



**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT COMPREHENSIVE
PROJECT REPORT (CPR) FOR THE PROPOSED REHABILITATION OF A WACH-
KANO IRRIGATION SCHEME IN EAST KANO/WAWIDHI WARD, NYANDO SUB
COUNTY IN KISUMU COUNTY**



**KENYA CLIMATE SMART AGRICULTURE PROJECT,
DEPARTMENT OF AGRICULTURE, IRRIGATION, LIVESTOCK AND FISHERIES
P.O BOX 2738 KISUMU.
FEBRUARY, 2021**

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Certification

Certification

This is to certify that the Lead Expert hereunder as per the requirements of the Environment Management and Coordination Act, CAP 387, carried out this Environmental and Social Impact Assessment.

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List of Acronyms

| | |
|------------------|---|
| AEZ | Agro- Ecological Zonation |
| AIDS | Acquired Immune Deficiency Syndrome |
| Ca ⁺⁺ | Calcium ions |
| CBO | Community Based Organization |
| CEC | Cation Exchange Capacity |
| C- ESMP | Contract specific Environment and Social Management Plan |
| CESSCO | County Environment and Social Safeguards Compliance Officer |
| CIDP | County Integrated Development Plan |
| CITES | Convention on International Trade in Endangered Species |
| COVID 19 | Corona Virus disease |
| CPP | Consultation and Public Participation |
| CPCU | County Project Coordination Unit |
| CPR | Comprehensive Project Report |
| CSA | Climate-Smart Agriculture |
| EA | Environmental Audit |
| EHS | Environmental Health and Safety |
| EIA | Environmental Impact Assessment |
| EMCA | Environmental Management and Co-ordination Act |
| EMP | Environmental Management Plan |
| EMS | Environmental Management System |
| ESIA | Environmental and Social Impact Assessment |
| ESMF | Environmental and Social Management Framework |
| ESMP | Environmental and Social Management Plan |
| ESS | Environmental and Social safeguards |
| ERP | Emergence Response Plan |
| GBV | Gender Based Violence |
| GDP | Gross Domestic Product |
| GHGs | Greenhouse gases |
| G.o.K | Government of Kenya |
| GIS | Geographical Information system |
| GPS | Geographical Positioning System |
| Ha | Hectare (Measure of land size) |
| HIV | Human Immunodeficiency Virus |
| IEE | Initial Environmental Examination |
| ILO | International Labour Organization |
| IWRUA | Irrigation Water Resource Users Association |

| | |
|-----------------|---|
| KCSAP | Kenya Climate Smart Agriculture Project |
| KEBS | Kenya Bureau of Standards |
| KFS | Kenya Forest Service |
| KWS | Kenya Wildlife Service |
| LM | Lower Middle Zone |
| LU | Livestock Unit |
| Mg/L | Milligrams per Litre |
| MOU | Memorandum of Understanding |
| NEMA | National Environment Management Authority |
| NGOs | Non-Governmental Organizations |
| NLC | National Land Commission |
| NO _x | Nitrogen Oxides |
| OSHA | Occupational Safety and Health Act |
| P | Phosphorus |
| PAPs | Project Affected Persons |
| PCB | Polychlorinated biphenyls |
| PCR | Physical Cultural Resources |
| PH | Hydrogen Potential |
| PPE | Personal Protective Equipment |
| RAP | Relocation Action Plan |
| SAR | Sodium Adsorption Ratio |
| SEA | Sexual exploitation and Abuse |
| SH | Sexual Harassment |
| SO ₃ | Sulphates |
| SOP | Standard Operating Procedure |
| TIMPs | Technology, Innovation and Management Practices |
| TOR | Terms of Reference |
| UM | Upper Middle |
| WHO | World Health Organization |
| WRUA | Water Resource Users Association |
| WRA | Water Resources Authority |

Executive Summary

Kenya is predominantly an agro based economy where small-scale farmers dominate with about 75% of the populations' livelihoods directly linked to agriculture. Agriculture is thus key to overall national development, equity objectives and sustainable growth. Intuitively, weather-related disasters, particularly droughts, present a major challenge to the predominant rain fed agricultural production system with profound adverse impact on the economy. The adverse effects negatively affect foreign exchange earnings, food security and nutrition, employment and rural livelihoods. Adaptation to extreme weather impacts is thus a priority under National Adaptation Action plans (NAPAs). Among other objectives, NAPAs envisages improved crop productivity through irrigation. These objectives are captured under several strategies and policies such as the Agriculture Sector Development Strategy (ASDS) and the irrigation Policy of 2013. Building farmer resilience to climate change risks is thus one of main objective under the *Agricultural Sector Growth and Transformation Strategy (ASTGS)*, which in agriculture operationalizes the climate change Act objective of mobilising financial resources for adaptation and mitigation climate change risks.

The Kenya Climate Smart Agriculture Project (KCSAP) under the Support of World Bank (WB) intends to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an eligible crisis or emergency, to provide immediate and effective response. The Sub project activities will contribute to KCSAP development objective by up-scaling Climate-Smart Agriculture (CSA) Practices and supporting smallholder farmers to adopt integrated climate-smart Technology, Innovation and Management Practices (TIMPs). It supports community driven development approach in smallholder agro-pastoral production systems in 24 counties of Kenya. It's against this backdrop that the County government of Kisumu, one of the recipient counties is seeking to undertake Environmental and Social Impact Assessment for Awach Kano irrigation sub-project as it falls under the second Schedule of Environment Management Act (EMCA).

In accordance with the requirements of the National Environment Management and Coordination Act (EMCA), 1999 (REVISED 2015), Environmental and Social Impact Assessment for the proposed facility has been undertaken as it warrants such scrutiny under the second schedule of the Act, as well as in fulfilment of the world Bank operational guidelines Environmental and Social safeguards (ESS). The objective for this is to integrate environmental and social concerns in the project planning and implementation processes. This report was carried out in line with EMCA, 1999 and the Environment Impact Assessment and Audit Regulations, 2003 and the World Bank Environment and social safeguards guidelines OP 4.01.

This ESIA has considered all the relevant legal, policy and institutional framework, key among them; the World Bank Environment and Social Safeguards Policies, the existing environmental regulatory

framework EMCA Cap 387 and the Environmental (Impact Assessment and Audit) Regulations of June 2003, Occupational Health and Safety Act (2007), the Water Act (2016), wastes disposal regulation of 2006, environmental standards, and sustainable use of natural resources principles. Other relevant legislations to this EIA that were considered include the public health, physical planning, land planning Acts and gender promotion, HIV/AIDS prevention and control Act, and sexual offences Act.

The ESIA process was achieved through public participation exercise and consultation involving 4 key informant (KI) interviews and Focus Group Discussions (2) as well as desk reviews of critical planning documentation such as Project Development Objective (PDO). The report gives a summary of the findings. The proposal is in line with vision 2030, County of Kisumu CIDP II, 2018- 2022 and National Adaptation Action Plan (NAPAS). Though the analysis from the assessment reveals both positive and negative social as well as environmental impacts.

Environmental impacts include increased hydrological risks during low flow regimes and changes to water flow regimes, toxic concentration of agrochemicals and pesticide residues in aquatic systems, changes in soil quality and microhabitat degradation, degradation of irrigated land, changes in surface and ground water quality, local erosion and sedimentation. Other negative environmental impacts include solid waste and emissions, emissions to air and increased water consumption. Negative social impacts include, temporary disruption in farming calendar, Sexual exploitation and Abuse (SEA), Gender based violence and sexual Harassment (GBV&SH), child abuse and child labour, spread of COVID 19 in the community and among workers, risk of increased spread of HIV/AIDS and Sexually transmitted diseases, increased labour burden on women, water borne diseases, loss of grazing land, increased inequity as well as risk of accidents.

Measures to mitigate these impacts are as follows: Solid waste, there is need to provide collection facilities and encourage waste segregation through sensitizing workers and community on waste management practices and ensure recycling of recyclable wastes such as paper, metals, and plastic. To mitigate public and occupational health and safety the proponent will provide suitable personal protective equipment during construction to avoid muscular strains, ensure water is treated and safe for workers and community. To mitigate on the use of pesticides, farmers will be trained on safe and effective use of pesticides including disposal of used pesticides and containers. The proponent will also undertake surveillance, monitoring of water quality and regular desiltation. Measures to mitigate air, dust and noise pollution are sprinkling to minimize dust emission during construction, ensure regular servicing and maintenance of vehicles and machinery. The proponent will ensure that all COVID 19 prevention measures are enforced e.g., keeping social distance, wearing masks rightly, sanitizing and washing of hands regularly.

The proponent as agreed during the public participation to review and incorporate agreed changes in the procurement plan as well coordinate and oversight the implementation of the recommendations thereof. The main issues and concerns raised during public consultation and meetings relate to Gender based violence (GBV), employment by the contractor, wayleaves for canals, divergence in community perception of what constitutes child labour, leasing out of land to the disadvantage of female members, malaria risks and their control, seasonality of rice production and price fluctuation, control of sedimentation, input and marketing challenges and design issues such as the desiltation of the canal as well as water access rights challenges. The issues were addressed by various stakeholders including the project engineer. The CPCU and the contractor will in coordination with the local leadership undertake community awareness on GBV and put in place grievance redress mechanisms (GRM) for tracking and resolving any emerging issues during the Project implementation. The IWUA as the vehicle for collective action will take lead on advocacy concerning child labour and GBV. Health department will take lead in water borne disease control while the department of Agriculture will sensitize on alternative livelihoods. Strengthening of local institutions i.e. Irrigation water users association (IWRUA) and the scheme management committee will also be given urgent attention by CPCU in collaboration with relevant stakeholders.

The review of this ESIA is undertaken during the era of the Coronavirus disease (COVID-19) pandemic outbreak. As such, specific mitigation measures have been introduced to prevent the spread of the pandemic during the construction period. Moreover, consultations required as part of the mitigation measures, such as during training on E&S issues, also pose a risk of infection to communities. For this reason, the risk of contracting the virus during consultations will be avoided, minimized and mitigated with specific measures such as adherence to Ministry of Health Standard operation procedures on social distancing, open air congregation, and use of masks, hand washing and limiting the number of participants.

Based on the assessment, the project is, therefore recommended for approval by the National Environment Management Authority (NEMA). The EIA licensing conditions will be tracked through annual environmental and social audits after operating for one year. Implementing the ESMP will cost Kes 4.89 M and shall be part of the project contract. The Proponent should share the ESMP with the selected Contractor and the latter will be required to develop and implement a Contractor-Specific ESMP (C-ESMP). The CPCU will follow up and monitor implementation of the ESMP. The CPCU/CESSCO, contractor, IWRUA, the supervising water engineer, the proponent and the Kisumu County environmental committee will be required to ensure that the mitigation measures proposed for the construction, operation and decommissioning phases in the ESMP are followed.

CHAPTER ONE

1.0. INTRODUCTION

1.1. Project Background

The purpose for which the Awach Kano irrigation rehabilitation project is initiated is to increase, rehabilitate and expand the existing community irrigation project for increased agricultural productivity and climate change mitigation and adaptation.

The project has been prioritized by the community as key economic venture to boost the rural economy through increased production of high value crops, employment creation and improved household nutrition. This is in line with World Bank supported Climate Smart Agriculture Project (KCSAP) project development objective of increasing agricultural productivity and building resilience to climate change risks among small scale farmers. The rehabilitation of the project will up-scale Climate-Smart Agriculture (CSA) Practices and resilience of the community.

The proposed rehabilitation of the irrigation scheme sub-project has more positive impacts on the community than negative impacts: increased participation of farmers in economic livelihoods, crop diversification and increased earnings per acre, resilience to price risks and creation of employment opportunities. It represents a key adaptation intervention to climate change that can cushion livelihoods from erratic weather patterns and flood management. The Subproject is in line with the overall national development objectives of the Government of Kenya, such as accelerated economic growth and rising productivity of all sectors, equitable distribution of national income, alleviation of poverty through provision of basic needs, enhanced agricultural production, industrialization, accelerated employment creation and improved rural-urban balance. It is particularly in line with the National Irrigation Policy and Kisumu County government integrated development plan.

1.2. Aim and goal of the Project

The overall objective of the project is to stabilize irrigation water supply, build resilience to climate related risks, poverty alleviation and environmental sustainability.

Specifically, the project intends to improve efficiency of the irrigation scheme, increase area production and extend growing period as well as possibilities for sequential crops. This will be made possible by improving the intake works to support irrigation water supply throughout the year as opposed to seasonal availability.

1.3. Objectives of ESIA

The specific aims of the Environmental and Social impact assessment were to:

- Provide a detailed description of the proposed project in terms of location, objectives, design, activities, materials, inputs outputs, products and waste
- Provide a detailed description of the baseline environment and socio-economic conditions of the project area
- Review the relevant legal policy and institutional framework applicable in the implementation of the proposed project
- Provide a detailed description of the potentially affected environment
- Identify, predict and analyze the environmental and socio-economic impacts of the project, including seeking neighbor's and public views and or/concerns
- Provide an analysis of the project alternatives in terms of site, design, implementation technologies and provide reasons for preferred options
- Provide a detailed Environmental Management Plan proposing measures for mitigating negative environmental impacts, cost for offsetting such measures, timeframes, responsibility and monitoring frequency and indicators to implement the measures
- To provide an action plan for management of the occupational/public health and safety concerns

1.4. Justification of Conducting ESIA

Environmental and Social Impact Assessment for the proposed subproject has been undertaken as it warrants such scrutiny under the second schedule of EMCA, as well as in fulfilment of the world Bank operational guidelines Environmental and Social safeguards (ESS). The objective for this is to integrate environmental and social concerns in the project planning and implementation processes. This ESIA report thus identifies key environmental and social aspects impacted on by the proposed project while recommending appropriate mitigation measures in accordance with Environmental Impact and Audit regulations, 2003 policies and relevant legal framework and World bank operation procedures, policies and safeguard OPs. The Environmental and Social Impact Assessment (ESIA) report also predicts the likely impacts, their significance, and proposes mitigation measures for identified impacts. The Environmental and social Impact Assessment (ESIA) study for the project was conducted in February, 2021. The assessment considered all the impacts of the project from construction, operation and decommissioning. The Environmental and Social Management Plan (ESMP) from the exercise will form part of the contract and will be provided to the contractor, who will be required to implement the outlined mitigation measures.

1.5. Terms of Reference

In line with Terms of Reference (TOR) in appendix (XIV), the key instructions were to produce an ESIA report that specifies key environmental and social aspects impacted on by the proposed project

while recommending appropriate mitigation measures in accordance with Environmental Impact and Audit regulations, 2003 policies and relevant legal framework, World bank operation procedures, policies and safeguards OPs. In particular, the consultant was to provide an Environmental and Social Management Plan (ESMP) outlining measures for minimizing, eliminating or mitigating the adverse impacts on the environment and ensuring the health and safety of the workers and community, provide cost for offsetting such impacts, timeframes, responsibility and monitoring frequency and indicators to implement the measures.

