worker is seen interacting with a community member in an inappropriate/	Throughout construction and operation	Grievance log detailing incidents involving inappropriate behavior	PEA and ECC	□ Number of grievances raised. □ Number sexual
9.	Prevention of Gender-Based Violence (GBV) and Sexual Harassment	Develop a worker code of conduct regarding GBV and sexual harassment, including training and awareness raising within the workforce and local communities, including schools. Penalties such as termination of contract and/ or imprisonment will be enforced in the case of proven incidents.	Throughout construction	Grievance log detailing incidents involving inappropriate behavior	ECC Contractor and PEA	• As above. • Presence of worker code of conduct. • Training materials and records related to GBV and sexual harassment.
10	Incident Reporting Related to GBV and Sexual Harassment	Implement a mechanism for workers and community members to report cases of GBV and sexual harassment confidentially and without retribution. Training will be	Throughout construction	As above Incident log for GBV and sexual harassment incidents	ECC Contractor and PEA	• Number of incidents recorded. • Number of grievances raised.

		undertaken with local communities and the workforce on the reporting mechanisms.				
Community Wellbeing						
11	Noise Disturbance	Increased noise resulting from construction activities and construction traffic will be managed in line with national and international requirements detailed in a Noise Management Plan that will include detail on noise reduction and mitigation measures such as: • Construction times/ days; • Noise buffer measures, such as plantings and noise barriers; and • Noise limits in line with national and international requirements • Maximize the use of manual labor and hand tools	Prior to and during construction	• Ongoing monitoring of construction noise • Monthly review of Noise Management Plan	ECC Contractor	• Noise Management Plan in place. • Number of grievances raised in relation to noise.
12	Pollution	Dust and pollution from construction activities will be managed in line with national and international requirements detailed in the Air	Prior to and during construction	Ongoing monitoring of air quality from construction activities	ECC Contractor	• Air Quality Management Plan in place.

13	pollution	Quality Management Plan which includes pollution reduction measures such as: • Construction times/ days; • Watering of roads in key construction areas; • Implementation of dust/pollution buffers such as plantings and fencing/netting; • Waste management in key construction areas.		Monthly review of Air Quality Management Plan		• Number of grievances raised in relation to air quality.
Vector Borne and Communicable Diseases						
13	Prevention of Transmission of Communicable Diseases	Workers will receive comprehensive training on prevention, transmission and treatment of communicable diseases as part of their induction. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks. Additionally, Toolbox Talks will occur on a daily basis and will capture current risks and incidents in relation to communicable diseases.	Prior to and during construction	Health and Safety Education and Training Database in order to record details of the training provided to the workforce and communities. This information will be used to determine the success of the training and the need to amend training and information in light of diseases which are occurring.	ECC Contractor and PEA	• Records of training topics delivered. • Records of attendees by grade, gender and location with aim of 100% of workers receiving training. • Results of tests undertaken as part of the training to determine level of understanding of participants – 'pass rate' should be over 75%.

		Pre-employment screening will take place prior to mobilization to ensure that workers are fit-for work and that do not have any pre-existing conditions that are harmful and easily transferable to others. Screening protocols will consider heath conditions related to the nature of the work undertaken and legal requirements. If the candidate is suitable for the job, the Project will provide support in treating conditions as not to exclude them on that basis.	Prior to and throughout construction	Health Surveillance Monitoring System in order to record Project workers' health details, identifying actions or follow-up where necessary, and the type of healthcare that is being sought. This information will be used to identify the emergence of any health concerns or trends, which need to be proactively managed.	ECC Contractor and PEA	• 100% of workers having received pre-employment screening. • Additionally, the following will be tracked: • Number of cases of communicable diseases in total, by disease and gender. • Number of cases of vector borne diseases in total, by disease and gender. • Number of cases of STIs in total, by disease, gender and age.

14	Prevention of Transmission of Vector Borne Diseases, mainly associated with the build-up of water at construction sites during the rainy season	Workers will receive comprehensive training as part of their induction and then at least every 12 months, where appropriate, on vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. Specific training regarding malaria control will include the A-B-C-D programme. A = Awareness, B = Bite control, C = Chemoprophylaxis, D = Diagnosis and treatment. Additionally, Toolbox Talks will occur on a weekly basis that includes a discussion on risks associated with vector borne diseases during the rainy season.	Throughout construction	Health and Safety Education and Training Database	ECC Contractor and PEA	• 100% of workers receiving training. • Number of vector-borne diseases recorded. Meeting minutes from Toolbox Talks.
Sexually Transmitted Diseases / Infections						
Risk of Injury from Project Equipment/Machinery and accidents						
15	Risk of injury from Project equipment/ activities	Hazard risk assessment to be undertaken on a daily basis to observe site risks that could pose a threat to local communities.	Throughout construction	Hazard log to track and manage site risks, and to ensure that appropriate mechanisms are in place	ECC	• Hazard risk assessment in place. • Number of hazards recorded by type.

		Place hazard signage in English and in Swahili in areas where activities are taking place.	Throughout construction	As above	ECC	Hazard signage in place in English and Swahili.
		Undertake a community sensitization programme within communities and nearby schools to raise awareness of Project hazards using interactive/ practical methods of communication.	Throughout construction	As above	ECC	• Number of communities engaged. • Number of incidents involving community members. • Percentage of grievances resolved within agreed timelines.
		The Worker Code of Conduct will include provisions for protection of the community in relation to Project hazards.	Throughout construction	As above	ECC	Worker Code of Conduct in place.
		Access control measures will be in place in high risk areas.	Throughout construction	Hazard log	ECC	Access control in place.

Table 9. 7: Labour and Procurement Management Plan (including OHS)

No.	Aspect / Activity	Management Measures	Timing	Monitoring Measure	Responsibility	Performance Indicator
Occupational Health and Safety						
1.	Occupational health and safety management	A stand-alone Occupational Health and Safety Plan (OHSP) shall be developed in line with Kenyan requirements and international standards, as set out in this Labour Management Plan (LMP) below.	Prior to construction	• LMP • OHSP	Contractor, HSE Manager	• OHSP in place • Updates to OHSP based on changes to mitigation measures resulting from incidents and lessons learnt • Monthly OHSP monitoring audit records
2.	Hazard analysis and risk assessment	A comprehensive Hazard Risk Management Plan (HRMP) shall be developed to determine the risks associated with occupational health and safety at the construction site, the likelihood of them occurring and associated mitigation measures.	Prior to construction	• HRMP • OHSP	Contractor, HSE Manager	• HRMP in place • Weekly review of HRMP • Number/ type of incidents recorded and addressed
		A Job Hazard Analysis (JHA) will be undertaken on a daily basis prior to work so that all the machinery and equipment is checked, and safety requirements are in place.	During construction	• HRMP	Contractor, HSE Manager	• JHA's undertaken on a daily basis • Safety and maintenance check records