1.6. Methodology

1.6.1 Environmental Screening Criteria

The three important aspects of the ESIA process included: Collecting information, evaluating the information and presenting relevant social & environmental information for use in project planning, implementation, decommissioning, Monitoring and evaluation. Screening exercise was undertaken to identify pertinent issues for coverage in line with the TOR (Appendix XIV) to complement a checklist developed by Agroecord consult ltd (Appendix I) and the findings from the world bank EMSF screening done by KSCAP, Kisumu. Primary data collection was achieved through administration of 32 questionnaires (Sample provided in Appendix V with a response of 96 %), 4 gender (Youth, Women, Men and community leadership) segregated Focus Group Discussions (Appendix VI) and one community public baraza (Appendix VI-VIII). Expert Consultations and scenario building were led by Mr Richard Oremo (Environmentalist), William Onura, Volenzo Tom, (Lead expert), Anne Kae (sociologist), Dayan Achieng (Hydrologist) and Richard Oruko (Ecologist). Some of the Key documents reviewed as source of secondary data include;

- ✓ The KCSAP Project Appraisal Document (PAD)
- ✓ EMCA Cap 387 and EMCA Amendments 2015
- ✓ Kisumu County CIDP 2018-2022
- ✓ 2019 Census Reports Volumes I and II.
- ✓ The World Bank Environment and Social Safeguard Framework
- ✓ Socio-economic survey reports (2015/16 Kenya Integrated Household Budget Survey (KIHBS)
- ✓ Hydrology and water Assessment Study Report
- ✓ The World Bank Screening Checklist already administered by the CPU and approved by NEMA
- ✓ Sessional papers and sectoral policies on environment, agriculture, water, forests, wildlife, fisheries, and natural resources.

1.6.2. Data Collection Procedures

The Consultant used screening and scoping report to avoid unnecessary data. The data collection was carried out through questionnaires/standard interview schedules, key stakeholders' meetings, use of checklists, observations and photography, site visits and desktop environmental studies, where necessary in the manner specified in Part V (section 31-41) of the Environmental (Impact Assessment and Audit) Regulations, 2003 and World Bank ESS guidelines. The lead expert practicing certificate is attached in Appendix (II). The questionnaire and Key Informant Interview schedule (KII) are in appendix V and VI respectively. The exercise was conducted through desk studies and field work. ESS data tool was used to capture baseline information (Appendix IV). Before the fieldwork, specific areas were identified for subsequent site visits. These included areas where major operations and work would take place during construction and operation of the project. In many sections of this study, the history, designs, engineers', layout, Key informant and Focus Group Discussions feasibility report was used to inform the study.

1.6.3. Environmental Screening and Scoping

This step was applied to determine whether an ESIA was required and what level of assessment was necessary. This was done in reference to requirements of the EMCA, 1999, and specifically the second schedule and World Bank Safeguard policies. Issues considered included the physical location, sensitive issues and nature of anticipated impacts. The Scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects whose analysis as given in Appendix II. The project does not trigger involuntary displacement and resettlement.

1.6.4. Desktop Study

This included review of existing documents in regard and review of proposed activities, project documents, designs policy and legislative framework, as well as the environmental setting of the area among others. This was complemented with discussions with managers and design engineers and interviews with community.

1.6.5. Site Assessment

Field visits were carried out for physical observations of vegetation, water resources, physiography, geology and soil. At the visited sites, documentation on geology, soil characteristics and landscape were recorded. Photographs at selected sites were taken for inclusion in this report to further emphasize these observations. Field visits meant for physical inspections of the site characteristics and the

environmental status of the surrounding areas to determine the anticipated impacts were conducted. It also included further interviews with the community and key stakeholders.

1.6.6. Public Consultation

The ESIA experts, in consultation with KSCAP, Kisumu sought the views of persons who may be affected by the proposed project. The public consultations were preceded by the identification of stakeholders and project affected persons (PAPs- appendix IV-VIII). Public meetings were undertaken at the proposed site and the project area (Appendix on public baraza attendance- appendix VIII). The general public baraza was attended by 32 persons (22 males and 10 females) while FDGs was attended by 25 persons. The record of minutes is provided in Appendices VII.

1.6.6.1. Key Stakeholder Consultation

KII were carried out with the objective of improving the understanding of the procedures and key concerns in the ESIA process in general. The KII schedule is provided in Appendix (VI). A total of government 10 officers (lead agencies) were interviewed on specific issues of concern to the project implementation (administrative, legislative, policy instruments). The following were consulted, Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), Irrigation Waters Users Association, County Environment Officers, Department of Agriculture, National Museums of Kenya (NMS), Governor office/ Ward office, WRA (Water Resources Authority), Water Department, Fisheries Department and Chief, Chief- Waswa Location.

1.3. Questionnaires

The aim of administering questionnaires was to capture community perception on the project's benefits, potential problems and possible solutions and whether they felt the project should be implemented or not. About 98 % of the questionnaires were returned (sample in appendix XI)

1.6. Data Analysis

The ESIA expert used past experience and knowledge, scenario building, community input and expert opinion to analyze the data from the desk studies and field visits in order to determine the potential impacts of the proposed project, the severity of effects arising from these impacts and how any adverse impacts can be best mitigated and positive impacts enhanced. This analysis provides the framework for the recommendations on corrective actions and remedial measures and provides the basis for the formulation of the environmental and social management plan as the actionable output from the ESIA process. The data was considered in terms of occupational health and safety with respect to the

construction and operational phases of the proposed projects, as well as sustainability concerns such as global environmental protocols and impacts.

In analyzing Environmental and social impacts the following were considered (provided in the checklist on appendix I). This included the current land use and impact of proposed project, general land use of the adjacent sites, sensitive area and habitats or critical habitat, threatened plant and animal species, potential effects on effects on ambient/natural Environment, drainage systems and storm water flow (including pollution indicators, impacts on water flow patterns and quality aspects, user interference and contamination). Other potential impacts considered were effects on Topography- especially landscape and soil erosion, Water quality, potential contamination/ landscape/aesthetics degradation, effect on drainage patterns in relation to waste water/effluents, oil spillages, air quality in relation to atmospheric emissions and vehicles/machinery, noise and vibration as well as a myriad of Social issues. These were considered against project alternatives considerations such as scheduling, location, demand, technology, inputs and process alternatives.

1.8. ESIA Responsibilities

The ESIA was to be carried out to full completion within a period of 21 days from the date of consultancy award. The Consultant (Lead Expert) coordinated the day-to-day functions and any related institutional support matters. The Consultant ensured constant briefing of the client during the exercise. The ESIA Report from the findings was compiled in accordance with the World Bank ESS guidelines as well NEMA provisions. The findings (summary of the ESMP) will be subjected to community disclosure as soon as possible. Description plans and sketches showing various activities are part of the Appendices (Some of the Structural layout in appendix III; and topographical map (appendix XIII).

1.9. Organization of the ESIA Report

The report is organized into nine substantive chapters. Following this introductory chapter, Chapter 2 discusses the Project activities. Chapter 3 gives the environmental and social baseline, chapter 4 discusses the project alternatives Chapter 5 discusses Policy, Legal, Institutional and Administrative Framework. Chapter 6 analyses public participation and its outcomes. Chapter 7 identifies the Potential environmental and social impacts and mitigation measures while chapter 8 provides the ESMP monitoring plan. Chapter 9 provides the conclusions and recommendations. This is followed by some of the literature sources consulted (References) and Annexes to the report.

1.10 Project Cost and timelines

The cost for the rehabilitation of the irrigation scheme is estimated at a cost of **Kes 56 Million**. The rehabilitation and auxiliary works will be completed within 6 months following NEMA and requisite statutory approvals. The ESMP will cost Kes 4.89M.

CHAPTER TWO

2.0. PROJECT DESCRIPTION

2.1 Introduction

The proposed project is a rehabilitation and expansion of existing community irrigation project in Kisumu County. The proposal intends to provide infield drainage system for 120ha which lies within the possible scheme area, provide for a permanent intake structure to enable the farmers abstract enough irrigation water during low river flows and release excess water in the wet season. The project is one among the Awach cluster of schemes such as Kobongo, Kojienda and Nyachoda whose operations largely depend on the Awach-Kano intake works. It is funded by the World Bank under KCSAP flagship projects. The rehabilitation works will cost Kes 56.5 Million and is expected to be completed within six months following the contract award.

2.2. Location of the Project

The proposed development is a community sub-project located next to Awach market along Ahero-Katito road, in Waseca Location, East Kano/Wawidhi Ward of Nyando subcounty, Kisumu County. It serves Ayueyo, Kimira and Katolo communities of East-Kano/ Wawidhi of Nyando Sub County, Kisumu County. The GPS coordinates for the sub project location is on Latitude: **-0.242509 S** and Longitude: **34.971931E** (Plate 1). The land in the area generally slopes from North East to South West. The irrigation scheme is a collective action with free hold land parcels being under individual farmers but water use collectively managed for efficiency and economies of scale. Accordingly, individual farmers on whose canals pass through have voluntarily agreed to allow the existing canals be rehabilitated as part of community contribution.

The total command area for the irrigation scheme is 625 acres which has been in existence since 1984 as an out-growers scheme. Currently, about 123 Ha of land is under irrigation with rice being the main crop grown. The rehabilitation of the project is expected to increase the area under irrigation by 20 Ha (the extension area is herein after referred to as tail end).

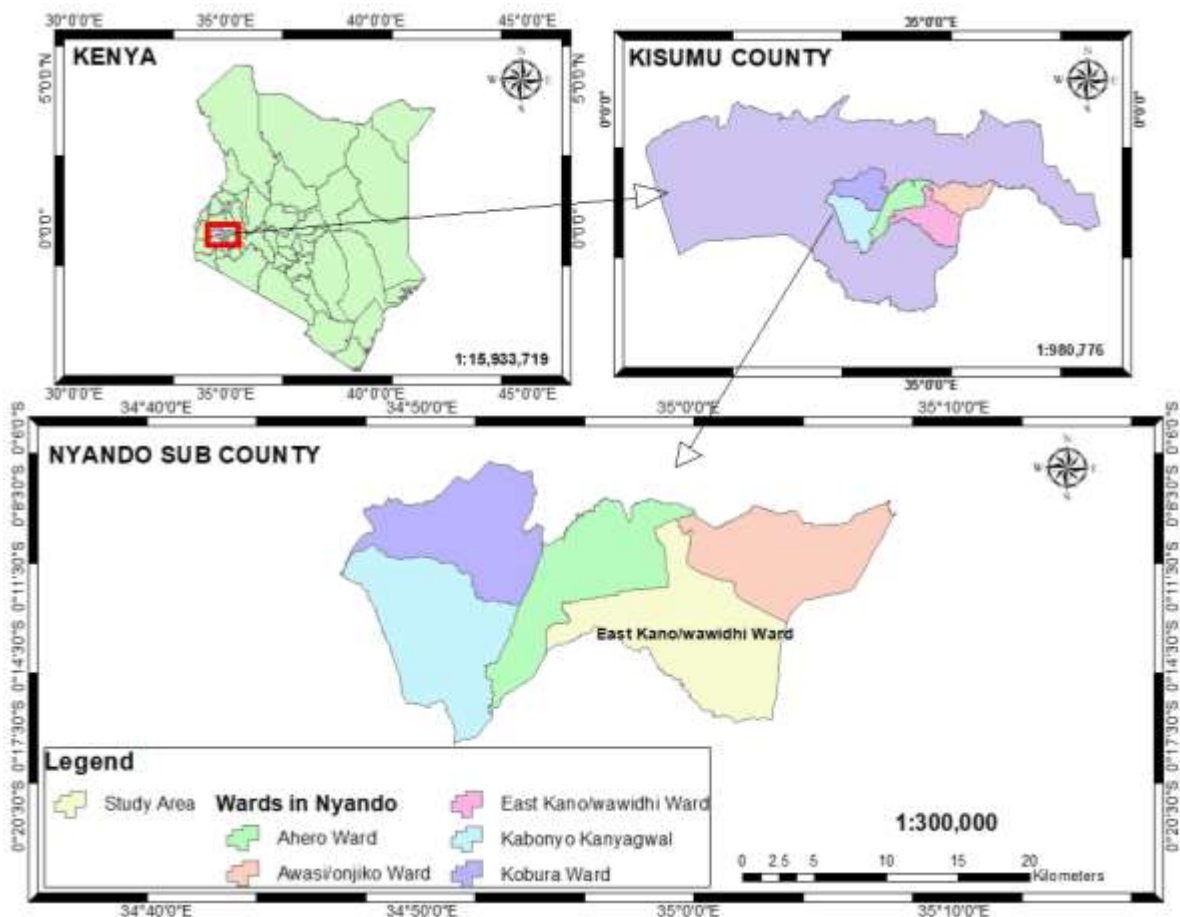


Plate (1) GIS generated map showing location of ESIA study area within Nyando subcounty of Kisumu County, Kenya

2.2.1: Project objectives and activities

The sub-project is being undertaken in order to rehabilitate and expand an existing community irrigation scheme. The scheme is served by River Awach whose tributaries originate from the greater Kericho watershed. This characteristic increase flood risks in the sub project area. The rehabilitation works take into cognisance the ineffectiveness of the existing drains to remove the excess water from the fields especially during periods of high flows, as well as the inability of the existing traditional supply canals to provide the sufficient flows during low river flows.

2.2.1.1. Layout and construction of gravity intake and weir

The weir will be the main intake of the scheme, which is approximately 50 m from the scheme head. The construction will include mass concrete, excavation of rip rap on river bank and weir body. The weir height will be 1m with crest of 0.65m, bottom width of 1.35m and abase height of 0.2m. The downstream slope is 1.43%. The weir length will be 15m. It will involve temporary River diversion during the repair of the riverbed unless the water quantity drastically reduces more than as it is now.

Diversion will be 200m long on a private land for which written permission by the land owner is to be given.

2.2.1.2. Intake site works

Awach River is about 12.0 m wide. Due to the flat nature of the intake site, the weir will be provided with spindle gates to enable excess water to flow through the intake structure without causing excessive flood damage. Spindle gates will also allow flushing of accumulated silt at the intake. The weir works will involve demolition of existing collapsed gabions and eroded concrete aprons. A straight weir with wing walls is adopted in the rehabilitation. Other intake site works include

- Side wall concrete repair both sides downstream of weir body measuring 5m
- Repair of Downstream and Upstream Apron of the weir measuring 12 m
- River bank Dyke construction both sides of the river bank measuring 200M (100M*2)
- Scheme stilling basin
- Construction of galvanised gabion boxes measuring 2x1x1 M and a length of 60M
- Construction of Intake Flume

2.2.1.2.1. Silt trap

Silting of soil in the main canal is a major problem in irrigation schemes. Accordingly silt traps are important auxiliary structures in management of siltation and drainage in irrigation projects. Construction of slit trap including excavation on river bank will be through installation of gate valves, screen, metal control gates and flash out chamber. In the rehabilitation works, the intake structures and bypass canals are improved with desilting facilities to trap soil flowing into the main canal. For sustainability purposes, there is need for the community to form a committee that will oversee the regular desiltation programmes.

2.2.1.3. Water conveyance and distribution system

This consist of main canal and secondary canals. The main canal will be 660m long. The two secondary canals namely northern and southern canals and associated structures are also major conveyance infrastructure. The northern canal is 1.2 Km while the southern canal is 1.8km. Table (1) provide the details on water conveyance structures and associated infrastructure for the Awach Kano irrigation scheme. Where possible the humic soils should be avoided in embankment of water conveyance structures. All the canals will be lined and where deemed necessary combined with Drop-structures. Other water conveyance structures include;

- Rehabilitation of group and main feeders (Main drain length = 2100 m, Group drains length = 3970 m)

- Installation of a series of hydrants to serve various blocks and lateral pipes at individual farms, canal lining, installation of culverts, intake (Weir) works, trench excavation, division boxes and silt trap along the main canal

2.2.1.4. Infield structures

These include the construction of footbridges, Box culverts, scheme roads and feeder canals as well as home protection (Dyke) for Flood control. The home dykes will be erected either side of the river to contain the backwater effect and control floods. The dimensions of the of the dyke will be 0.8 km long and 0.5 m high on either side of the Awach river, 1750 m. A total of 3000m of access roads will be opened and/ or graded. The embankment will be constructed using soil excavated in the site to reduce solid waste generation.