3.	Incident records	A log will be kept to record all occupational health and safety incidents, including details of the incident, date/ time, persons involved, how the incident was addressed and lessons learnt.	During construction	• HRMP • OHSP	Contractor, HSE Manager	• Incident log in place and maintained • Number/ type of incidents recorded and addressed
EMPLOYMENT AND PROCUREMENT MANAGEMENT PLAN (INCLUDING OCCUPATIONAL HEALTH AND SAFETY - OHS)						
4.	Emergency preparedness and planning	An Emergency Response Plan (EMP) associated with the construction site will be developed and maintained in the case of; Fire evacuation; Flooding and other natural hazards; Security threats; and Health outbreaks.	Prior to construction	• ERP • HRMP • OHSP	Contractor, HSE Manager	• ERP in place • Memorandums of Understanding in place with emergency providers (health, fire, security/ police, utilities) • Number of emergency incidents recorded and addressed
		All workers will be trained on the ERP. The plan will be kept in key areas in the relevant languages of workers.	During construction	• ERP • Worker Training Plan	ECC Contractor, HSE Manager	• 100% of workers trained
5.	Fire safety	An assessment will be undertaken by a trained fire officer to ensure that an adequate number/ type of fire extinguishers are available at the construction site in case of	During construction	• HRMP • OHSP • Quarterly fire safety inspections undertaken by a	ECC Contractor, HSE Manager	• Fire safety inspection records • Number of incidents recorded in relation to fire safety

		machinery/equipment overheating or catching fire. An alarm/ fire warning procedure will be in place to alert workers of fire incidents. Fire procedures will be clearly signposted in key locations at the site in English and the language of the workforce (Kiswahili).		registered fire safety advisor		• Fire procedures placed in visible locations in English and Kiswahili
6.	Occupational Health and Safety (OHS) Training	An OHS orientation training programme will be in place for all new employees and ECCs to ensure that they are familiar with the OHS standards and site requirements. Training will include: Hazard awareness. This involves risk to drowning during weir construction in the rivers, working near the river banks, trips and falls due to slippery rock/ terrain surface; Safe work practices and use of Personal protective equipment; Health risks and control measures; Equipment use and requirements; Emergency	Prior to construction	• OHSP • Worker Training Plan	ECC Contractor, HSE Manager	• 100% of workers trained • OHS training materials in place • Zero worker/ community incidents and/or accidents

		procedures (natural hazards etc); Hygiene requirements; Transmission of communicable and non-communicable diseases, including malaria, sexually transmitted infections (STIs), gastric illnesses etc.				
7.	Use of hazard signage	Hazard signage in English and Kiswahili will be placed in hazardous areas. Signage will be situated in obvious locations and be easily understood by workers, visitors and the general public.	Prior to construction	• HRMP • OHSP	ECC Contractor; HSE Manager	• Hazard signage in place in both English and Kiswahili
Provision and Use of Personal Protective Equipment						
8.	Protection of workers and visitors from workplace safety hazards	Provide all the project workers with appropriate personal protective equipment (PPE). Such PPE will include coveralls with reflector strips, reflectors, safety shoes, helmets and dusk masks. Particularly, the PPE issued to workers will be replaced when worn out. The specifics of the PPE are to be based on hazard analysis and risk assessment. Access to the construction areas will be controlled to only allow permit access. This also includes	Throughout construction phase	• HRMP • PPE issue records • H&S monitoring records	ECC contactor, HSE manager	• All project workers issued with appropriate PPE

		access by visitors who will first receive a safety induction and provided with appropriate PPE if they do not have them. Once provided, ensure mandatory PPE usage by all workers, supervisors and visitors. This is largely achieved through the OHS training of all the project workers stated above.				
9.	Access to healthcare/ provision of medical facilities	First aid facilities shall be available at the site, that includes; First aid kits proportionate to the number of workers, which are well stocked and available 24/7. A medical response aid vehicle on stand-by that is equipped with first aid storage, a bed and chair, clinical waste containers, drinking water and blankets.	During construction	• OHSP • CMP	ECC Contractor; HSE Manager	• Weekly EHS audit records • Presence of stocked first aid kits • Presence of a clean, well maintained and well equipped first aid response vehicle • Number of health and safety incidents recorded
Worker Health and Wellbeing						
10		Pre-employment screening will take place prior to mobilization to ensure that workers are fit-for-work and that do not have any preexisting conditions that are harmful and easily transferable to others. Screening	Prior to and throughout construction	Health Surveillance Monitoring System in order to record Project workers' health details, identifying	ECC Contractor; HSE Manager	• 100% of workers having received pre-employment screening. • Additionally, the following will be tracked: • Number of cases of communicable diseases in

		protocols will consider heath conditions related to the nature of the work undertaken, employee country of origin and legal requirements. If the candidate is suitable for the job, the Project will provide support in treating conditions as not to exclude them on that basis.		actions or follow-up where necessary, and the type of healthcare that is being sought.		total, by disease and gender • Number of cases of vector borne diseases in total, by disease and gender • Number of cases of STIs in total, by disease, gender and age • Number of cases of diarrhea diseases
		In the event of a new disease in an area, a significant increase in transmission compared to the baseline or outbreak, the Project will interact with local health workers/doctors to ensure there is an appropriate response in place. Depending on the situation, this may involve community education and awareness, training of health care workers etc. The Kenya Ministry of Health and international Centre for Disease Control and Prevention (CDC) will be informed of any disease outbreaks.	Throughout construction	As above	ECC Contractor; HSE Manager	• Response plans in place to address disease outbreaks • Number of cases of any new or novel diseases in the area
		The Project will implement tuberculosis (TB) prevention measures including testing and	Prior to and throughout construction	As above	ECC Contractor;	• Compliance with measures in place

		referral for treatment for all personnel working on the Project. This approach will be explained clearly to the workforce along with making it clear that there are no consequences for their employment once they have completed their course of treatment and are clear of TB. For clarity, if they are contagious or have drug resistance forms (e.g. multi-drug-resistant tuberculosis or totally drug resistant) TB they will be unable to be at the workplace.			HSE Manager	• Number of TB cases recorded
		The Project will monitor the emergence of major pandemics through CDC and World Health Organisation (WHO) alerts and/ or implement appropriate control measures and Emergency Response Plans.	Throughout construction	As above	ECC Contractor; HSE Manager	• Emergency Response Plan (ERP) in place and implemented as needed
11.	Prevention of Transmission of Vector Borne Diseases	Workers will receive comprehensive training as part of their induction and then at least every 12 months, where appropriate, on vector borne diseases, symptoms, preventative measures and	Throughout construction	Health and Safety Education and Training Database	ECC Contractor; HSE Manager	• 100% of workers receiving training • Number of vector-borne diseases recorded • Meeting minutes from Toolbox Talks

		transmission routes as well as treatment options.				
Mental Health and Substance Use						
16.	Mental health and use of substances	All workers will be made aware of the effects of alcohol, drug use and use of other potentially harmful substances, including the worker code of conduct in relation to such issues.	During construction	• OHSP • HRMP • Worker Code of Conduct/ contracts • Worker Training Plan	ECC Contractor; HSE Manager	• Worker training records • Number of males and females trained on substance use and the worker code of conduct • Number of incidents recorded in relation to substance use
17.		Support, such as counselling, will be made available to male and female workers that generally require someone to talk to about personal / mental health issues.	During construction	• OHSP • HRMP	ECC Contractor; HSE Manager	• Contracts in place with qualified counsellors / psychotherapists • Number of workers receiving counselling
Human Resource Management and Worker Rights						
18	Human resource policies and procedures	A Human Resource Management Plan (HRMP) and associated policies in line with Kenyan employment laws and the ILO requirements that clearly set out worker rights in relation to working hours, wages, overtime, sick pay, overtime, leave days and benefits. Particularly, the HRMP will include:	Prior to and during construction	• HRMP • Internal audit questionnaire on labour and working conditions (to be	ECC Contractor, HSE Manager	• Human Resource Management • Plan in place • Associated policies in place to support the Plan • Internal audit records