2.2.1.5. Tail end structures or Fall out structures

The expansion plan includes part of this a with the aim of minimising conflict. The tail end farmers have already constructed supply canals and drains to remove excess water from the fields. However only 20 Ha of the tail end area is catered for in the design.

2.2.1.6. Flood risks and damage control

Flood risks and damage is attributed to inefficiency of drain facilities and level of water. To mitigate regular road improvement, dredging of the river and rehabilitation of drain gates are recommended. Embankment and reshaping is done to reduce leakage and subsidence. Installation of box culverts are better suited to drain water from upper area of the irrigated area.

2.2.1.7. River bank rehabilitation

This will involve upstream and downstream repairs at intake point to mitigate scouring action that has affected the riverbed.

3.0. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The section presents the institutional and governance framework and how it relates to the Project implementation. This is set out in three main subsections; local, World Bank safeguards and international framework.

3.1 General overview

The Environmental Management and Coordination Act, Cap 387 of 1999 (revised 2015), direct that the proponent of a project undertake an ESIA/EA study and prepare a report thereof for presentation to the National Environmental Management Authority (NEMA).

3.2. National Policies

The sub project touches on a number of national policies during implementation as well as planning phases. This is discussed under:

3.2.1 Vision 2030

The policy covers a broad categories of development issues including sustainability, equity the waste management and adjustment to climate change crises such as droughts. The policy recommends the need for enhanced re-use/recycling of residues including wastewater and increased public awareness raising and appreciation of clean environment. Vision 2030 is divided into three fundamental pillars

- Integration of environmental concerns into all development policies programs and projects.
- Independent environmental impact assessment/audit (EIA/EA) report for any industrial venture or other development before implementation.
- Integrating environmental concerns into all planning processes as to improve environmental governance and achieve green growth pathways

Relevance

- ✓ The project implementation strategy *envisages reduction of poverty through provision of services and equity in resource allocation with an affirmative program for vulnerable groups.*
- ✓ *The ESIA process integrates Environmental concerns into the implementation process and takes cognizance of the social equity and poverty reduction concerns.*

3.2.2. National Policy on Water Resources Management and Development

The National Policy on Water Resources Management and Development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress.

The policy provides for establishment of standards to protect water bodies receiving wastewater based on polluter pays principle

This ESIA is in full compliance with this policy as it requires that such projects should also undergo comprehensive EIAs that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions.

3.2.3. The Forest policy of 2014

The policy addresses issues of reservation, protection, management, law enforcement and utilization of forests and forest resources.

Relevance

✓ *The Project development objectives will contribute to this through micro Project, Sustainable land management and natural resource management initiatives at subproject and micro project levels by incorporating all environmental and social safeguard policies*

3.2.4. National Gender and Development Policy, 2019

The National Gender and Development Policy provide a framework for advancement of gender equity and an approach that would lead to greater efficiency in resource allocation and utilization to ensure empowerment of women.

Relevance

✓ *This policy will guide the contractor to ensure both genders are given an equal opportunity during recruitment during the construction phase and operation phase of the project. The contractor will also provide adequate facilities for all genders within the project site*

3.2.5 Agricultural Sector Transformation and Growth Strategy 2019-2029

The importance of agriculture has been emphasized in Kenya through Vision 2030 and the Medium Term Plan III and most recently the President's Big Four priority agenda for 2017-2022, which emphasizes the importance of 100% food and nutrition security for all Kenya. To transform Kenya's agricultural sector and make it a regional powerhouse, the Government has formulated the Agricultural Sector Transformation and Growth Strategy (ASTGS).

Relevance

✓ *Achieving our potential in agriculture will achieve food and nutrition security, improve our farmer and local community incomes, lower the cost of food, increase employment (particularly for women and youth).*

- ✓ *The rehabilitation of the project contributes to the achievement of innovative commercially oriented resilient agriculture*
- ✓ *The proposed irrigation project resonates with the County integrated development planning objectives*

3.2.6 National Climate Change Action Plan 2018-2022

Kenya's National Climate Change Action Plan is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. The National Climate Change Action Plan (2018-2022) identifies priority adaptation and mitigation actions for transforming to a low carbon climate resilient development pathway. *Relevance*

- ✓ *Rehabilitation of the irrigation subproject would enhance mitigate downstream flooding and inundation of the project reducing incidences of malaria while planting trees will increase tree cover and water percolation. planting of indigenous trees fodder production around the catchment areas and gravity fed irrigation will also contribute to resilient low carbon growth pathways*

3.2.7. National irrigation Policy of 2015

The aim of the policy seeks to address challenges and constraints in irrigation development in terms of appropriate institutional and legal framework reviews, development of harmonised operation and management frameworks as well as capacity building, research, innovation and mainstreaming of alternative water harvesting and use technologies for irrigation.

Relevance

- ✓ *The ESIA process contributes to the identification of research areas for innovation and resilience building in rice production and irrigation development*
- ✓ *The rehabilitation of the scheme contributes to the strategic objectives of the policy especially the envisaged increase in area under rice cultivation to 104000 Ha*

3.2.8. National Policy for prevention and response to GBV 2014

The policy envisages collaboration between county and national governments to eliminate all form of gender based violence by addressing the underlying causes namely power imbalances and inequities in the social economic development sectors. Kisumu county has enacted sexual and violence policy of 2019 to operationalize the national policy on prevention and response to GBV.

Relevance

- ✓ *The policy will guide the contractor and local institutions on collective action (IWRUA) in hiring of workers and advocacy on GBV*

- ✓ *The policy will guide CPCU in the design of training programmes and Business development to empower women and VMGs*

3.3. Legal framework

The project has to comply with the provisions of the Environmental Management and Coordination Act, 1999 (Revised 2015) and its subsidiary legislation, as well as sectoral laws that protect the environment from development activities.

3.3.1 Constitution of Kenya 2010

The constitution is the supreme law of the land of Kenya. The Constitution require the public to be consulted and the study has complied by consulting the public.

Relevance

- ✓ *The Constitution is vital in identifying the need for this development initiative, since it endeavors to improve the general wellbeing of the people both environmentally and socio-economically and it will govern the means to ensuring the method in which the project is carried out, by providing an ESIA which is provided in this report.*

3.3.2 The Environment Management and Coordination Act, 1999 (Revised 2015)

EMCA 1999 provides under the Second Schedule, a list of projects that must undergo screening for ESIA. The proposed project falls under this schedule and as such requires that an ESIA Project Report be submitted to NEMA for review and licensing.

Relevance

- ✓ *In carrying out the ESIA study and preparing this report the requirements of this regulations and those of the World Bank Environmental and Social Safeguards have been integrated and followed throughout the process. The proponent did the screening and scoping then as advised by the NEMA office commissioned this ESIA study*
- ✓ *The proponent shall observe the guidelines as set out in the environmental management plan laid out in the ESIA report as well as the recommendation provided for mitigation of adverse impacts arising from the project activities*

3.3.3: The Environment (Impact Assessment and Audit) Regulations, 2003

Environmental Audit (EA) is the systematic documentation, periodic and objective evaluation of activities and processes of an ongoing project. Annual environmental audits will be undertaken during this sub-project operation and maintenance phase.

Relevance

- ✓ *In carrying out the comprehensive ESIA study and preparing this report the requirements of this regulations and those of the World Bank Environmental and Social Safeguards have been integrated and followed throughout the process. The proponent did the screening and scoping then as advised by the NEMA office commissioned this ESIA study*
- ✓ *The proponent shall observe the guidelines as set out in the environmental management plan laid out in the ESIA report as well as the recommendation provided for mitigation, minimization, and avoidance of adverse impacts arising from the project activities*
- ✓ *In conducting this exercise, the stakeholders were consulted and their views have been integrated in this report. Implementation of the incorporated ESMP and monitoring of the same is key to actualizing this regulation.*

3.3.4. Environment management and coordination (waste management) regulations 2006

These regulations outline requirements for handling, storing, transporting, and treatment/ disposal of all wastes categories as provided therein. The project will mainly generate solid wastes and oil leaks

Relevance

The project proponent and agents as a responsible citizen have obligation to include these guidelines within her operations for a cleaner and sustainable environment. Through the ESIA, the ESMP has provided measures for managing waste generated through the proposed project.

- ✓ *Measures to be undertaken for proper waste disposal include clearance of non-reusable and recyclable waste and disposing off in designated disposal site.*
- ✓ *Reusing excavated soil for rehabilitation of access roads in the scheme*
- ✓ *Training on safe and effective use of agrochemicals*

3.3.5. Environment management and coordination (water Quality) Regulations 2006

These regulations apply to drinking water, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purposes.

Relevance

- ✓ *The ESMP has outlined the water quality control measures such as provision of use of slow release fertilizers in top dressing of the rice*
- ✓ *Public health department will sensitize community on biodigester type of toilets*
- ✓ *The proponent will implement recommended guidelines on drinking water quality standards through periodic testing and conformity of drainage water to water effluent standards*

3.3.6. Environment management and coordination, conservation of Biological Diversity (BD) Regulations 2006

These regulations apply to conservation of biodiversity which includes conservation of threatened species, Inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefits sharing as well as the offences and penalties for violation of the regulations.

Relevance

- ✓ *This subproject is being rehabilitated therefore the biodiversity is not disrupted and no habitat or any threatened species of flora or fauna is threatened*
- ✓ *The Proponent and contractor will ensure that great care is exercised in the protection of vegetation during construction.*
- ✓ *The sustainable land use management and Natural Resource Management component will fund the promotion and establishment tree nurseries for livelihood improvement and environmental conservation in fulfilment of Project development objective*
- ✓ *The provision of fish ladder as mitigation measure to interference of fish movement upstream will minimize any negative impact on breeding of fisheries.*

3.3.7. Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009.

It contains provisions for the utilization of wetland resources in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services. The Proponent shall comply with the provisions of the Act in protecting wetlands, preventing and controlling pollution and siltation of rivers during construction phase and especially the 80% rule in the design of weir and intake works.

Relevance

- ✓ *The Proponent has undertaken the ESIA and developed this report as required by the regulation*
- ✓ *hydrological assessment of the proposed Awach-Kano irrigation has been undertaken as part of the feasibility studies*

3.3.8. Environmental Management and Coordination (Noise and Excessive vibration) control Regulation, 2009.

Section 4 prohibits excessive vibrations above 0.5 decibels per second or 30 M from moving sources. This includes vibrations from machinery, construction sites. It also restricts construction to day time unless where permitted.

Relevance

- ✓ *The demolition of weirs and construction of canals will involve heavy machinery*
- ✓ *The contractor is required to restrict construction work between 5am-5pm*
- ✓ *The contractor will provide ear muffs to workers in construction site and ensure they use them*

3.3.9. Irrigation Act no.3 of 2019

Part I of the act transfer the authority and responsibility for governance and delivery of management services to water users. It specifies the irrigation service fee, service plans and the role of water users association.

Relevance

- *The community irrigation scheme is under a registered irrigation water users association (IWRUA)*
- *The design of the scheme was spearheaded by the County governments irrigation and drainage technical committee and is thus compliant with Part iv of the act*
- *He schemes has complied with all guidelines under the Act*

3.3.10. The Water Act, 2016 (The National and Storage Regulations, 2019)

This Act provides for the regulation, management and development of water resources and water and sewerage services in line with the Constitution. According to the regulations, the owner or developer or other person charged with the mandate of developing, managing and or maintaining waterworks shall apply for and obtain a water use permit under the Water Resources Regulations 2019 and (b), an environmental impact assessment license

Relevance

- ✓ *The Proponent has undertaken the ESIA and developed this report as required by the regulation*
- ✓ *hydrological assessment of the proposed Awachi-Kano irrigation has been undertaken as part of the feasibility studies*
- ✓ *written authorization for the rehabilitation of the scheme to start as the Permit is being processed*

3.3.11. HIV /AIDS Prevention and Control Act 2006

It creates public awareness on causes, modes of transmission, consequences and means of prevention and control of HIV and AIDS. It protects the rights of the infected and affected and outlaws' discrimination in all its forms against persons living with HIV and AIDS or those perceived or suspected to have HIV and AIDS.

Relevance

- ✓ *The proponent will use the policy in promoting integration of reproductive health and HIV and AIDS services in all phases of the project. The proponent ensures that there is integration of HIV and AIDS information and services into reproductive health services at all levels and ensure adequate capacity for provision of the integration at all levels. The project is therefore expected to create awareness on HIV/AIDS and gender issues in all the stages of implementation*

3.3.12. Forest Conservation and Management Act No.34 of 2016

The Act gives effect to article 69 of the constitution with regard to sustainable management of forest resources for social economic development of the country and the associated ecosystem services. The Act recognizes the critical role that forests play in soil, water conservation, wood products provision, biodiversity conservation and as a habitat for wildlife.

Relevance

- ✓ *Natural vegetation will be protected and conserved within the catchment*
- ✓ *Further with the support from KCSAP there shall be increased establishment of tree nurseries for agroforestry development which contributes the achievement of 10% forest cover targets*
- ✓ *The ESMP has provided measures for the compensatory planting any lost plants through planting of indigenous vegetation by the contractor*

3.3.13. The Public Health Act (Cap. 242)

The primary purpose of this Act is to secure and maintain public health. Some of its provisions relevant to this project include prohibition of nuisance activities such as spillage or noise or other condition deemed to be injurious or dangerous to human health. According to Part IX Section 115 no person will be allowed to cause nuisance or condition liable to be injurious or dangerous to human health.

Relevance

- ✓ *Since, the subproject will be implemented at a time when the whole World and the country is experiencing Covid-19 pandemic, preventive measures will be made to prevent contractor, workers, County government team and other players from being infected with the virus as provided for under the Public Health Act and related standard operating procedures on containment of COVID (Covid-19 Restrictions of movement of persons and related measures)*
- ✓ *Other Mitigation measures include sensitization of the community on prevention of malaria, as well as provision of sanitation facilities, training/ sensitization on solid and liquid waste management*

3.3.14. The County Government Act No 17 of 2012

The Act gives effect to chapter 11 of the constitution, spells County government powers, functions and responsibilities and range of services under the purview of County governments. To effect the Act, County governments are empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided under the Act.

Relevance

- ✓ *Undertaking this ESIA process comply with the outlined principle of citizen participation and aligns well with the CIDP, sectoral and spatial plans which among other seeks to increase the under irrigation in the County from 15-45% of irrigated potential*
- ✓ *The Grievance Resolution mechanism has been ensured through awareness and sensitization meetings*
- ✓ *The ESIA process captures Conflict resolution GRM protocols which is in line with County Government Act on public participation and conflict resolution as well resonates and complements County government service provision obligations*

3.3.15. The Penal Code (Cap. 63)

Section 191 of the Penal Code states that, any person or institution that voluntarily corrupts or spoils water from public springs or reservoirs', rendering them less fit for its use is guilty of an offence.

Relevance

- ✓ *The ESS safeguards codifies and complements mitigation measures on offences such as GBV, child abuse, SEA, OSHA that are to be accepted and enforced by the contractor*

3.3.16. Occupational Health and Safety Act 2007

This legislation provides for protection of workers during construction and operation phases. It is tailored at implementation of the EHS plan in compliance with the relevant sections of this Act.