19.	Working conditions and terms of employment	Every worker, regardless of their status, is required to have a contract that sets out the conditions documented in the human resources policy.	Prior to and during construction	As above	ECC Contractor; HSE Manager	• Contracts in place that are aligned with the HRMP
20.	Working meetings	Meetings will be held with every worker prior to the signing of their contract to ensure that it is clearly understood and that they are made aware of their rights.	Prior to and during construction	As above	ECC Contractor; HSE Manager	• Meeting records
21.	Workers organisations and freedom of association	Freedom of association, as per the ILO requirements will be respected, allowing workers to form a committee that have the freedom to express grievances, their rights and make suggestions on labour and working conditions	During construction	HRMP detailing worker rights in line with the ILO standards and local labour laws	ECC Contractor; HSE Manager	• Trade union / worker committee formed and acting in line with the ILO standards • Number of incidents / grievances raised in relation to labour and working conditions • Contracts detailing worker rights in relation to freedom of association and collective bargaining
22.	Non-discrimination and equal opportunity	Employment decisions shall not be based on personal characteristics such as gender, race, nationality, ethnic, social and indigenous origin, religion or belief, disability, age, or sexual	During construction	HRMP Recruitment policy	ECC Contractor; HSE Manager	• Grievances raised in relation to recruitment • Number of people recruited by gender, ethnicity, religion, disability, age.

		orientation. Decisions will be made on the skills, experience and ability to perform. Recruitment processes will be carried out in a fair and equitable manner. ***Preference however shall be made to those in the local community***				
23.		In order to support gender equality, the recruitment of women will be encouraged for all available jobs. This includes approaching local technical centres and communities to inform them of such opportunities and the application process.	Prior to and during construction	• HRMP • Recruitment policy • Gender Development Plan	ECC Contractor; HSE Manager	• Number of female staff recruited • Records of recruitment efforts with various institutions / organisations
24.		Workers' gender and religious, cultural and social backgrounds will be respected by all management and workers. This includes providing workers with the possibility of celebrating religious holidays and observances.	Prior to and during construction	HRMP	ECC Contractor; HSE Manager	• Number of incidents / grievances raised in relation to labour and working conditions • Contracts detailing worker rights in relation to diversity and religious holidays / observances

25.		As with recruitment, the employment relationship will be based on equality and fair treatment, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. Measures will be taken to prevent and address harassment, intimidation, and/or exploitation, especially in regard to women. The principles of nondiscrimination apply to migrant workers.	Prior to and during construction	As above	ECC Contractor; HSE Manager	• Number of grievances raised and addressed • Number of reports of harassment
26.	Retrenchment	Prior to implementing dismissals that are a result of an economic, technical, or organizational reason (or other reasons that are not related to performance or other personal reasons), an analysis of alternatives will	As/ when required	Retrenchment Plan	ECC Contractor; HSE Manager	• Presence of retrenchment plan • Worker consultation records • Grievances raised in relation to retrenchment

		be undertaken. Additionally, a retrenchment plan will be developed and implemented that is based on requirements related to non-discrimination, and includes a consultation plan with workers, and that complies with collective bargaining agreements and local law.				
27.		All workers will receive notice of dismissal and severance payments mandated by law and collective agreements in a timely manner. All outstanding back pay and social security benefits and pension contributions and benefits will be paid (i) on or before termination of the working relationship to the workers, (ii) where appropriate, for the benefit of the workers, or (iii) payment will be made in accordance with a timeline agreed through a collective agreement. Where	As above	As above	ECC Contractor; HSE Manager	• Retrenchment payment records • Grievances raised in relation to retrenchment

		payments are made for the benefit of workers, workers will be provided with evidence of such payments.				
Consultation and Grievance Mechanisms						
28..	Worker Consultation	A worker committee shall be established composed of an equal number of male and female workers to represent their needs and requirements, as well as to facilitate good working relations. The committee shall meet regularly, at least on a monthly basis.	During construction	• HRMP • Stakeholder Engagement Plan (SEP) in relation to worker engagement	ECC Contractor; HSE Manager	• Agreement in place that includes details of the worker representative committee members • Number of males and females on the committee • Monthly committee meeting records
29.		Meetings shall be held with workers regularly, at least on a quarterly basis in order to gather feedback and capture grievances and suggestions on improvements, where required.	As above	As above	ECC Contractor; HSE Manager	• Regular worker engagement meeting records • Number of male and female workers participating in meetings • Number / type of grievances/ suggestions raised during meetings

30.		The Project SEP shall capture the means and frequency for engaging with workers and camp residents.	Prior to construction	SEP	ECC Contractor; HSE Manager	• Engagement meeting records • Number of male and female workers participating in meetings
31.	Grievances	A grievance mechanism for reporting grievances shall be in place that allows workers to report grievances and suggestions anonymously where they wish. Reporting mechanisms shall include, but not be limited to a suggestion box, contact phone number, email address, whistleblowing mechanism and through worker representatives in the worker committee.	During construction	• Grievance mechanism • HRMP	ECC Contractor; HSE Manager	• Number/ type of grievances raised using the various mechanisms in place • Number of open and closed grievances recorded in grievance log • Active use of all mechanisms
32.		All workers shall be made aware of the grievance mechanism through training (e.g. inductions) and notices placed in key locations	During construction	• Grievance mechanism • Worker Training Plan	ECC Contractor; HSE Manager	• Number of workers trained on the grievance mechanism • Number of notices placed around the construction sites

		around the construction sites.				detailing the grievance mechanism
33.		A grievance log shall be maintained to record and track grievances, as well as monitor those that may be re-occurring.	During construction	Grievance mechanism	ECC Contractor; HSE Manager	• Maintained grievance log in place • Number of open and closed grievances recorded in grievance log
34.	Conflict resolution and disciplinary measures	Workers that may be subjected to disciplinary proceedings arising from behaviour at work shall have access to a fair and transparent hearing with the possibility to contest decisions and refer the dispute to independent arbitration or relevant public authorities.	During construction	• HRMP • Grievance mechanism	ECC Contractor; HSE Manager	• Number of workers subject to disciplinary proceedings • Number of grievances raised in relation to disciplinary proceedings
35.		• In the case of conflicts between workers or other staff, all have the right to raise the issue and appeal through a conflict resolution process with management	As above	As above	ECC Contractor; HSE Manager	• Number of workers using the conflict resolution process detailed in the HRMP • Number of grievances raised in resolution to the

		or the authorities, where relevant.				conflict resolution process
36.		In cases resulting in serious issues such as physical harm, mental abuse or Gender Based Violence (GBV), the relevant authorities/ institutions shall be informed.	During construction	• HRMP • Grievance mechanism • Gender Development Plan	ECC Contractor; HSE Manager	• Number / type of incidents raised and resolution

Protection of the Workforce

37.	Child labour	In line with Kenyan employment law, children that have not attained the age of 18 shall not be employed. Children between the ages of 13 and 18 shall not be engaged in work that is harmful to the child's health and development, and that shall not affect their attendance in school or further education. This shall be included in the HRMP.	During construction	HRMP	ECC Contractor; HSE Manager	• Number of incidents raised in relation to child labour • Quarterly inspection records to identify cases of child labour

38.		Children under the age of 18 will not be employed in hazardous work - (i) with exposure to physical, psychological, or sexual abuse; (ii) underground, underwater, working at heights, or in confined spaces; (iii) with dangerous machinery, equipment, or tools, or involving handling of heavy loads; (iv) in unhealthy environments exposing the worker to hazardous substances, agents, processes, temperatures, noise, or vibration damaging to health; or (v) under difficult conditions such as long hours, late night, or confinement by employer.	As above	As above	ECC Contractor; HSE Manager	As above
39.		All job applicants will be required to provide proof of age and identify those that are under the age of 18 years old.	As above	As above	ECC Contractor; HSE Manager	• As above • Copies of identification of workers (passport/ ID card)
40.	Forced labour	Anyone engaged in forced labour shall not be employed, including involuntary or compulsory labour, such as indentured labour, bonded labour, or similar labourcontracting arrangements.	During construction	HRMP	ECC Contractor; HSE Manager	• Number of incidents raised in relation to forced labour Quarterly inspection

		Additionally, trafficked persons shall not be employed.				records in relation to forced labour

Procurement / Supply Chain

41.	Workers engaged by thirds parties	A procurement management plan shall be in place that includes policies and procedures for managing and monitoring the performance of such third parties. Conditions that align with Kenyan and international requirements shall be included in third party contracts.	Prior to and during construction	Procurement Management Plan	ECC Contractor; HSE Manager	• Procurement Plan in place • Procurement Plan monitoring records
42.		Background checks shall be carried out to ensure that third parties are reputable and legitimate, as well have an Environmental and Social Management System (ESMS) in place that is in line with Kenyan requirements and international standards.	As above	As above	ECC Contractor; HSE Manager	• ESMS in place for third parties • ESMS audit records
43.		Contracted workers shall have access a grievance mechanism. If no such mechanism is in	During construction	As above	ECC Contractor;	• Workers with access to a grievance mechanism

		place, they shall be invited to use the overall Project grievance mechanism for workers.			HSE Manager	• Grievances raised and means of reporting
44.	Supply chain risks	The supply chain/ procurement agencies will be checked and monitored to identify risks or issues related to child or forced labour and the safety of the working conditions as well as any other issues that are not in conformance with Kenyan requirements and international standards.	Prior to construction	Procurement Management Plan	ECC Contractor; HSE Manager	• Procurement Plan monitoring records • Number of incidents raised in relation to the supply chain

Table 9. 8: Gender Development Plan

Focus Area	Need	Action	Timing	Monitoring Measure	Responsibility	Performance Indicators
Stakeholder/ Community Engagement	Due to traditional community structures, women do not generally participate in community decision making.	Undertake focus group discussions with women and men separately to capture gender specific perceptions/ concerns/ suggestions.	Prior to construction, construction and operation	Stakeholder Engagement Plan Meeting minutes, photos and registers	PEA and ECC Contractor	• Number of men and women participating at meetings • Number/ type of actions implemented as a result of engagement activities
		Ensure that female representatives are nominated.	Prior to and during construction	Stakeholder Engagement Plan Meeting minutes, photos and registers	PEA	• Memorandum of understanding detailing names, roles and responsibilities of committee members • Number of men and women attending meetings
		Gather feedback regarding meeting organisation and facilitation to gauge the level of understanding that has been obtained by participants at	As above	As above	PEA and ECC Contractor	• Feedback raised by gender/ type of issue Number/ type of actions implemented as a result of feedback

		meetings, as well as suggestions for improvement.				
		Ensure that the Project grievance mechanism is accessible for men and women. This includes ensuring that project-affected communities are aware of the various grievance reporting mechanisms.	Prior to construction, construction and operation	Submitted grievance forms and log/tracker Meeting minutes, photos, and registers. Notices posted in communities with grievance reporting contact details	PEA and ECC Contractor	• Number/ type of grievances raised by gender (where possible) • Feedback on the grievance process
Social and Environmental Management	Men and women will be differentially impacted by the Project. As such these impacts should be	Gender-based health and safety training in communities, where applicable.	Prior to and during construction	Community Health and Safety Management Plan Meeting minutes, photos, and registers Grievance records	PEA and ECC Contractor	• Training materials and records • Number of grievances and incidents recorded by gender and type
	considered and integrated into Project ESMP.	Engaging and training women and men in project-affected communities to raise awareness of project risks/ hazards.	As above	As above	PEA and ECC Contractor	• Training materials and records • Number of community meetings held and number of men and women

						attending such meetings
		Engaging health workers to conduct gender-specific sensitisation regarding sexual health in schools and communities. This includes identifying and training young women in communities that can act as mentors to empower others.	As above	Community Health and Safety Management Plan Meeting minutes, photos and registers	PEA and ECC Contractor	• Memorandum of understanding with health workers • Health/ STI prevalence rates • Number of sensitization meetings held in communities and schools • Number of mentors identified and trained
		Ensure that women are equally represented in community meetings (refer to SE section above)	As above	Stakeholder Engagement Plan Meeting minutes, photos and registers	PEA and ECC Contractor	• Number of men and women participating at meetings • Number/ type of actions implemented as a result of engagement activities
Employment	Women often are less exposed to employment opportunities, particularly the industrial or construction-related sector. As such, they tend to have	Maximize direct employment opportunities for women through identifying women in communities with such education/experience directly and in technical institutions	Prior to construction	Recruitment plan that includes measures and targets for recruiting women	PEA and ECC Contractor	• Number of men and women employed • Training opportunities identified and implemented • Number of women trained and hired by job type

	less opportunity to benefit from men	Identify training opportunities for women in relation to available nonskilled jobs				
		Identify local procurement/ service provision opportunities run by/ that support women. (E.g. catering, cleaning, tailoring, logistics, food supply, etc.)	Prior to construction	As above	PEA	• Number/type of business identified and contracted
		Through a community investment programme, investigate options/ feasibility for providing scholarships and skills training for young women.	Prior and during construction	Community Investment Plan	PEA	• Feasibility study for provision of skills training and scholarships • Training options identified and implemented Number of women accessing training and scholarships

CHAPTER 10: CONCLUSION AND RECOMMENDATION

10.1 Conclusion

Environmental and Social Impact Assessment is a necessary tool to ensure that operations at the irrigation scheme are in conformity to the existing environmental rules and regulations and international best practice.

This ESIA has attempted, in an integrated manner, to cover all the components of proposed project. It has identified the adverse impacts and as appropriate recommended feasible and attainable mitigation measures. In this light, it is imperative that the Environment Management and Monitoring Plan be fully implemented. The Plan should also feed into the African Development Bank evident commitment to environmental conservation.

It is thus the expert's recommendation that the project be approved subject to the outlined mitigation measures being adhered to. The key goal should be geared towards minimizing the occurrence of impacts that (may) have the potential to degrade the general environment. This will be effectively overcome through close monitoring and adoption of the recommended Environmental Management and Monitoring Plans (EMPs). The project proponent shall work closely with the environmental Expert including NEMA, the general public and the County Government of Siaya to enhance the management of the issues of concern.

For the Biophysical components, the scheme has to put up measures to protect the water intake, they practice afforestation but will also work on documentation of protected site, flora and fauna. For the socio-economic components, the scheme should ensure that labor required within the scheme is sourced from the locals thereby offering employment opportunities; management committee should work to ensure that farmers use certified inputs and are offered with requisite training. In terms of infrastructure, the scheme sponsors should work to address a number of areas including transport infrastructure, Water supply infrastructure, liquid and solid waste infrastructure and operations and maintenance infrastructure.