Relevance

- ✓ *The work site will be registered with Directorate of Occupational Safety and Health (DOSHS) and the contractor will be required to ensure all necessary records on workers are kept during construction phase by providing PPEs, registration of workers, train workers on emergency preparedness and response while ensuring all SOPs on Covid 19 containment are adhered to*

- ✓ *Occupational health and safety audits will be carried out periodically to ensure compliance with this Act particularly in the construction phase*

3.3.17. Physical Planning Act, 1999

The Act provides for the preparation of a physical development plan for the purpose of improving the land and associated amenities

Relevance

- ✓ *Undertaking this ESIA project report was sanctioned by KCSAP is in tandem with the provisions and is in line with sectoral and spatial planning and Kisumu County CIDP*
- ✓ *A variety of infield structures namely access roads will adhere to stipulated procedures under the Act*

3.3.18. The Agriculture Act (Chapter 318)

The Act provides for soil conservation on any land whose slope exceeds 12%, as well as protection of watercourses, setting a riparian zone of a minimum 2 meters or equivalent to the width of river and to a maximum of 30 meters.

Relevance

The proposed site is flat with a slope of less than 5% and construction work will not impact negatively on soil erosion risks. The ESMP provides for restoration of the site through planting of grass, indigenous trees as well as catchment conservation.

3.3.19. The Wildlife Conservation and Management Act, Cap 376

The Act provides for the protection, conservation and management of wildlife in Kenya especially protected wildlife habitats, migratory areas or dispersal corridors. Though the project site has birds and snake's species, they are of insignificant biological conservation.

Relevance

The sub- project will have minimum if any impact on the present wildlife. However, the contractor as provided for in the ESMP will replant all removed trees.

Fish ladders will be provided at the weirs to prevent interference with fish migration upstream

3.3.20. The Land Registration Act, 2012

This Act applies to

- ✓ Registration of interests in all public land as declared by Article 62 of the Constitution
- ✓ Registration of interests in all private land as declared by Article 64 of the Constitution
- ✓ Registration and recording of community interests in land. Section 24 states that the registration of a person as the proprietor of land shall vest in that person the absolute ownership of that land together with all rights and privileges belonging or appurtenant thereto.

Relevance

- ✓ *The sub-project is being undertaken on land owned by individuals who have come together for the purpose of increasing efficiency in water access and use. The collective action of pooling land resources is voluntary with each individual rights and privileges remaining intact save for water access and use rights which are under the IWUA.*

3.3.21. The Land Act, 2012

This is an Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and ownership dispute resolution.

Relevance

- ✓ *The implementation of the project is guided by sustainability principles anchored on World Bank safeguard policies*
- ✓ *The land is not under dispute or encumbrances as any selling and management is controlled by the community*

3.2.22. National Land Commission Act No. 5 of 2012 revised 2016

The Act provides for broad mandate of the National Land Commission including

- ✓ Managing public land on behalf of the national and County governments
- ✓ investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress
- ✓ application of traditional dispute resolution mechanisms in land conflicts
- ✓ Monitor and have oversight responsibilities over Land Use Planning throughout the country

Relevance

- ❖ *The community through this ESIA has agreed to abide with sustainable land use practices as provided for in the ESMP*

- ❖ *The subproject site does not contravene land use planning as it is an existing collective community action irrigation project since 1984*

3.3.23. Labour Laws of Kenya including Employment Act 2007

The Act deals with conditions of employment and the rights of workers with respect to minimum wage, working conditions and time, and also in the resolution of disputes. *This provision will guide the contractor in engagement and payment of the workers during implementation. The contractor will be given a copy of this report (C-ESMP) for reference too.*

- ✓ *The Proponent through the contractor will make sure that fairness and gender equity are followed during the recruitment of the labour force to be used during the construction phase. Preference will be given to the local community for both skilled and unskilled labour.*
- ✓ *The proponent will ensure the engaged contractor is qualified, register the site as place as provided under DOSH.*
- ✓ *The contractor will also provide requisite PPEs and ensure they are always worn by the workers*

3.3.24. The Sexual Offences Act, 2006

This Act protects people and employees from any unwanted sexual attention or advances by staff members. This act ensures the safety of women, children and men from any sexual offences which include: rape, defilement, indecent acts. This law will govern the code of conduct of the Contractor's staff and provide repercussions of any wrong doing.

- ✓ *The ESMP provides for the implementation of a SGBV action plan with an Accountability and Response Framework as part of the Construction-ESMP (C-ESMP) and administration of the whole project cycle*

3.3.25. Public Roads and Roads of Access Act (Cap. 399)

- ✓ Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads. Section 10 and 11.
 - ✓ Provision of access roads is provided for in the BQs

- ✓ *Proponent shall seek permission from the appropriate authorities to access routes and canals through private land before the construction phase (especially for the 200m canal running through private land*

3.3.26. National Museums and heritage Act 2006

This is an Act of Parliament that consolidates the law relating to national museums and heritage; provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya. *This act resonates well with OP 7.11 the protection of physical cultural resource under World Bank safeguards operation policy.*

- ✓ The proposed site has no sites of cultural heritage
- ✓ *National Museums of Kenya (NMs) and International best policy for accidental discovery of heritage resources and burial sites will be adhered to through well-established documentation and line of communication protocols, securing the site and ceasing operations where chance finds occur (Chance find procedures Appendix XV). This is to avoid any further damage to such chance finds*

3.3.27. The Standards Act Cap 496

The Act is meant to promote the standardization of the specification of commodities, and to provide for the standardization of commodities and codes of practice relating to the methods to be applied or the procedure to be adopted in connection with the construction, installation, testing, sampling, operation or use of any article, apparatus, instrument, device or process.

- ✓ *The Act contains various specifications touching on irrigation structures. The Proponent shall ensure that commodities and codes of practice utilized in the project adhere to the provisions of this Act especially the structural standards are maintained*

3.3.28. Climate Change Act, 2016

The Act is to be applied for the development, management, implementation, and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya.

- ✓ *The rehabilitation and implementation of the Awach- Kano irrigation scheme project will contribute towards this Act by reducing vulnerability of communities to climate related risks thus enhancing their resilience*

3.3.29. Malaria Prevention Act (CAP 246)

This is an ACT of Parliament that provide for the prevention and control of malaria and for connected purposes.

- ✓ *The Proponent has adequately provided measures (such as sensitising the community on use of treated mosquito nets, local spraying and bush clearing near households) for the prevention and control of malaria*

3.3.30. The Fisheries Management and Development Act No.35 of 2016

This is an Act of Parliament that provides for the conservation, management and development of fisheries and other aquatic resources in Kenya to enhance livelihoods of fisheries dependent communities.

- ✓ *The ESMP from the ESIA has incorporated specific measures on river bank protection and provision of fish ladders*
- ✓ *The ESMP provides for minimisation of fertilizer and pesticides contamination of water resources in the irrigation scheme through sensitisation and training of farmers*

3.3.31. Pest control products Act Cap 346

This is an Act of parliament that guides the importation, exportation, manufacturing, and distribution and use of pesticides and connected purposes.

- ✓ *Training on farmers on effective and safe use of pesticides*
- ✓ *Integrated production methods will be promoted in the scheme to reduce contamination risks*
- ✓ *The use of pesticides and agrochemicals will be on very small-scale level and an integrated pest management plan (Appendix XI) will guide the farmers in horticultural and agricultural productivity improvement activities.*
- ✓ *Among other mitigation measures no pesticides under WHO class 1A and 1B of pesticides will be procured as to comply with World Bank safeguard policies on pesticides. The proposed insecticides to be used for horticultural and general agricultural improvement initiatives will thus fall under World Health Organization (WHO) class 11 (moderately hazardous) and WHO Class 111(slightly hazardous).*

3.3.32. The Energy Act, 2019

The Energy Act, 2019 was enacted in response to calls to consolidate the laws relating to energy; promote renewable energy; promote exploration, recovery, and commercial utilization of geothermal energy; regulate midstream and downstream petroleum and coal activities, among

others. **Though the scheme is gravity fed**, heavy machinery will be used in the construction and operation of the project. This will utilise substantial amounts of diesel and petrol. Mitigation measures include;

- ✓ *The contractor will ensure all the machinery are well maintained to increase fuel efficiency*
- ✓ *The contractor will instruct drivers not to idle engines unnecessarily*
- ✓ *The contractor will avoid working during wet seasons as to minimise loss of energy*

3.4. World Bank Environmental and Social Safeguard Policies

The following World Bank environmental safeguards (Operational Policy (OP) /Bank Procedure (BP)) will guide the proposed sub-project.

3.4.1 OP/BP 4.01 (Environmental Assessment)

The World Bank's environmental assessment policy and recommended processes are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment. Its purpose is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. Environmental screening has been undertaken for the proposed project to determine the appropriate extent and type of environmental assessment. NEMA has advised the CPCU to prepare project report.

- ✓ *The guidelines have helped to assess the potential environmental risks and impacts of the sub project in its area of influence; examine sub-project alternatives; identify ways of improving the sub-project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts.*
- ✓ *This report has established all the significant impacts that need to be addressed and proposed appropriate measures to prevent or reduce any risk that may be posed to the physical, biological and social environment*
- ✓ *The adverse impacts and their mitigation measures are well outlined in the ESMP including responsible parties, duration and cost in the whole project cycle*

3.4.2. OP/BP 4.04 Policy on Natural Habitats

The policy seeks to ensure that World Bank-supported infrastructure and development sub-projects take into account the conservation of biodiversity, as well as the numerous environmental services and products, which natural habitats provide to human society. In order to ensure conservation and project

sustainability, this policy requires that Project alternatives are sought when working in fragile environments and key stakeholders e.g. NMS, WRA were consulted during the project design, implementation, monitoring and evaluation of mitigation. *A careful evaluation of the project context was carried out in the baseline studies to determine if the project setting has any significance that may be disrupted due to the implementation of the sub project. From the study, the proposed site has no known species of biological conservation significance*

- ✓ *The proponent through this ESIA and ESMP has taken advance measures for protecting, preserving and conserving the environment in the project setting from predicted and emergent adverse impacts*
- ✓ *The proponent will undertake the planting of indigenous trees in the project area*

3.4.3. OP/BP 7.12 Policy on Involuntary Resettlement

This policy includes safeguards to address and mitigate these impoverishment risks. This policy contributes to the World Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures.

- ✓ *The proposed sub-project will not involve any form of displacement and resettlement.*
- ✓ *The sub project site is private voluntarily pooled together as to increase cost effectiveness and collective use of an indivisible public good*
- ✓ *the sub project will not lead to the displacement of any people during construction hence Resettlement Action Plan will not be required*

3.4.4. Pest Management (Operational Policy, OP/BP 4.09)

The policy is meant to minimize and manage the environmental and health risks associated with pesticides use and promote and support safe, effective, and environmentally sound pest management. Though no procurement of pesticides or pesticide application equipment is envisaged for the subproject per se, the envisaged horticultural and agricultural improvement activities tied to the wider project implementation objectives may involve pesticide use and subsequent increase in health and environmental risk.

- ✓ *CPCU will train farmers on safe and effective use of pesticides and agrochemicals*
- ✓ *Environmental Social Safeguards Team through the CESSCO will develop a pest management plan as per the attached guideline in appendix*
- ✓ *Farmers will be sensitized on integrated production methods including use of manure, crop rotation and use of disease/pest resistant cultivars as well as observing closed seasons*

3.4.5. Forests (Operational Policy, OP/BP 4.36)

The policy on forest safeguards seeks to realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. This policy is not triggered because the project doesn't involve construction through any forest.

- ✓ *Baseline survey of the sub project area showed the area does not have a forest. In the ESMP the proponent has agreed to measures to enrich the environment with more trees in the site should any removal occur.*
- ✓ *The sub project will lead to the establishment of tree nurseries and enhance tree growing in the area*

3.4.6 OP/BP 7.11 (Physical Cultural Resources)

The objective of this policy is to avoid or mitigate adverse impacts on physical cultural resources from development sub-Project, Identify the likely physical cultural resources issues, if any, to be taken into account by the EA. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

- ✓ *The proponent during the environmental and social screening exercise investigated from the community of the possibility of a history of any physical or cultural significance of the proposed project site. It was found out from the community that the land for the sub project site has not and is not known to have any physical or cultural object/resource that the proposed development may interfere with. This ESIA report has established that (OP/BP 7.11 -Physical Cultural Resources) will not be triggered through the implementation of the proposed sub project.*
- ✓ *International best policy for accidental discovery of heritage resources and burial sites will be adhered to through well-established documentation and line of communication protocols, securing the site and ceasing operations where chance finds occur as to avoid any further damage in case of such chance finds (see Appendix XV on Chance find procedures)*

3.4.7. Pest Management (Operational Policy, OP/BP 4.09)

The policy is meant to minimize and manage the environmental and health risks associated with pesticides use and promote and support safe, effective, and environmentally sound pest management. Though the policy has no procurement of pesticides or pesticide application equipment is envisaged for the subproject per se, the envisaged horticultural and agricultural improvement activities tied to the wider project implementation objectives may involve pesticide use and subsequent increase in health and environmental risk. The recommended IPM strategies (Appendix XV1 on IPMP) include

climate management techniques such as green houses, screens and precision farming, training on safe and effective use of pesticides for farmers, extension staff and agrochemical Stockists.

- ✓ *The use of pesticides and agrochemicals will be on very small-scale level and an integrated pest management plan (Appendix XI) will guide the farmers in horticultural and agricultural productivity improvement activities.*
- ✓ *Among other mitigation measures no pesticides under WHO class 1A and 1B of pesticides will be procured as to comply with World Bank safeguard policies on pesticides. The proposed insecticides to be used for horticultural and general agricultural improvement initiatives will thus fall under World Health Organization (WHO) class 11 (moderately hazardous) and WHO Class 111(slightly hazardous).]*

3.5. Relevant International Conventions and Treaties

Conventions are agreements that are legally binding on states that have become parties to them Kenya is signatory to several international conventions and treaties that would need to be adhered to in implementing this project and are geared towards environmental protection and conservation.

3.5.1. International Convention on Biological Diversity (1992)

The convention promotes the protection of ecosystems and natural habitats, respects the traditional lifestyles of indigenous communities, and promotes the sustainable use of resources.

- ✓ *The proposed project site is not habitat to any threatened or endangered flora and fauna*
- ✓ *The ESMP has proposed the establishment of tree nurseries in the area and catchment conservation measures in the subproject area*

3.5.2. The United Nations Framework Convention on Climate Change (UNFCCC)

The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Relevance

- ✓ *Planting of trees in the subproject area will contribute to carbon sequestration hence climate change mitigation*

3.6. Institutional framework

The project beneficiary is the individual farmers in the Awach Kano irrigation scheme. KCSAP, Kisumu has the overall responsibility of ensuring successful project implementation. The actual

construction of the project will be undertaken by a contractor identified through a competitive bidding process. Monitoring the environmental impacts of the project and compliance to the Environmental Management Plan will be the responsibility of the National Environment Management Authority (NEMA) through the County Environment Officer, and the Sub County Environment Committee and WRUA. However, the CPCU, ESIA expert, Health and safety officer, WRA and the CESSCO will undertake routine monitoring to ensure compliance and implementation of the ESMP

WRUAs are local community institution established under the Water Act which work with WRA to manage water resources at the grass-root level. The County in partnership with WRMA has established Eight (8) WRUA's to support management of water resources in Kisumu County. Currently, the proposed site is within the Awach Kano Water Resources Users' Association area of jurisdiction (one of the 8 WRUAs in Kisumu County). The proponent need to collaborate with WRUAs for effective and successful implementation of management of the proposed water project and efficient utilization of the water and activities such as tree planting in the catchment and the riparian of the River Awach. To realize this, capacity building for the WRUAs and the community is necessary in order to enhance sustainable management of the project and the catchment

CHAPTER FOUR

4.0 BASELINE INFORMATION

4.1 Environmental conditions

The section describes the geomorphological, climate and related features of the bio-physical environment in the project area. The Coordinates are **-0.2442672 S** and **34.9715955 E**. Plate (2) provides the aerial photograph of the Irrigation scheme. Basically, this is an agricultural cum-settlement area along the Kano flood plains. The riverine vegetation along the canals demonstrates the potential influence of human beings on natural environment through irrigation (artificial wetlands along the irrigation canals in this case).