The water, soil, air and noise analysis should be done regularly to inform the authorities a number of things like; Concentrations of chloride and fluoride at main inlets and drainage outlets to ensure they do not exceed NEMA standards for irrigation water; levels of BOD of irrigation water point to some level of pollution. Soils acidity and if laced with some pesticide residues. The Scheme should work into applying proposed mitigation measures.

The Environmental & Social Impact Assessment concludes that the project is feasible and should be allowed to proceed by the authority issuing EIA License.

10.2 Recommendations

The proponent must comply with the Water Act, 2016 on the provision of agriculture/irrigation and use of water resources. The use of energy efficient equipment and use of approved materials are all important in ensuring the sustainability of the proposed project.

- Environmental problems in the Anyiko Ujwanga Kathieno Irrigation Scheme ecosystem are intertwined and so approaches to address them should be integrated.
- All institutions in the ecosystem are affected by these problems or contribute to them and so they should be involved in seeking solutions.
- The community should own all the conservation efforts since they are the main beneficiaries. They must therefore be involved at all stages.
- There is no one solution to the environmental problems. A range of approaches has to be employed to address these problems.
- Communities residing in the upstream should be cushioned against the effects of reckless resource use practices upstream since it affects downstream users.
- Community empowerment in form of training is important to addressing environmental problems in the area.
- Success of environmental conservation efforts will be realized only to the extent poverty alleviation in the area will be addressed.

Therefore, in this area, the following interventions will lead to environmental sustainability Initiate irrigation projects but work towards high irrigation efficiency Promoting alternative livelihoods such as bee-keeping which is thriving in other semi-arid areas

- Promote drought resistant crops
- Improve water harvesting and storage techniques
- Promote value addition of raw products
- Reforesting with appropriate tree species
- The proponent should undertake an Environmental Audit after first year of operation of the project

The positive impacts will benefit all stakeholders' especially local residents. The project proponents have promised to adhere to prudent implementation of the environmental and social management plan. They are obtaining all necessary permits and licenses from the relevant

authorities and have qualified and adequate personnel to implement the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements.

They should therefore be licensed to implement this project subject to adherence to the environmental and social management plan proposed in this report and the statutory requirement.

REFRENCES

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APPENDICES

APPENDICES 1: LEAD EXPERT LICENCE

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/17596

Application Reference No: NEMA/EIA/EL/23113

M/S **Evance Lusi**
(individual or firm) of address

P.O. Box 49720-00100 NAIROBI

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **7833**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **5/17/2022** Expiry Date: **12/31/2022**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

APPENDICES 2: PUBLIC CONSULTATION AND SENSITIZATION ATTENDANCE SHEETS

1. LUR VILLAGE

① Village: LUR

Date: 23/11/22

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION OF THE PROPOSED ANYIKO-UJWANGA-KATHIENO IRRIGATION SCHEME

S/NO	NAME	ID NO.	~~GENDER~~ Position	PHONENO.	SIGN
1.	Charles Otieno Gero	11824902	Chairman	0703563983	[signature]
2.	Clement Oduor Onyango	35018649	C. Member	0706768745	[signature]
3	Tirus Odhiambo Otieno	31221828	C. Member	0744223927	[signature]
4	Victor Otieno Okech	30555850	C. Member	0710817931	[signature]
5.	Julius Omondi Onyango	—	member	—	[signature]
6	[illegible] Owino Onyango	3966420	Member	0717893800	[signature]
7.	Vincent Onyango Omondi	35758857	Member	0113030354	[signature]
8	William Onyango Awuor	10264065	member	—	[signature]
9	Robert OUMA OUMA	33722637		0792691000	[signature]
10	Frankline Okoth Oduor	33745996	Member	0769007796	[signature]
11	Francis Opondo [illegible]	~~[illegible]~~ 7128514	member	0106439309	[signature]
12.	LUCAS OTIENO OLOO	0257361	"	0795812674	[signature]
13	Omondi Kevin [illegible]	4094582	"	0715526497	[signature]
14	JOSEPH OMONDI	34112635	"	0791759916	[signature]
15	[illegible] OJWANG	11118527	"	0735353582	[signature]
16	Samwel Raleng Omondi	~~[illegible]~~ 30650719	"	0729521907	[signature]
17	DOMINIC OYENGO ODONGO	31691661		0746903589	[signature]

2. Village: Lur

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION OF THE PROPOSED ANYIKO-UJWANGA-KATHIENO IRRIGATION SCHEME

S/NO	NAME	ID NO.	~~GENDER~~ Position	PHONENO.	SIGN
18	JOSEPH OMGOR	13761524	member	0729832079	[signature]
19	OWINO JACOB	2734187	MEMBER	0721325817	[signature]
20	RAYMOND ODUOR	8239800		0725842405	[signature]
21	Kennedy Odhiambo	22685546	Member	0795483137	[signature]
22	George O. Oguju	11070278		0794535189	[signature]
23	Joseph Juma Aloo	9398384	Member	0703343280	[signature]
24	Kevin Owino Opondo	36022508	member	0795112026	[signature]
25	William O. Lalo	4882983	ACSf/Chief	0712459819	[signature]
26	Blassio Oyugi Ochuol	5485820	V/Elder	0722421193	[signature]
27	LUSI EVANCE	2369211	RAE	0728254681	[signature]
28	Hesbon Opuko	16000729	Contractor	0722449315	[signature]
29	MICHAEL OBIERO OKWOYA	3334230	member	0710267985	[signature]
30	WILSON OCHIENG			0720861974	[signature]
31	FREDRICK O. ODHUONGO	9183672	—	0722250779	[signature]
32	Silvester Halo Raleng	0308712	V. Elder	0708144492	[signature]
33	CHARLES OKWEYA	1083632		0727660727	[signature]
34	PAULINE MUGA	26341484	SEC.	0704378803	[signature]