Plate 2 : Aerial photograph of the irrigation scheme. Note the natural and man-made wetlands (Northern and Southern canals) and along River Awach and the irrigation respectively (Source; Google map)

4.1.1. Topography

The County consists of relatively flat low-lying landscape, hills and minor carps with some hilly areas not exceeding 25% and an altitude of between 910-1420 M above sea level. The granitic escarpment of the Nyando faults to the vast kano plains, a secondary rift valley filled with sediments. The average slope in the subproject operation area lies between 0% and 3%. Essentially this area can be classified as a flood plain river terrace. The flat to undulating topography of less than 5%, does not cause any limitations to irrigation planning. However, it presents risks in form of seasonal flooding and denudation especially from upstream areas. This has been taken into account in the design of the scheme rehabilitation works.

4.1.2 Soils in the Awach Kano Irrigation scheme

Though the rock formation in the subproject area is the Nyanzian system bedrock, the soils in the subproject area are either senile shallow or young foot slope soils of high to moderate fertility and subject to seasonal water logging. Such soils are moderately well drained, deep dark brown firm cracking clay with humic top soil (vertic luvisols) or imperfectly drained deep to very deep dark brown very firm clay loam (eutric planosols). However, in places where depressions occur, the soils are poorly drained, moderately deep to deep dark grey mottled firm clay with humic topsoil over petroplinthite (mollic greysols). Generally, Phaeozems have high cation exchange capacity (CEC) as they have undergone little weathering. The Phaeozems in the subproject area are derived from igneous rocks, such as andesites and basalts. However, where the parent material is recent alluvial sediments from metamorphosed conglomerates and banded iron stones, the soils are easily exhausted. Given that the soils in the subproject area favour high water retention, they are suitable for flood irrigation. Their poor workability during rainy season, however presents challenges in construction scheduling. Accordingly, the proponent will endeavour to undertake the construction during relatively dry season so as to mitigate on energy losses and emissions.

4.1.3 Hydrology

The County has two major rivers namely; Nyando and Sondu-Miriu which form County 's drainage systems into Lake Victoria. Other permanent rivers in the County include Awach Kano, Oroba/Ombeyi, Kibos, Kisian , Mugru and Seme Awach. The Rivers are important sources of water for farming and domestic use and the development of blue economy. The catchment is strongly influenced by North-South movement of the Inter Tropical Convergence Zone (ITCZ) and local winds from land and Lake Victoria breezes which influence the spatial and temporal variation weather parameters. There are also several swamps, wetlands, dams and pans in the County. Generally, the County has good potential of ground water underlying the Nyanzian rock aquifer system. The potential however, diminishes as one approach the lake. The shallow Ground water system in the area comprises interconnected water bearing alternating layers of silt clay and sand below a depth of 15cm. The aquifer is recharged by rain water percolation and river systems that generally flow in North-South direction towards the existing rivers.

4.1.4. Reliability of water flow along Awach river

Awach River provides the major source of water for the Awach-Kano, Nyachoda, and Gem-Rae schemes. Sondu River also contributes but only during the heavy storms. It is considered that the water demand will be at its peak in the month of October for an irrigation period from September to

December. Data for the month of October is used for computing discharge probabilities on the basis 39-year statistical mean. Analysis of probabilities for daily discharge records and 10-day average discharges were adopted. The analysis considered both low and high flows. However, for the high flows, annual discharges were used instead of the 10 – day averages. The 80% reliability flow is given in table (1). According to the statistical analysis the mean base flow of Awach River in October is 450l/s in four times out of five years. The maximum recorded discharge is 8.964M³/s. Using the average evapotranspiration of 6 mm/day and an overall efficiency of 50%, a crop water requirement of 1.4 l/s ha is adopted. To guard against overestimation of flow reliabilities, the extra water supplied by rain is not taken into account. Table 1 provides the effective rainfall data.

Table 1 : Effective rainfall data in the catchment

| Month | Jan | Feb | March | Apr | May | June | Jul | Aug | Sep | Oct | Nov | Dec | Total for Year |
|------------|------|-----|-------|-----|-----|------|-----|-----|------|-----|------|-----|----------------|
| Penman | 210 | 192 | 210 | 189 | 187 | 171 | 163 | 180 | 171 | 205 | 189 | 207 | 2279 |
| Wood Head | 205 | 195 | 212 | 179 | 178 | 169 | 167 | 175 | 194 | 200 | 200 | 180 | 2236 |
| difference | (5) | (3) | (2) | 10 | (9) | 2 | (4) | 5 | (17) | 5 | (11) | 27 | 43 |

Source: Project feasibility design for Awach Kano scheme

Table 2 : 80% flow Reliability of River Awach Kano (39 years)

| Month | Jan | Feb | March | Apr | May | June | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------------|-----|-----|-------|-----|-----|------|-----|-----|-----|-----|-----|-----|
| 80% reliability flow L/S | 170 | 135 | 100 | 195 | 460 | 320 | 420 | 400 | 500 | 450 | 330 | 260 |

Source: Project feasibility design for Awach Kano scheme

Whereas the wood head exceed 2,200 mm, the annual rainfall subproject area is only 1,200 – 1,400 mm. This is indicative of low ground water balance in the root zone. Effective rainfall or the difference between total rainfall and actual evapotranspiration is acritical parameter in irrigation planning. . The determinants of effective rainfall include rainfall intensity, frequency, spatial and temporal distribution

as well as the effect of temperature, radiation, humidity and wind velocity. It is also affected by the topography, slope and type of land use.

4.1.3. Climate

An agro-ecological zone describes agronomic conditions on basis of landform, soil types, rainfall, temperature and water availability which in turn influences the type vegetation, length of growing season and crop adaptability [FAO, 1996]. Nyando Sub-County where the proposed sub project largely falls under zone LM 3 (Table 3). As in the County, the probability of crop failure during long rains is 50%. This increases to 80% during the short rains. Water stress occurs especially after second rains which are feeble and not reliable. Accordingly, cultivation of second crop and indeed in most seasons is not feasible without irrigation.

Table 3: Agro-ecological zonation of Kisumu County

| AEZ | Description | SubCounty | Predominant soils | Suitable crops |
|-----|----------------------------|---|--|---|
| LM2 | Marginal sugarcane Zone | Part of Nyando and Nyakach , Kisumu East , Muhoroni, Seme | Chromic and orthic Luvisols/ luvic Luvisols, planosols | Sugarcane, Maize, beans, finger millet, coffee, sweet potatoes and horticulture, rainfed rice |
| LM3 | Marginal maize Cotton zone | Kisumu west, Nyando , Parts of Seme | Orthic and ferallo-orthic Acrisols and lithosols, planosols and Luvisols | Maize, beans, finger millet, sorghum, cotton |
| LM4 | Marginal cotton | Nyakach | Vertisols | Sunflower, sorghum cassava |
| UM2 | Marginal coffee Zone | Koru in Muhoroni | | Coffee, maize |
| UM1 | Main Coffee zone | Maseno | | Coffee, maize |

Source: Jaetzold et al, 2009

The SubCounty has an inland equatorial climate that is modified by the effects of altitude, relief and the influence of the large body of water of Lake Victoria. The long rains are in March to May and short rains in August to September. The sub project area of Awach Kano receives around 1080-1230mm of rainfall, 67% of which is lost through evapotranspiration. The mean minimum temperature in the subproject area over 35 years is 16.3°C with mean Maximum of 30.1 °C. According to the Kenya Soil Survey and Integrated Regional Development plan for the Lake Basin Development Authority, the Sub County in which the subproject is located can be categorized as semi humid rainfall regime (maize- cotton agroecological zonation or lower midland 3; LM3).

4.2. Biological Environment

The biodiversity of plant and animal species in the subproject area varies with microhabitats, with the highest concentration being along the Awach riverine and the artificial wetlands created through irrigation canals.

4.2.1 Flora

The sub project area is mainly a plain grassland with scattered trees dominated by *Cassia siamea* and *Ficus sycomorus*. Other include *Acacia polycartha*, *Aeschenomene schimperi* and *Cyperus papyrus*, *Pennisetum phragmitis* species. In some places especially along the river we have mimosa pigra and ipomea aquatica plants, invasive species that catchment conservation intervention will need to integrate into the overall subproject implementation. The rehabilitation project will remove some the macrophytes especially around the intake point and along the main canal. however, from the trees species to be removed are not of any biological conservation significance (endangered, endemic, threatened or facing extinction) that would require its protection. Further removal of vegetation where necessary will be limited to the construction area only.

4.2.2 Fauna

Wetland such as rivers are critical habitats for most of the wildlife in the sub-County.



Plate 3: Flora in the site: Riverine vegetation around the intake point. clearance of such vegetation will lead to localized biodiversity losses. However, landscaping and catchment conservation will compensate and even enhance the type and amount of biodiversity.

The wetlands are habitats to most macrovertebrates such as hippopotamus (Lake Victoria, Rivers Sondu Miriu and Nyando Yala), monitor lizard, snakes, monkeys and leopards. The common fish species along River Awach include, protocterus ethippican (kamongo) and Clarioid (catfish). The avifauna (birds) include ploceidae and syviidae families as well as white winged warblers. The macroinvertebrates in the subproject area are mainly in the class of Hemiptera, coleoptera and diptera. Reptiles in the area are mainly snakes and amphibians along the wetland's areas. River Awach has a number of fish and likely route for fish migration upstream. However, the proposed sub project site is not in a protected area and is not home to any endangered or threatened animal or plant species. It is worth noting that the aquatic snails are likely to pose the risk of schistosomiasis transmission to the community in the paddy fields during operation phase.

4.2.3. Forestry

Kisumu County shares a diversity of tree species with agro-climatic zonation dictating the distribution of both exotic and indigenous tree species. This includes shrubs, grasslands, herbs, heathers, lianas, moss, lichens and other forms of vegetation. As one of the counties with lowest forest cover (0.45%), it only has two gazetted forests namely, Koguta in Nyakach (446 Ha) and Karateng (41.6 Ha). However, there is no forest in the subproject area. Though the main forest products used in the subproject area include timber, firewood, and charcoal they are mainly sourced from neighbouring counties such as Nandi, Kisii, Kakamega, Vihiga and Uasin Gishu and at times from Uganda. Some of the most common trees in the County include *Markhamia lutea*, *Albisia corarria*, *Ficus sycomora*, *Melicia excels*, *Eucalyptus camaldulensis* *Grivellea robusta* and *Jacaranda mimosifolia*. Project implementation will take this into consideration in their planning of catchment conservation interventions especially the promotion of agroforestry species.

4.3. Socio-Economic Characteristics

The sub-County has several wards that are inhabited mainly by the Luo. Rapid population growth is putting pressure on environmental resources especially land, water, wildlife and forests. This is a driver in land degradation. At 62 %, poverty index is one of the greatest challenges facing the sub project area and a major underlying driver of environmental degradation. Fishing, subsistence farming and livestock rearing is the dominant economic activity in the area. However, their potential is not fully exploited.

4.3.1. Livelihood and Economic Activities

The project area community members are predominantly small-scale farmers who practice mixed farming with irrigated rice being the main crop. Other agricultural enterprises in the area local cattle and indigenous chicken. A number of farmers also maize, beans, sorghum and horticultural crops. Petty trade, sand harvesting and off-farm employment also contribute to livelihoods of the community.

However, Unemployment is relatively high and stands at 65 % with the unemployed relying on earning from petty trade, farming, artisan fishing and remittances from relatives.

4.3.2. Land use, ownership and use patterns

The major land uses in the County are conservation, settlements, and agriculture. Table (3) provides land ownership background in the County and the subproject area. Due to low water levels, farmers tend to lease out land to those who can afford to pump water. However, this trend is likely to be reversed with rehabilitation of the scheme.

Table 4 : Land ownership in the Project area

| Ownership type | % |
|----------------------|-----------------|
| Land with titles | 68(61) |
| Individual ownership | 71(79) |
| Leased/ rented | 25(11) |
| Clan | 1(5) |
| Communal | 1(Less than 1%) |
| Average size | 4.5 (2) acres |
| Agricultural parcel | 4.0 (1.5) |

Source: ESIA team and Project appraisal document. Figures in parentheses () to aggregated County level statistics

The proposed scheme consists of a cluster of clan groups under a common irrigation management regime registered with the social services as an irrigation water users association, (IWUA). The objective of the IWUA is to ensure fair access to and use of water resources, effective water use and manage conflict among the clan groups. Currently, the temporary intake and field structures, however undermine the vision of the group. For example, the intake canal takes a long route to avoid interference with traffic flow and the rocky terrain. Due to the stated limitations (essentially receding flood irrigation), farmers are forced to only plant after end of the long rains (around June) and harvest towards the onset of the short rains. This contributes to loss of productivity especially during the drought period. The rehabilitation works intend to enhance the intake and conveyance capacity for increased production and production throughout the year.

The farmers are well organized through an elected committee of 15 members and have had trainings by the irrigation department. The role of the Committee is to organise the farmers during communal work especially maintenance of canals. It is also charged with the responsibility of mobilizing the farmers for maintenance work and enforcement of water user rights. Though Individuals farmers of a

particular clan own plots adjacent to each other, farmers are highly discouraged by unreliable water supply and poor marketing where middlemen dominate the value chain. Accordingly, leasehold entrepreneurship has become very lucrative undertaking thus reducing participation of the local farmers in the value chain.

4.3.4. Livestock Production

Livestock-keeping is an important sector in the sub project area. Meat, milk and eggs provided by livestock serve as important sources of high-quality protein to complement diets that are based on starchy crops like maize, millet and cassava and rice. Cattle also provide traction and manure. The main type of cattle kept by farmers is of the Zebu type. The number of cattle households on average in the project area is 7 head of cattle and 5 chicken. The production level for milk remains low at 2litres per cow per day. Though the carrying capacity of 0.7-1.0 ha/ LU is possible under improved system of fodder and pastures, such as Maasai love grass, guinea grass, buffel grass, Columbus grass, stylo cowpea, luceana, gliricidia, sesbania, the current carrying capacity lies around 0.2 LU/ Ha as most the farmers rely on naturally growing fodder/pastures. Rice straw integration alongside legume fodders, such as luceana into livestock feeding programmes could greatly enhance carrying capacity and manure collection efficiency. Such interventions could improve on kitchen garden interventions and intra household dynamics on control of income from rice farming. Currently most of the straw is burned, a practice that reduces air quality and increases nutrient mining and soil exhaustion.

4.3.5. Crop agriculture and irrigation

The available water from River Awach has potential to supply irrigation for 700 Ha. Rice is the main irrigated crop and a major cash crop. Maize, Sorghum, Millet and cassava are some of the other crops grown on a subsistence level. Table (5) provides the statistics on hectarage of major crops and their yield levels. Currently gravity fed schemes account for 123 Ha of the area under irrigation.