(3) Village : Lur

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION OF THE PROPOSED ANYIKO-UJWANGA-KATHIENO IRRIGATION SCHEME

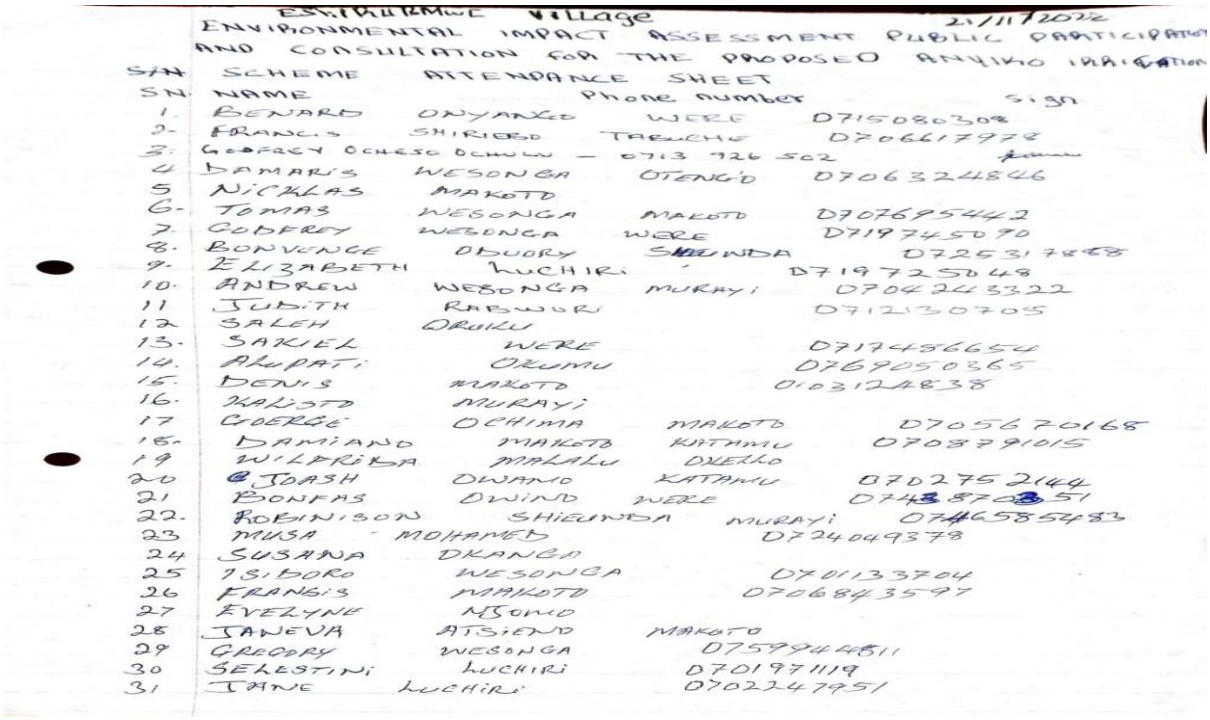
S/NO	NAME	ID NO.	~~GENDER~~ Position	PHONENO.	SIGN
1	PRISCA AOKO	9892505	CHV	0719180131	
2	DOMTILA AMYANGO	16053472	—	0733617800	
3	LINET ANYANGO OSANYO	27153819	MEMBER	0706009460	
4	ELIZABETH ADHIAMBO ONYANGO	21243394	C Member	0716947625	
5	NICHOLAS OKOTH	16088337	Member	0717626618	
6	Margret Atieno	31575-82	Member	0735464337	
7	Beatrice Aoko Adhiyo	8781503	Member	0714593392	
8	PAMELA ACHIENG ANYANGO		MEMBER	0712217566	
9	Alice A Wasonga	280717	MEMBER	0711813028	
10	JOAN OMENO	25196424	MEMBER	0713382867	
11	GRACE AKINYI	61997[illegible]	MEMBER	0700081883	
12	Joseph Odoi Mbita	619985	Member	—	
13	Mercy Ngure	26264720	SLRO	0723269092	

(4) Village Lur

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION OF THE PROPOSED ANYIKO-UJWANGA-KATHIENO IRRIGATION SCHEME

S/NO	NAME	ID NO.	~~GENDER~~ Position	PHONENO.	SIGN
1.	Micah Omondi	38541[illegible]	[illegible]	[illegible]	
2	Daniel Okhieng	26[illegible]	Member	0713916409	
	FRANCSI owino	0713671464	Member	—	
4	Boniface Akuno A	5462501	MEMBER	0721976958	
5	Ouma Robert Otieno	28519892	MEMBER	0729991981	
6	Onyango Oseko Odhiambo	28198571	MEMBER	0716870138	
7	Edwin Ochieng	2[illegible]	Member	0752426342	
8	Geoffrey Otieno	29[illegible]	Member	0746631210	
9	Kevin Otieno	—	Member	07—	
10	George Lukalo	04796[illegible]	Member	0771070[illegible]	
11	John Oloo	9641907	Member	0715672[illegible]	
12	Jane Atieno Oduor	32899793	Member	0701999659	
13	MARGARET AKUOTH	24187190	Member	0791407787	
14	RISPA ATIENO	—	Member	0719512779	
15	PAMELA AKINYI	—	Member	0770626618	
16	MARY AOMA	—	Member	0790410507	
17	SARAH AKOTH	32124[illegible]	Member	0717775949	

2. ESHIRUMBWE VILLAGE

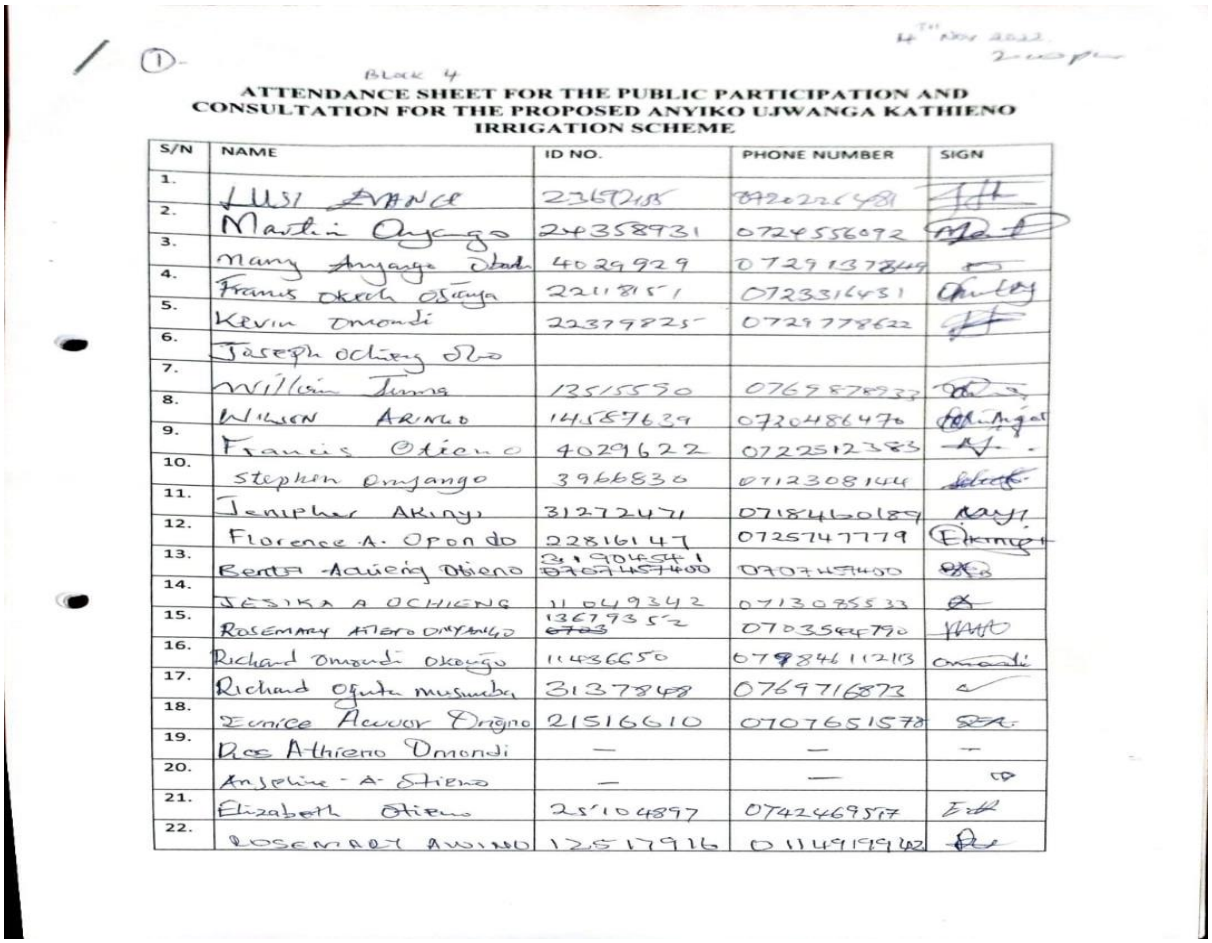


ESHIRUMBWE Village 21/11/2022

ENVIRONMENTAL IMPACT ASSESSMENT PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO IRRIGATION SCHEME ATTENDANCE SHEET