Table 5 : Crop agriculture, acreage and yield levels in the sub project area

| Crop Type/ irrigation type | Total area (Ha) | Yield (Tons)/ Ha |
|----------------------------|-----------------|-------------------------|
| Rice | 123 | 4.5 |
| Maize | 65 | 0.6 |
| Sorghum | 50 | 1.2 |
| Horticulture | 10 | Variable with crop type |

Crop Development, Kisumu County

The sum total of hectarage of land under irrigation is therefore below the potential. Rehabilitation of the existing schemes is one of the strategies identified in the CIDP to close the gap.

4.4. Human Development Index

According to the 2019 population census, East Kano Wawidhi ward has 10824 people (5203 males and 5621 females). The Human development index (HDI) , a measure of development that combines indicators on life expectancy , education attainment and income in the ward mirrors the county indicators. Kisumu County HDI of 0.49 is below the national average of 0.56. Prevalent poverty in the sub project area manifests in socio economic outcomes such as poor nutrition (stunting among children), low educational attainment, and low access to basic services such as water and sanitation. Resilient and productive agriculture, that is possible through irrigation is an intervention that could lift the community out of poverty by increasing their adaptive capacity to the ever-increasing adverse impacts of climate change.

4.4.1. Education

Kenya adult literacy rate was at level of 81.5 % in 2018, up from 78.7 % in 2014. The literacy levels in the area is 66%, the same as the County mean literacy. This is relatively lower than the national average. The County has many learning institutions among them Maseno University, a public chartered university, GRESTA, a private university as well as many middle level colleges. The ward in which the project is located has 16 primaries and 4 secondary schools and 1 TVET institute (under construction).

Table 6: Population distribution of East Kano/ Wawidhi Ward

| SUB LOCATION | VILLAGE | TOTAL | SEX | | LAND AREA (Sq. Km) |
|--------------|----------|--------|-------|--------|--------------------|
| | | | MALE | FEMALE | |
| EAST KANO | KATOLO | 5,967 | 2,761 | 3,226 | 36.3 |
| | ACHEGO | 3,162 | 1,509 | 1,653 | 11.9 |
| | TOTAL | 9149 | 4,270 | 4,879 | 48.2 |
| WAWIDHI | AYWEYO | 5,820 | 2,823 | 2,997 | 33.9 |
| | NYAKONGO | 1,941 | 903 | 1,038 | 9.8 |
| | MAGINA | 3,063 | 1,477 | 1,586 | 24.4 |
| | TOTAL | 10,824 | 5,203 | 5,621 | 7.1 |

Source: 2019 Kenya Population and Housing Census; Volume II

The enrolment especially in primary schools is balanced between the two gender but is skewed in favour of boy child at secondary level. Dropout due to factors such as early pregnancy among girls account for the unfavourable dynamics.

4.4.2. Energy sources and their accessibility

Energy is critical driver in development, livelihood activities, food security and health outcomes. Table (7) provides the energy sources and their accessibility at household level in the project area. The area is supplied with electricity though household connectivity remains low at less than 3 % of the households. Biomass at 87% provides most of the energy in the County. The trend is replicated in the subproject area. The sources of energy for lighting are fuelwood (25%), tin lamp (10%), paraffin lantern (53%), solar (1%) and battery lamp/torch about 2%. The main source of energy for cooking is fuelwood (firewood and charcoal) at about 80%.

Table 7: Energy and their sources in Kano East/ Wawidhi Ward

| Energy source Type | %Households |
|--------------------|-------------|
| Paraffin | 88 (67) |
| Electricity | 5(18.3) |
| Gas Lamps | 2 (8) |
| Fuel wood | 80(87) |
| Charcoal | 13 (30) |
| Gas | 2 (5) |
| Solar | 1 (4) |

Source: Field data analysis, 2020; Parenthesis refer to County aggregated levels and basis of comparison. Some households use more than one source of energy

Most households still use what is classified as dirty energy with far reaching implications on welfare of the community and the environment. Clearly there is need for household energy source interventions with agroforestry providing an opportunity for meeting household fuel wood needs while providing for other co-benefits such as soil fertility improvement and carbon sequestration. This intervention should go hand in hand with technologies that mitigate indoor pollution risks for fuel wood.

4.4.3. Water Access and Sanitation

Streams, shallow wells and rivers are the main sources of water supply to communities. The distribution of water sources, surface and underground in the area is however inadequate as evidenced by the community drawing water from irrigation canals. Though the long-term objective of the Government to enable households access water within 500m of their settlement, the intervention measures the Ministry of water has put in place so far in terms of piped schemes, point sources like boreholes and shallow fall below the target. The water sources in the area are summarized in (Table 8). However, the portability of the water sources remains a challenge and a risk factor in water borne diseases such as typhoid.

Table 8 : Sources of water in the subproject area

| Type of Source | No. | Comment |
|--------------------|-----|---------------------------------|
| Seasonal streams | 1 | Tributary of Awach Kano |
| Permanent streams | 1 | Tributary of Awach Kano |
| Water pans | 3 | Public |
| Shallow(dug) wells | 10 | Individual |
| Rivers | 1 | Awach Kano River |
| Boreholes | 2 | Individual |
| Dams | 1 | Upstream of the subproject area |

Source: Agroecord consult survey team, 2021

Moreover, a large number of water points are seasonal as in the project area. Awach- kano as a permanent river is the main source of water away from the project area. Less than 80% (against 86.4% at County level) of the residents have pit latrines. This could imply risk of surface water contamination with fecal material.

4.4.4. Housing and house types

The major housing type in the area is mud walled iron roofed houses. Table 9 provides a comparison of housing type in the area with the County aggregated statistics.

Table 9: Housing type in the project area

| Housing type | % of Households in the Project site | County level indicators |
|----------------------|-------------------------------------|-------------------------|
| Earth floor | 95 | 88 |
| Cement Floor | 2 | 12 |
| Mud walled | 92 | 88 |
| Corrugated Iron Roof | 96 | 87 |
| Grass thatched | 2 | 13 |
| Brick /Stone wall | 8 | 12 |

Source: ESIA team field data analysis, 2020 (ESS data sheet in appendix and FGDs)

The main housing type of housing in the area is the mud walled iron sheet roofed houses with either mud or cemented floor. However, permanent structures are coming up rapidly. As housing type reflect wealth status, the Project area could be said to be relatively poor to other areas of the County.

4.4.5. Land tenure

Land in the County is categorized as per the Article 61 of Kenya’s Constitution, Land Act, 2012 and Community Land Act, 2016. The first category of land that constitutes bulk of the land parcels is

private land. The community land is further categorized as registered community land and unregistered community. The second category is the public land which are mostly land owned by National Governments, public institutions and they include road reserves, riparian, ridges, lakes and forests. The land for the proposed irrigation rehabilitation works project in Awach Kano individual owned land under clan clusters. The site is a pre-existing irrigation scheme that is being redesigned to address limitations of existing scheme, such as flood risks and inadequate water for irrigation as a result of poor siting of intake works.

4.4.6. Communication

Table 10 provides the ownership and means of communication in the subproject area. The mobile network coverage in the area is relatively high at 85% compared to an average of 92% for the County which well compares with the national average of 85%. Network coverage is fairly good with all networks well represented (airtel and Safaricom dominate). Access to the means of communication is relatively high especially the mass media. This could be advantageous in advocacy initiatives on issues such as GBV.

Table 10: Ownership and access to means of communication

| Communication channel | % of Households with access/ownership |
|-----------------------|---------------------------------------|
| Radio | 88 (92) |
| Tv | 8 (45) |
| Mobile Phone | 85 (92) |
| Computer | < 0.5 % |

Source: ESS data sheet field data collection, 2020

In order to mitigate any negative impacts emanating from the construction and operation activities of the proposed development, relevant and cost-effective measures have been proposed in the Environmental Management Plan.

4.5. HIV/AIDS prevalence, Knowledge, Attitudes and Practices

The HIV prevalence in Kisumu County is above the national rate at 19.9 % and among the highest prevalence in Kenya. However, this has been going down from a high of 26.7% in 2010 and 25 % in 2015 (CIDP, Kisumu). Drivers of HIV in the County can be attributed to several social, economic and cultural factors, such as polygamy, circumcision, wife inheritance and poverty as well the migration of people in search of employment in the sugar belt and rice fields. This ESIA study did established the existence of HIV/AIDS cases in the community. Rice field clusters and associated activities, beaches and urban centers largely drive the HIV epidemic. The employment and influx of job seekers

in the project site during construction of the proposed rehabilitation works is likely to escalate the spread of HIV/Aids in absence of mitigation measures proposed in the ESMP such as sensitization of the workers and involved in the construction, promotion of the use of protective devices and encouragement of voluntary testing. The subproject area, Awach Kano is located in East Kano Location which has an HIV prevalence of 11.2% (Table 11).

Most of the community members are Christians (Protestants, Catholics and indigenous churches) whose spread and distance varies. Strong attachment to African traditional religious practices, though declining is adhered to with widow inheritance being common and a driver of high HIV infections. Family leadership is patrilineal though women have some decision-making power that allows them effectively participate in local political, economic and social discourses. However, land use and inheritance are largely controlled by men. This in most cases disadvantages female gender especially with the prevalent leasing of land and denies the participation of women in commercial agriculture and potential benefits that accrue from land development interventions. Accordingly gender sensitive agricultural technologies alongside skill development and diversification of the agro-based interventions need to be considered in the implementation of the subproject.

Table 11 : HIV prevalence in wards of Nyando Sub County

| Ward | Sampled | Seropositive | % |
|-----------------|---------|--------------|------|
| Ahero | 1700 | 227 | 14.4 |
| Kobura | 1495 | 102 | 6.8 |
| E. Kano/Wawidhi | 874 | 98 | 11.2 |
| Kobonyo Kany | 751 | 91 | 12.1 |
| Awasi/ Onjiko | 474 | 78 | 16.5 |
| Totals | 5294 | 596 | 12.1 |

Source: Department of Health, Kisumu County analysis, 2013-2018

4.6. Vulnerable and Marginalized Groups (VMGs)

The KCSAP PAD recognizes VMGs as the unemployed youth, elderly women and men, widows and orphans and people living with HIV/AIDS. Orphan hood in Kisumu County is estimated at 20 % (KNBS, 2018). Th percentage distribution of orphans between the ages of 0-14 years is about 15%. Vulnerability is largely driven by the HIV/Aids related mortalities, climate change risks and unemployment as well as environmental degradation. The male to female ratio stands at 98% in the County (Table12). One of the drivers of the gender differences is the high HIV related mortalities and low life expectancy among men in comparison to women. In this particular subproject area, women constitute the largest proportion of the labour force in the rice fields. This can be accounted for by

many reasons such as low skill levels, early marriages and lack of alternative employment opportunities. Women are thus more vulnerable to the risk of HIV from migrant workers during construction phase. They are also more vulnerable to water borne diseases such as schistosomiasis.

Table 12: Project beneficiaries by category

| Description | Total | Females | Males |
|-------------|-------|---------|-------|
| Direct | 1500 | 890 | 610 |
| Indirect | 6000 | 3840 | 2160 |
| Vulnerable | 370 | 230 | 140 |

Source: Project Appraisal document, KCSAP, Kisumu

4.7. Climate change and Disasters

The irrigation area is served by the great Awach River. This river flows from their watershed sources of Kericho hills. Just before reaching Awach scheme, the two rivers Sare and Nyaidho join to form one main river called Awach River at Kibogo market. The high flooding risks in the subproject area is thus attributed to the water brought into the area from the Kericho hills and the upper sugar cane zones. The River Awach river flow dynamics thus influence the perennial flooding and inundation in the sub project area. The rehabilitation design has taken into account the flood risks by including dyke structures. Without irrigation, the probability of crop failure is 50% during long rains and over 80% during short rains. Irrigation is thus a timely adaptation and mitigation strategy to perennial droughts and /or flood disasters

4.8. Common Conflicts and their resolution in project area

The main grievances were those involving succession and inheritance, natural resources, grabbing of public utility spaces and land boundary disputes, tenancy and labour. Domestic violence relating to sexual exploitation and abuse and gender-based violence are some the cases relevant to project implementation. Several methods are used in resolving these household conflicts as reported during the survey. The instruments used in the resolution of the reported conflicts in the area include extended family members, Religious institutions/ religious leaders, Chief/Assistant chief, Elders, Courts, IWRUA.

Even though men make decisions in the whole process of development, all the genders including men, women and youth implement the activities. As this project is guided by the Social Accountability and Integrity Committee principles, the scheme management committee and IWRUA has been tasked with forming an Accountability subcommittee to provide leadership in the GMR process. Though no record of conflict over irrigation water resource use is recorded, the limited access to water has been a source

of an expressed friction between clans especially between those who have full access and those who are limited to access at the tail end. CPCU will organise for sensitisation of the community on GMR framework and integrate the crosscutting issues into implementation. Secondly the likelihood of GBV or SEA during construction and operation phase of the project have been raised and the ESMP has captured detailed precautionary measures to address such risks. Alternative livelihoods and skill development among youth and women, as well as financial services inclusion deepening mechanisms need to be exploited, for example, the use of catchment management allocation to innovatively empower women and youth groups.

5.0. PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATION

5.1 Introduction

One of the most important aspects of ESIA is Public participation and stakeholders engagement. The Environment Management and Co-ordination Act CAP 387 and Section 35 (2) (j) of the Environmental Impact (Assessment and Audit) Regulations 2003 requires seeking views and concerns on health and safety issues from the project employees, the local and other potentially affected communities.” This is in addition to the World Bank ESS guidelines and policies.

5.2 Objectives of the public consultation

The objectives of public consultations for this Environmental Social Impact Assessment were to:

- ✓ To seek and examine views on health, safety, social and environmental issues from the potentially affected community
- ✓ To lay the foundation for future negotiations on any issues that may arise so as to build consensus and reach a mutually acceptable resolution of issues
- ✓ Provide the establishment’s neighbors/community with a forum to air any issues or concerns they may have with the establishment’s operations on Health Safety, social and Environment (HSSE)
- ✓ To facilitate the integration of plausible HSE management practices into the Environmental and Social Management Plan (ESMP) as recommended by neighbors/community

5.3. Methodology

The environmental and social assessment public participation exercise was conducted in February 2021 by the expert in three ways through (i) 3 Focus group and Key informant interviews and discussion, (ii) Field surveys and observational checklists and (iii) 2 Public meetings. In general, the following steps were followed in carrying out the entire CPP process: -

- ✓ Identification of institutions and individuals interested in the process and compiling a database of the interested and affected parties (KII schedule in Appendix VI and Community barazas (See minutes in Appendix VII) and ESS tool (Appendix IV)
- ✓ Administration of questionnaires to different target groups and local community members in the administrative area for the proposed project site (Appendix XI).
- ✓ Public/Technical Meetings at various levels and with different target groups provide an appendix(VII)

Consultative meetings were continuously held during the field exercise to consolidate the issues affecting the project as well as capturing issues raised by the project affected persons. One comprehensive public meeting as well as and technical meetings were held on various dates in January and February, 2021, with the local residents, chiefs, Village elders, and other local administrative leaders in attendance in the project area. The issues arising in the meeting are captured in Plate 4



Plate 4: Public engagement forum in the subproject site

5.3.1 Concerns and Issues Raised

The discussion provides the details of the outcome of the public consultations successfully carried out.