S/N	NAME		Phone number	Sign
1.	BENARD	ONYANGO	WERE	0715080308
2.	FRANCIS	SHIRIBSO	TABUCHE	0706617978
3.	GODFREY OCHIENG OCHIENG		0713 926 502	
4	DAMARIS	WESONGA	OTENG'O	0706324846
5	NICKLAS	MAKOTO		
6.	TOMAS	WESONGA	MAKOTO	0707685442
7.	GODFREY	WESONGA	WERE	0719745070
8.	BONVENGE	OBUORY	SHIWNDA	0725317868
9.	ELIZABETH	LUCHIRI		0719725048
10.	ANDREW	WESONGA	MURAYI	0704245322
11	JUDITH	RABWORI		0712130705
12	SALEH	ORUKU		
13.	SAKIEL	WERE		0717456654
14.	AKUPATI	OKUMU		0769205065
15.	DENIS	MAKOTO		0103124838
16.	KALISTO	MURAYI		
17	GOERGE	OCHIMA	MAKOTO	0705672068
18.	DAMIANO	MAKOTO	KATHAMU	0703791015
19	WILFRIDA	MALALU	OKELLO	
20	@JOASH	OWANO	KATAMU	0702752144
21	BONFAS	OWINO	WERE	0743870351
22.	ROBINISON	SHIELUNDA	MURAYI	0746585483
23	MUSA	MOHAMED		0724049378
24	SUSANA	OKANGA		
25	ISIDORO	WESONGA		0701133704
26	FRANCIS	MAKOTO		0706845597
27	EVELYNE	MSOMO		
28	JANEVA	ATSIENO	MAKOTO	
29	GREGORY	WESONGA		0759944811
30	SELESTINI	LUCHIRI		0701971119
31	JANE	LUCHIRI		0702247951

3. BLOCK 4



(1)

4TH NOV 2022

BLOCK 4

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.				
2.	Martin Oyango	24358931	0724556092	
3.	Mary Anyango Otieno	40299299	0729137849	
4.	Francis Okech Osinya	22118151	0723316431	
5.	Kevin Omondi	22379825	0729778622	
6.	Joseph Ochieng Otieno			
7.	William Juma	13515590	0769878937	
8.	WILSON ARINDO	14587639	0720486470	
9.	Francis Otieno	40296222	0722512385	
10.	Stephen Onyango	3966830	0712308144	
11.	Jenipher Akinyi	31272471	0718460189	
12.	Florence A. Opondo	22816147	0725747779	
13.	Bertha Achieng Otieno	31904624 / 0707457400	0707457400	
14.	JESIKA A OCHIENG	11049342	0713095533	
15.	ROSEMARY ATIENO ONYANGO	13679355 / 6703	0703544790	
16.	Richard Omondi Okoth	11436650	0798461121	
17.	Richard Ogutu Musumba	31378478	0769716873	
18.	Eunice Achieng Origino	21516610	0707651578	
19.	Ras Athieno Omondi	—	—	—
20.	Angeline A. Otieno	—	—	
21.	Elizabeth Otieno	25104897	0742469517	
22.	ROSEMARY AWINO	12517916	0114919902	

(2) -

4th NOV 2022

Block 4

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.	Judith Sewe	—	0728209249	AKO
2.	Monica Juma	—	0727057849	[illegible]
3.	Colleta Omondi	—	0729662821	[illegible]
4.	Josphine Auma Awino	—	0728871153	[illegible]
5.	Jenipher A. Ogola	—	—	J.
6.	Mary Akinyi Odieng	37607473	0110367808	[illegible]
7.	Celestine Otieno	11302666	0741978021	Celestine
8.	MARGARET KIPLAGAT	21792264	0713854063	[illegible]
9.	JOSEPH OTIENO	20371112	0701754764	[illegible]
10.	CHRISPIN OMONDI NE	5999221	0725278678	[illegible]
11.	Charles Sewe	13517515	0715111246	[illegible]
12.	STEPHEN OBIPO	13597149	0724971306	[illegible]
13.	LUCAS OTIENO OPONDO	3587983	0726806055	[illegible]
14.	JOSEPH OWINO OLOO	8454834	0798975266	[illegible]
15.	MICHAEL OPONDO OCHONGO	22428469	0704185434	[illegible]
16.	ALOYCE ONYANGO	30800778	—	[illegible]
17.	Wilson Mwalo	8762092	0792746833	[illegible]
18.	JAMES OWINO	21248950	0111479951	[illegible]
19.	WILLIAM Odhiambo	29880348	0717329414	[illegible]
20.	Alfred Alfred O.	02735455	0114643187	[illegible]
21.	Godliver Ouma	30598532 ~~0798111692~~	0796 11 1692	[illegible]
22.	JAMES ODERO OLOO	13759902	0712260408	[illegible]

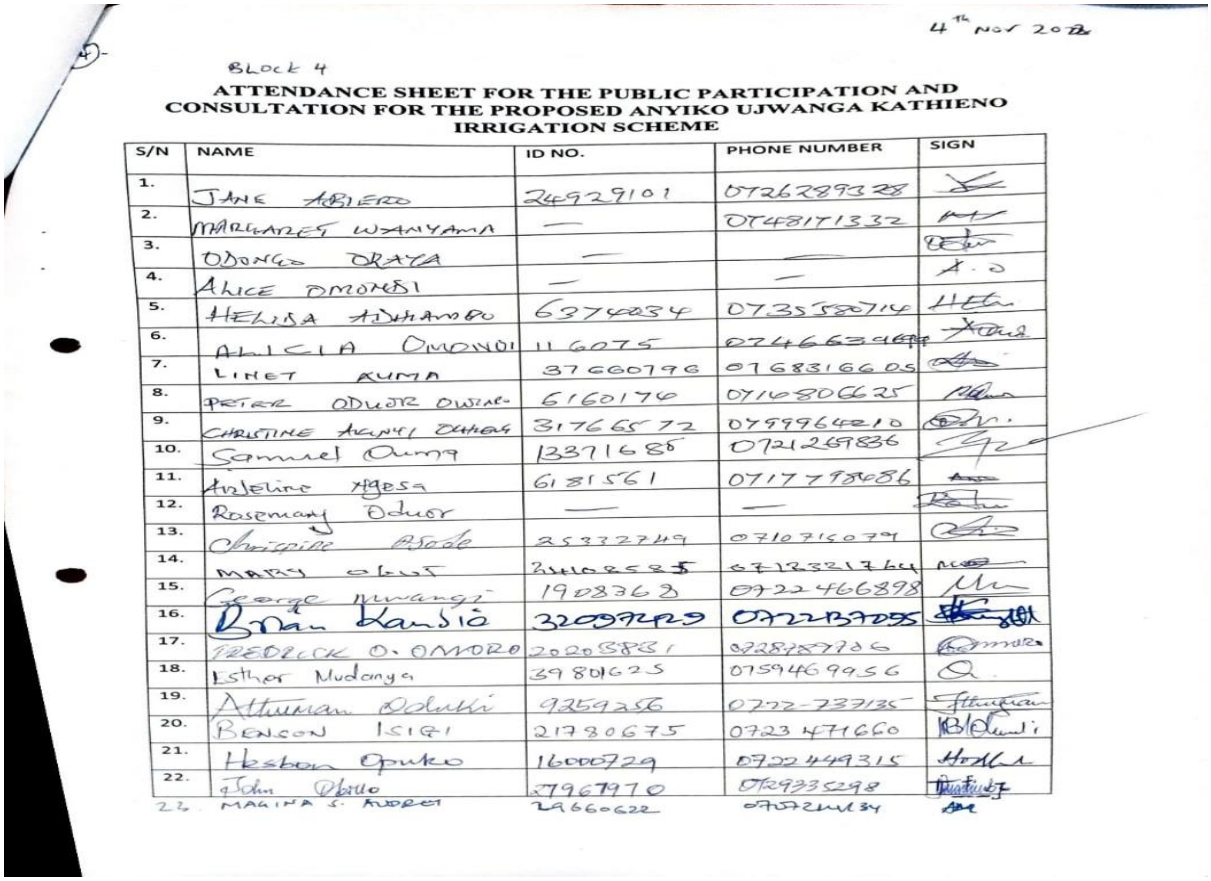
(3)