5.3.1.1. Positive Issues arising from public participation

During public participation, the community pointed out that the project will far have positive impacts in their lives. Some of the impacts are as listed:

- Increased employment opportunities through diversification
- Improved infrastructural access (road improvement)
- Diversification and skill development especially for women
- Conservation of the catchment through tree planting and community nurseries
- Improved adaptive capacity to frequent droughts in the area
- Reduced inundation
- Sequential cropping and at least 2 cropping seasons
- Crop diversification especially of high value crops
- Improved food security and nutrition security especially vegetable production

- Possibility of increased access to safe drinking water if the community can successful fund raise for borehole construction

5.3.1.2. Negative Issues arising from public participation

In general, there was no community objection to project implementation during the consultative process. Among the stakeholders during the public participation exercise were: the local community and relevant sector agencies from County Government of Kisumu and Lead agencies such as Forest department, County NEMA office, WRA, design engineer, fisheries department and health. However, hydrological risks such as water catchment degradation and runoffs were evident and mentioned to be anticipated mainly during the project implementation. The design will take into account the hydrological risks by adhering to standard laws and national construction Authority regulations and laws

5.3.1.3. General issues from Public participation

Various issues, most which fall under the social category were raised particularly during site meetings and FGDs (See appendix VI). The issues are highlighted under and their resolution is captured in Table (13) as well as incorporated in the ESMP. **From key informants, the issues of concern were**

- Conforming with water Act 2016 on abstraction of water. CPCU was tasked to liaise with WRA and community and facilitate the application and regularizing abstraction permit soonest and before commissioning of the subproject
- Revising and sharing of the hydrological assessment report with all concerned stakeholders especially WRA. The CPCU to ensure the input of WRA is captured in the draft hydrological report
- Sharing of the Technical design report among all involved agencies- CPCU to share the technical report among all the concerned parties
- Scheme not registered by WRA. The CPCU to liaise with community and ensure registration of the group with WRA immediately

5.4 Analysis of public consultation and participation

The public meetings captured the concerns of the people especially those directly affected by the project. The issues raised during the public meeting enabled the identification of the specific issues from the stakeholders' response which provided the basis upon which the aspects of the ESIA were undertaken. The views of these stakeholders were considered and their names and their contacts were

taken for future references as required by NEMA (See Appendix VIII for the list of participants in the Public Participation and Consultation). The local communities and major stakeholders independently gave their views, opinions, and suggestions in their best interest, bringing out the factors that affected the circumstances, influences, and conditions under which their organizations exist.

From the field work and the public meetings, it was apparent that the majority of the stakeholders were aware of the project and unanimously supported its implementation. The consultant and proponent also responded to the queries that the public sought to know about the project. All the environmental issues raised can be adequately mitigated exhaustively as explained in chapter 7 of this report. Other issues surrounding the project were amicably addressed during the public meetings since representatives, of the proponent were in attendance and responded to the issues which were unclear to the public. The comments are captured in appended sample questionnaires (Appendix XI and XII in appendix VI) as well as ESS tool in appendix IV. The community showed unanimous approval for the project. Employment creation, adaptation to and mitigation of extreme climate change episodes, poverty alleviation, income enhancement, skill development, infrastructure development, food security and nutrition and environmental conservation were the main reason for the support. From the field work and the public meetings, it was apparent that the majority of the stakeholders were aware of the project. The consultant and proponent also responded to the queries that the public sought to know about the project.

Table 13: Summary of major issues during public participation

| Venue | No. of participants | Major issue/concern | Response |
|---------------------|--|--|--|
| Awach Kano W/P site | 32 people in cognizant of SOP Covid containment measures (3 FGDs and 1 general baraza), 12 women, 10 youth and 10 men 19 of the attendees could be classified as VMGs | <ul style="list-style-type: none"> • Sanitation for the community vis avis the high-water table and low coverage • Water borne diseases such as bilharzia and malaria • Labour burden on female gender • Funding of Conservation and income generating activities for women and Youth in the area • Disruption to farming calendar • Alternative livelihoods • Leasing of land and intrahousehold conflict as well as equity issues • Risk of rape at the site during construction phase • Child labour • Sexual exploitation • Wayleaves for canals through private land • Water borne diseases | <ul style="list-style-type: none"> • Public health to sensitize community especially use of biodigester technology • Community sensitization by Health department • Create alternative livelihoods such as kitchen gardening and advocacy • The community to come up with proposals for possible funding • The contractor to schedule construction in such away it doesn't completely deny access to the community at any one time • Ministry of agriculture to sensitise community on available agribusiness opportunities • Community sensitization, agribusiness development and advocacy • Community by-laws and enforcement • WB does not condone employment of children under 18 • Community sensitization and world bank policies • Permission to be sought for affected parcels |

| | | | |
|--|--|---|--|
| | | <ul style="list-style-type: none"> • Gender based violence • Use of canal water for domestic purposes • Value chain dominance by middlemen • Pollution of water sources | <ul style="list-style-type: none"> • Awareness and advocacy • Advocacy • Community to be discouraged from using canal water • Alternative livelihoods and skill development, fodder banks, kitchen gardens and agroforestry • Training on safe and effective use of agrochemicals |
|--|--|---|--|

CHAPTER SIX

6.0 POTENTIAL ENVIRONMENTAL & SOCIAL IMPACTS AND MITIGATION MEASURES

6.1. Introduction

An effort has been made to account for impacts during the initial site preparation, construction and the operation stages of the project. This Section discusses the various potential environmental and social impacts (both positive and negative) associated with the proposed project. Upon critical scrutiny of the issues and general levels of impacts the following environmental and social impacts were identified as critical for detailed assessment and monitoring

6.2. Construction phase impacts

6.2.1. Positive social impacts

6.2.1.1. Employment creation

Employment creation is expected from construction work. Both skilled and un-skilled labour on temporal terms will be hired during the project construction and maintenance during operation phase as well through small scale irrigated farming. Women will particularly benefit from food vending opportunities.

6.2.1.2. Increased market and economy

The construction work will require supply of hardware such as steel, timber, cement etc. from the local suppliers with gains accruing to the economy through multiplier effects. This will also contribute to the growth of informal sector. The reduction in losses. The establishment of tree nurseries will create new revenue streams for farmers.

6.2.1.3. Improved access roads

The construction and improvement of 3 Km roads will improve the condition of the road network in the area hence ease of movement hence facilitate trade.

6.2.1.4. Improved Skill set

The employment of youth and other labour from the area will lead into transfer of skills to the local community

6.2.2. Environmental Impacts

6.2.2.1 Air pollution and Aerial Emissions

The potential sources of air pollution include traffic, emission from excavator and material supply vehicles. This is a short-term negative impact and will last within the actual excavation period and ferrying of materials. This impact is considered low risk. Increased use of fossil fuels during construction phase of the project is anticipated and the emissions may contain potential pollutants like NO_x, Sox, Cox₂/CO and other hydrocarbons, depending on the type of fuel used by the vehicles. This may also have an effect on level of greenhouse gas emissions.

Proposed mitigation

- ✓ *Ensure that maintenance on all machinery is done regularly to avoid the emission of noxious gases.*
- ✓ *Drivers and machine operator to avoid unnecessary running of motor vehicle engines and machinery when not in use*
- ✓ *Gravity fed system will avoid use fuel(hydrocarbons) and mitigate greenhouse gas emission during operation phase*

6.2.2.2: Solid Waste Generation

The project will entail a small scale of masonry work. The volume of solid waste generated from the construction of water troughs, latrines and any other masonry structure and packaging materials such as cement will be small with low impact.

Proposed mitigation measures

The contractor should ensure that construction wastes generated and not reusable or recyclable is cleared from the project site and disposed of accordingly in line with appropriate law by the regulatory agency at the region which is NEMA and County Government of Kisumu

- ✓ Contractor to practice waste separation to enable easy recycling of re-usable waste materials
- ✓ Contractor to provide temporal waste disposal receptacle in site.
- ✓ Contractor to liaise with licensed waste collector to routinely collect and dispose the waste
- ✓ Train workers and local communities on solid waste management

6.2.2.3: Surface and ground water pollution/ contamination

Earth movement, disposal of vegetation and other cleared materials and the inadequate disposal of liquid and solid waste, including the human waste from the workers, are likely to cause physical and chemical alteration of surface and ground water quality. Civil works, excavations, or an inadequate planning of cuts and fills, may affect the water table significantly. The digging of channels and diversion of water may also affect the turbidity and water quality, as well as the level and course of

the river. Changes in surface hydrology are likely to alter the flow of water through the landscape and microhabitats

Mitigation measures

- ✓ *The contractor to construct a standard temporary (lined) pit latrine for the workers*
- ✓ *Contractor to identify an appropriate site pit for disposal of vegetation and biodegradable plant material*
- ✓ *The contractor to engage a registered private waste management firm to collect and dispose off the generated wastes*
- ✓ *Civil works, excavations, cuts and fills to be compacted so that there is minimal soil loss*

6.2.2.4: Geomorphology and soils.

Surface alterations of the project works could destabilize the soil and lead to soil erosion. Land clearing in the project area and excavation may generate large amounts of fill and rubble.

Mitigation measures

- ✓ *Large amount of fills will be transferred to appropriate disposal sites*
- ✓ *Compaction should be limited to the construction area.*

6.2.2.5: Dust generation

Excavation and the movement of vehicles carrying material such as fuel and other required construction materials and equipment during construction will result to generation of dust in the air. This will take a short duration and mitigation measures are easily implemented.

Proposed mitigation measures are

- ✓ Provision of dusk masks to workers by the contractor
- ✓ Contractor to instruct drivers to avoid high speed near settlements in the project area
- ✓ Contractor to ensure water and mist sprays are undertaken during dry periods
- ✓ Contractor to ensure trucks removing waste and delivering materials such as cement are covered

6.2.2.6: Oil spills/Fuels and Lubricants

Oils and grease spillage on the ground may cause contamination to the soil and groundwater.

Proposed mitigation and management measures are:

- ✓ *Proper maintenance of vehicles and other equipment (using petroleum products) to avoid fuels and lubricants spills at the project site.*

- ✓ *The contractor should properly handle, storage, and disposal off oils and greases and their wastes during construction by ensuring that servicing is strictly done at designated servicing yard or external petroleum stations*

6.2.4.7. Hydrological impacts

Flood water discharges may cause siltation or sedimentation, or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Since storm water discharge constitutes a major portion of the total volume of the receiving water, adverse public health effects are likely in absence of water testing and treatment interventions. Construction activities may also alter drainage patterns on the site where construction occurs.

Mitigation measures

- ✓ *The proponent must ensure that the weir is constructed as per the engineering design specifications to ensure proper flow and reduce siltation or sedimentation.*

6.2.4.8. Habitat impacts

Excavation, site development, grading, and other surface-disturbing construction activities may adversely affect species or their habitat. Storm water may drain into and inundate species' habitat, degrade aesthetics, cause landscape alterations and negatively impact infrastructure within and without the project area. Effects associated with construction activities and related handling and disposal of wastes generated may contribute to the introduction of nuisance such as pests and related breeding sites (ponding). The impact on microhabitats includes spread of invasive species.

Proposed **mitigation measures include;**

- *Contractor to ensure machinery and equipment are regularly checked for oil leakages and well maintained on regular basis*
- *Contractor to only remove vegetation where construction is taking place only*
- *The CPCU to replenish lost vegetation by supporting planting of indigenous trees in the catchment*
- *The SLM component to support agroforestry among farmers in the area*

6.2.4.9. Landscape disturbance, erosion and biodiversity loss

Building material such as hardcore, ballast, cement, rough stones and sand will be required and obtained from quarries, hardware shops and natural sites such as river banks. This may result in landscape changes, displacement of habitats and reduction in visual quality of the surroundings. The site is an existing pan that is being rehabilitated with minimum clearance of vegetation expected.

Proposed mitigation

- ✓ *Where possible the contractor to exercise selective removal of existing acacia and species*
- ✓ *The Project component on NRM and SLM to support community establishment and planting of indigenous trees in the catchment*
- ✓ *The contractor to plant grass and indigenous trees around the weir and along the river area as per the ESMP recommendations*
- ✓ *excavations of the site will be confined only within the sections upon which construction is taking place*
- ✓ *Excavated earth will be held away from drainage channels*
- ✓ *The CPCU will develop catchment conservation plans to address soil erosion in the catchment*

6.2.3. Social impacts

6.2.3.1. loss of grazing area

An extra 20Ha in the tail end of the existing scheme will be put under irrigation denying livestock access to the pastures. Possible mitigation includes;

- *Awareness creation on storage and use of rice straw for livestock feeding instead of burning*
- *Sensitize the community on agroforestry (particularly on fodder trees)*
- *Enhance pasture production and management*
- *Sensitization of the community of flock size management to avoid overgrazing*

6.3.3.2. Temporary Disruption of farming calendar

The rice planting is season specific and highly depend on water supply from the upland area. Demolition of the intake and associated field structures will likely interfere with planting unless it coincides with the fallow period. Possible mitigation of the impacts includes;

- *Scheduling of activities to coincide with the fallow period*
- *Phased construction of northern and southern canals*

6.3.3.3. Risk of Accidents

During Construction phase, increased traffic flow into and through the site will occur. This increases the risk of accidents unless the traffic is properly controlled. Hauling of equipment (plant and machinery) and other materials and supply to the project site may pose a potential risk of accidents to animals and even people, especially children.

Proposed mitigation measures

- ✓ *Drivers to be instructed not to speed especially near settlements when supplying materials to the site to prevent accidents especially to animals and children*
- ✓ *Provision of PPEs to all workers*
- ✓ *Installation of warning signage at the construction site and identified*
- ✓ *Contractor to register the site with DOSH and insure workers*

6.3.3.4 Labour Influx Effects

During construction the project will attract jobseekers and hawkers with possibility of thieves intruding into the area. This therefore leads to concentration of people in one area drawn from diverse social backgrounds often resulting to a number of issues such as strain on various resources especially water resources, grievances from local community members over job opportunities, sexual exploitation and abuse, unwanted pregnancies among other social issues. To mitigate against possible social ills associated with labour influx during construction phase and conflicts thereof, the contractor will adhere to the following mitigation plan;

Mitigation measures to Labour Influx effects

- ✓ *The contractor awarded the Project will develop a labour Management Plan (LMP) in consultation with local leaders.*
- ✓ *The contractor will ensure effective community engagement and strong grievance mechanisms on matters related to labour, with a discrete mechanism for safely and confidentially reporting issues of SEA and GBV at the community level triggered by the Project*
- ✓ *Effective contractual obligations for the contractor to adhere to the mitigation of risks against labour influx, the contractor should engage a local community liaison person who is also trained in PSEA.*
- ✓ *The contractor will ensure proper records of labour force on site while avoiding child and forced labour*
- ✓ *The contractor will ensure comply to provisions of Workplace Injuries and Benefits Act (WIBA) 2007*
- ✓ *The contractor will develop and implement a children Protection Strategy, this strategy will ensure that no child under the legal age of 18 years is employed to the Project.*
- ✓ *The contractor should institute a security plan e.g. through a register for all visitors and workers.*
- ✓ *The contractor will Adopt and adapt Nyumba Kumi strategies*

6.3.3.5. Spread of COVID-19 amongst community members during construction

During project execution (civil works), large numbers of workers will be required to assemble together in consultation engagements, meetings, toolbox talks and even at work sites; varied number of

workforce including suppliers of material and services are also expected to come in from various places in the country which may be COVID-19 hot spots; and interaction of workers with the project host community will happen as workers find accommodation close to work sites, and/or return to their homes after works. The potential for the spread of any infectious disease like COVID-19 by projects is high. There is also the risk that the project may experience large numbers of its workforce becoming ill and will need to consider how they will receive treatment, and whether this will impact on local healthcare services including the project host community.