4th NOV 2022

Block 4

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.	Maria J Osiaya	—	0710263293	M-O
2.	Fredrick Aluoch	—	0713812546	[illegible]
3.	Francisca Agalla.	4881991	—	[illegible]
4.	Olingo Peter	36603235	0705123133	[illegible]
5.	Rose Anna Osiaya	5967920	—	[illegible]
6.	George Okoth Mwalo	11671634	0740680850	[illegible]
7.	Phoebe Adhiambo Opiyo	3668385	0799245390	[illegible]
8.	Lucy Achieng	25788957	0792070458	[illegible]
9.	Rosegdys Orian	13126073	0769939180	[illegible]
10.	MARY ODIPO	26662276	0701712248	[illegible]
11.	Veronica Atieno	12518995	0720837810	[illegible]
12.	Fredrick Otieno Ogola	—	0722734346	[illegible]
13.	AMANYA ADHIAMBO O	29849478	0705957667	[illegible]
14.	AKINYI ADHIAMBO	—	—	[illegible]
15.	Elizabeth Akinyi	079964436.	—	[illegible]
16.	JAMES OTIENO	24532031	0700235708	[illegible]
17.	ELIJAH OGOLA.	357495617	0741235602	[illegible]
18.	MARTIN OUMA OTOO	24520258	0722767795	[illegible]
19.	AMA OTIENO	—	—	[illegible]
20.	ANNA A. OTIENO	—	—	[illegible]
21.	BEATRICE A. OGOLA	9222529	0727512257	[illegible]
22.	CONSLATA OLOO	—	—	G.O



4th Nov 2022

BLOCK 4

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.	JANE ABIERO	24929101	0726299328	
2.	MARGARET WANIYAMA	—	0748171332	
3.	ODONGO ORAYA	—	—	
4.	ALICE OMONDI	—	—	
5.	HELISA AJWANGO	6374034	0735580714	
6.	ALICIA OMONDI	11 6075	0746633	
7.	LINET AUMA	37660796	0168316605	
8.	PETER ODUOR OWINO	6160176	0716806625	
9.	CHRISTINE AGNES OKWEA	31766572	0799964210	
10.	Samuel Auma	13371685	0721269836	
11.	Juleline Agesa	6181561	0717798686	
12.	Rosemary Oduor	—	—	
13.	Christine Atieno	25332749	0710715079	
14.	MARY OLENJ	2[illegible]5	0712321764	
15.	George Muwangi	19083623	0722466898	
16.	Brian Kandio	32097429	0722837035	
17.	FREDRICK O. OMORO	20205885	0728787786	
18.	Esther Mudanya	39801625	0759469956	
19.	Athuman Oduki	9259256	0722-737135	
20.	BENSON ISIGI	21780675	0723 471660	
21.	Hesbon Opuko	16000729	0722 449315	
22.	John Obullo	27967970	0729335298	
23.	MAGINA S. AUDREY	29660622	0757211134	

4. UKELA

Ukela Ungahwa

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.		—	—	
2.	Erick Bangiya			
3.	Dennis Odour	30107768	0755005105	
4.	MONICA 'A' OWIDH	13371704	0725901418	
5.	Oduor Wilson	23987454	0705752082	
6.	CHARLES OTIENO	23139997	0786645551	
7.	George Olual	13599286	0799028610	
8.	George Odhiambo	23387058	0712967244	
9.	ISAYA CHITECHI	30559490	0769256410	
10.	Joseph Onyango			
11.	EDWIN ODONGO	34894206	0758329829	
12.	BENARD OKELO	11197199	0702188261	
13.	STEVEN JOSEPH OTIENO	8704825	0714501631	
14.	OCHIENG WILLIAM	11196387	0717289977	
15.	JOACKIM ACHING	13761578	0743056745	
16.	RAPHAEL DHANJO	—	—	
17.	JOSEPH OMONDI	22348450	0707255033	
18.	Charles Akech		0703790541	
19.	Margret Obiero	11197500	0713974034	
20.	ALICE AKECH	21720352	0712263826	
21.	Jackline OMOLLO	26217697	0743148326	
22.	HENDRICK ATIENO	—	0791934181	
	GRACE OKOTH	28733293	0796863125	

•Day 2 : UKELA (1)

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.	Maurice Miller	8781215	0723250591	
2.	Peter Ochieng	3508104	0721129683	
3.	George Odeo	14483209	0715566490	
4.	Joseph Ogola	4070151	0115[illegible]	
5.	Vincent Otieno	27178748	0711809454	
6.	Daniel Odour	28502489	0707125741	
7.	John S. Nyamuka	02862498	0726139729	
8.	Josiah Owino	26464578	0706525847	
9.	Jane Owitia	25429397	0717937278	
10.	Richard Odour	23391965	0712827922	
11.	Walter Magoha	13594252	0714397338	
12.	James Opondo Aloo	11235428	0706460462	
13.	Charles Juma Ramuya V. Elder	8238068	0706206597	
14.	John Obillo	27967970	0729335298	
15.	Mercy Ngure	27272640	0723269092	
16.	Hesbon Opuko	16000729	0722449315	
17.	Lusi Dance	13692451	0720224981	
18.	Martin Onyango	24358931	0724556072	
19.				
20.				
21.				
22.				

UKELA / NYAHWA VILLAGES (2)

ATTENDANCE SHEET FOR THE PUBLIC PARTICIPATION AND CONSULTATION FOR THE PROPOSED ANYIKO UJWANGA KATHIENO IRRIGATION SCHEME

S/N	NAME	ID NO.	PHONE NUMBER	SIGN
1.	Aloys Ouma Auma	8606146	0725475346	
2.	John Obillo	27967970	0729335298	
3.	Martin Onyango	24358931	0724556072	
4.	James Aloo	11235428	0706460462	
5.	Hesbon Opuko	16000729	0722449315	
6.	Jane Opondo	23851011	0707398243	
7.	Joyce Awono	11619187	0717595881	
8.	Eunice Awino	—	—	
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APPENDICES 3: PUBLIC CONSULTATION AND SENSITIZATION PHOTOS

Ukela Village Public Consultation Baraza

Ngahwa Village Public Consultation Baraza

Eshirubwe Village Public Consultation Baraza

Lur Village Public Consultation Baraza

APPENDIX 4: BILLS OF QUANTITIES