Covid Mitigation Measures

The Contractors will develop SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilization. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions;

Mitigation measures

- ✓ *Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including workers and visitors*
- ✓ *Avoid concentrating of more than 15 persons or workers at one location. Where more than one person is gathered, maintain social distancing of at least 2 meters*
- ✓ *All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening.*
- ✓ *The project shall put in place means to support rapid testing of suspected workers for covid-19;*
- ✓ *Install hand-washing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings and ensure they are used;*
- ✓ *Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of work stations, door knobs, hand rails*

6.3.3.6: Gender Based violence and Sexual Harassment

While such cases are difficult to assess, there is likelihood of cases of GBV during construction and operation phase of the project. This impact is triggered during Project Construction Phase when the Contractor fails to comply provisions gender inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2019 and 2/3 gender rule. Failure to protect Human Risk Areas Associated with, Disadvantaged Groups, interfering with Participation Rights, and interfering with Labour Rights.

Mitigation measures

This mitigation is triggered by gender inclusivity requirements in hiring of workers and entire Project cycle

Mitigation measures on Human Rights and Gender requirements which oblige the contractor to:

- ✓ *Ensure clear human resources policy against sexual harassment that is aligned with national law*
- ✓ *Integrate provisions related to sexual harassment in the employee COC*
- ✓ *Ensure appointed human resources personnel to manage reports of sexual harassment according to policy*
- ✓ *The Contractor shall require its employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse*
- ✓ *The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: effective and on-going community engagement and consultation, particularly with women and girls; review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women*
- ✓ *the contractor shall develop specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc*
- ✓ *The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.*
- ✓ *Identify a safe space for GBV cases that may arise*

6.3.3.7 Child Abuse

Children within project areas will be exposed to risks associated with interaction between them and Project Workers. This includes child labour and sexual abuse which coherently leads to teenage pregnancies and exposure to communicable diseases such as HIV/AIDS.

Mitigation Measures to Child Protection

- ✓ *The contractor will develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project including on SEA...*
- ✓ *All staff must sign, committing themselves towards protecting children, a contract which clearly defines what is and is not acceptable behaviour*
- ✓ *Children under the age of 18 years should not be hired on site as provided by Child Rights Act (Amendment Bill) 204.*
- ✓ *Wherever possible, ensure that another adult is present when working in the proximity of children.*

- ✓ *Not invite unaccompanied children to workers' home, unless they are at immediate risk of injury or in physical danger.*
- ✓ *Refrain from physical punishment or discipline of children).*
- ✓ *Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.*
- ✓ *Comply with all relevant local legislation, including labor laws in relation to child labor specifically provisions of Kenya's Employment Act Cap 226 of 2007 Part VII on protection of children against exploitation*

6.3.3.8: Sexual Exploitation and Abuse (SEA)

This impact refers to sexual exploitation and abuse committed by Project staff against communities and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project.

Mitigation Measures to Risk of SEA

- ✓ *Develop and implement an SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). The SEA action plan will include how the project will ensure necessary steps are in place for:*
- ✓ ***Prevention of SEA:*** *including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials;*
- ✓ ***Response to SEA:*** *including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management;*
- ✓ ***Engagement with the community:*** *including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights;*
- ✓ ***Management and Coordination:*** *including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.*

6.3.3.9. Spread of COVID-19 amongst community members during consultations

During consultations for ESIA, various activities will be undertaken. For efficient and meaningful engagement, a wide range of individual participants, groups in the local community and other stakeholders will be involved. The consultations will involve verification of PAPs covering the occupants of the affected area and vulnerable persons and groups; awareness raising, sensitization of PAPs and gauging attitude to the project; training and capacity building for livelihoods restoration grievance redress, execution of site - specific Surveys among others. The activities will lead to close interaction between the proponent and the community members leading to a high risk of spreading Covid-19 amongst community members during the consultation process. To minimize the social risk, measures will be required to ensure social distancing and appropriate communication measures. The mitigation measures will be supervised by a communications / stakeholder engagement / social safeguards expert in the project proponents' team.

COVID-19 mitigation measures

- i. Electronic means of consulting stakeholders and holding meetings shall be encouraged whenever feasible. One-on-one engagements for the PAPs while observing social distance and adhering to PPE wearing shall be enforced;*
- ii. Avoid concentrating of more than 15 community members at one location. Where more than one person is gathered, maintain social distancing of at least 2 meters;*
- iii. The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet;*
- iv. Use traditional channels of communications (TV, newspaper, radio, dedicated phone-lines, public announcements and mail) when stakeholders do not have access to online channels or do not use them frequently. Ensure to provide and allow participants to provide feedback and suggestions.*
- v. Hold meetings in small groups, mainly in form of FGDs if permitted depending on restrictions in place and subject to strict observance of physical distancing and limited duration.*
- vi. In situations where online interaction is challenging, disseminate information through digital platform (where available) like Facebook and WhatsApp & Chat groups.*
- vii. Ensure online registration of participants, distribution*

6.4. Operational phase impacts

6.4.1. Positive Social impacts

6.4.1.1. Resilience to climate risks

Irrigation is one of the most reliable strategy in adaptation to extreme weather events such as droughts. The high risk of crop failure for rain fed agriculture in the subproject area is 50-80 % in 4 out 5 years. The rehabilitation of this scheme increases coping and building better from droughts by the community and reduces their vulnerability to livelihood shocks in the short and long term. Increased access to water will mitigate against droughts and open opportunities for irrigation ensuring food security and nutritional security as well as income stabilization among farmers.

6.4.1.2. Improved food security

Availability of water will promote production of high horticultural value crops. This will increase access to food and improve nutrition beside income generation and employment among VMGs such as women and the youth. The increase in cropping intensity/sequential cropping will also improve food security in the community.

6.4.1.3. Livelihood diversification

The proposed project will enhance livelihood diversification through sustainable land management and natural resource management interventions, including small scale irrigation projects and farm level conservation works. Diversification will contribute towards employment creation, income generation and food security in the project area.

6.4.1.4. Increased crop intensity and productivity

Irrigation increases food productivity by 100-400%(FAO, 2009). The rehabilitated scheme will put an extra 20Ha of land under cultivation while increasing reliability of moisture supply for existing 133 Ha. The increased cropping intensity will increase productivity.

6.4.1.5. Increased employment

Increased employment will be due to increased cropping intensity, increased crop area and output from irrigation. The direct employment will largely benefit women. The backward and forward linkages expected from the supply chain effect will increase decent jobs for the community .i.e. stockists shops, transport and animal feeds production

6.4.1.6. Flood Control and other ecological functions

The project area receives very low rain. Extended retention of water in an extra 20Ha of the scheme will improve recharge of the aquifers for later use. The recharge the of the ground water levels in the process reduces surface flow and lowers the risk of flooding downstream.

6.4.1.7. Extended cropping period

Only one cropping cycle is currently feasible. Following rehabilitation works, sequential cropping hence intensification of cropping patterns would be possible. This will greatly impact livelihoods.

6.4.1.8. Increased crop intensity and household income

The increase in cropping intensity, sequential cropping and horticultural production will have appositive impact on per unit crop yield and returns. This eventually increases household income to limit majority of the farmers out of poverty

6.4.1.9. Skill development

It expected that skill development will be impacted on the community especially in areas of business development and alternative livelihood strategies such as fish farming and stall feeding of livestock.

6.4.1.10. Livelihood diversification

Currently only one cropping cycle of rice production is possible due to seasonality of water availability (it depends on upland flow. With the re design of the weir and provision of a still basin, water supply will be improved increasing crop intensification as well as production of horticultural crops. The diversification and intensification is expected to positively impact livelihoods including those of farmers in the tail end.

6.4.1.11. Improved access roads and social services

The road network in the area are few and dilapidated/ washed away by rains. The rehabilitation of the scheme will lead to improvement of 3km of access roads. Other infield structures such as footbridges will improve movement within and without the irrigation scheme. This is in addition to increased social services and capacity building of community on environmental conservation as well as livelihood diversification/ skill development.

6.4.1.12. Increased food security and nutrition

The diversification in crop enterprises, cropping intensification, introduction of fish farming and horticultural development will not only increase access to food but also increase nutrition security to reduce the high stunting among children. The increase in household income in particular will in particular reduce the vulnerability of the community to price shocks in the wider food market.

6.4.1.13. Reduced food (rice) imports nationally

Currently Kenya imports over 50% of its rice requirement. The rehabilitation of the scheme will contribute significantly to filling the local production gaps. This is expected to save the country substantial foreign exchange.

6.4.1.14. Decrease in livestock diseases and attendant increase in productivity

Though the extension of the scheme into the tail end area will reduce available grazing resources by 20Ha, it will manage to end the assembling of huge number of livestock in one area. This could minimise the spread of ticks and zoonotic diseases. The awareness on use of rice straw for livestock feed instead of burning, as well as integration with agroforestry could increase productivity of the existing livestock and even adoption of high producers especially dairy cattle.

6.4.2. Negative social impacts

6.4.2.1. Reduced grazing area

The rehabilitation will expand area under irrigation by 20HA. The current use of the 20Ha is for communal grazing.

Proposed **mitigation measures**.

- ✓ *Sensitize the community on agroforestry (particularly on fodder trees)*
- ✓ *Sensitise farmers on pasture production and improved management of existing pastures*
- ✓ *Sensitization of the community on flock size management*
- ✓ *Sensitise storage and utilisation of rice straw and other crop residues as animal forage*

6.4.2.2. Labour burden on women

Women are the main source of labour during most of the agronomic operations i.e. weeding, harvesting, drying and winnowing. Increasing cropping intensity may therefore increase burden on them. Possible mitigation includes;

- ✓ *CPCU to undertake skill development initiatives for women*
- ✓ *Mechanisation of some of the current operations with appropriate technology packages*
- ✓ *CPCU to promote kitchen gardens so as to enhance income and nutrition of women*

6.4.2.3. Inequity issues

Three productivity scenarios are possible in the scheme for rice production. The yield levels depend on agronomic practices adopted. Since yield levels ultimately impact household income levels, high yield differentials among scheme farmers may cause social inequities in the short to medium term. This may further be exacerbated by some farmers leasing their land for short term financial needs or emergencies. Agronomic practices such as level of fertilizer are the main determinant to give a gross

margin of 43,750 to 82,031. advisory services on soil fertility and pest management will thus be key in closing gaps in productivity, otherwise it will become a driver of inequity among households. Low, medium and highest yield levels are 4, 5 and 7 Tons/ Ha. With the current selling prices per bag of paddy (IR) being Kes1750, the corresponding gross income (Income- Expenditure) are Kes 43,750, 54,687 and 82,031 respectively. This is based on a constant variable costs of Kes, 15500 (harrowing, weeding, water fee, seeds and labour costs).

The gross margins per year are likely to increase with increase cropping intensity especially with the growing of high value horticultural crops. This will lift many farmers out of poverty and reduce their vulnerability to middlemen who exploit them during synchronised harvest. Crop intensification also come up with other environmental risks associated with increased fertilizer and pesticide use with cascading ecological and social impacts. One of the negative social impact of intensification include widening of inequities across the social stratum. This related to farmer ability to afford the requisite inputs. The lure of high returns may also increase appetite of entrepreneurs who lease farms from poor segment of the farmers.

Possible mitigation measures include;

- ✓ *Increase access to financial/ credit services and agricultural extension*
- ✓ *Promotion of kitchen gardens, fuel wood and agroforestry*
- ✓ *CPCU to promote alternative livelihoods*
- ✓ *CPCU to undertake Business and skill development for the youth and women*

6.4.2.4. Water Borne diseases

Ponding and water logging may promote the breeding of mosquitoes. Working in the fields without gumboots may also transmit schistosomiasis among farmers and the community.

Mitigation measures include

- ✓ *Contractor to provide for drainage to prevent disease outbreak*
- ✓ *CPCU to sensitise and educate the community about the prevention of water borne diseases*
- ✓ *CPCU to sensitise the community not to use canal water for domestic purposes*
- ✓ *CPCU to sensitise the community to wear gumboots when working in the rice fields*

6.4.2.5. Occupational health and safety risks

This may occur during maintenance of canals. Mitigation Include

- ✓ Farmers and workers will be *provided with PPEs*

- ✓ *Contractor to erect proper signage and appropriate warning at least 100m from the hazard to mitigate against the chances of accidents*

6.4.2.6. Increased pressure on infrastructure

The proposed project will lead to increased number of job seekers and workers putting pressure on limited social amenities such as toilets.

Mitigation measures

- ✓ *Protect the pan by fencing off and put appropriate conservations measures around by planting grass along the embankments and trees species that do not extract a lot of water from the ground the proponent will undertake these measures in collaboration with forestry department in the County.*
- ✓ *Construct water collection points at least 5meters away from the protected pan*
- ✓ *Observe Covid-19 guidelines by maintaining social distance and avoid congestion or public gathering*

6.5. Environmental impacts

6.5.1. Degradation of irrigated land

Water logging, use of pesticides and nutrient leaching as well build-up of salts (salinity) will occur during the operation of the scheme

Possible mitigation measures include

- *Farmers to be sensitised on regular soil testing as a monitoring tool to track changes and timely management of any adverse changes*
- *Provide adequate drainage for disposal of excess water to avoid water logging and salt built up*
- *Provide for leaching regime of the rice fields and/or fallow periods*
- *Sensitise and train farmers on alternative good husbandry practices such as organic farming, safe and effective of agrochemicals*

6.5.2. Erosion and sedimentation

Local erosion from routine land cultivation as well as sedimentation of the canals is likely throughout the project cycle.

Possible mitigation measures include

- *Farmers to maintain channels to prevent seepage and inefficiencies resulting from siltation and weeds proliferation*
- *Contractor to ensure adequate access to channels for ease of maintenance works*

- *Farmers to form a committee and mobilise for regular desiltation of the canals*
- *Contractor to Install silt trap chambers*

6.5.3 Toxicity and contamination from Pesticides

The Project objective is to contribute to resilience building through increased agricultural productivity. In the sub-Project area, horticultural and micro irrigation activities are envisaged. However, this will be on minor scale. This will increase use of agro chemicals (though on small scale).

Proposed Mitigation Measures

- ✓ *Training of farmers on effective and safe use of pesticides*
- ✓ *Avoid use of chemicals especially the restricted class of pesticides*
- ✓ *Use of PPE by sprayers*
- ✓ *Implementation of the recommended Integrated Pest Management (IPM) such as crop rotation, use of traps, Micro irrigation, green houses and screens, foliar feed and organic manure*
- ✓ *Only resort to low-risk pesticides when cultural and biological control measures fail*

6.5.4 Pollution of water sources

This may occur during **construction phase** as well during **operation phase** largely due to farming activities and or/ lack of sanitary facilities in the catchment

Proposed Mitigation

The contractor should avoid unnecessary wastage of water during construction

- ✓ *the contractor should provide oil sumps at the construction yard and/or service and fuel at registered oil dealers yards' necessary measures to prevent oil and grease spills and soil erosion which may pollute the water*
- ✓ *Install bio-digester for latrine facilities during operation phase*
- ✓ *Regular testing and chlorination of water at the community water point during operation phase*
- ✓ *Community sensitization and awareness on sanitation*
- ✓ *Test for suspected presence of heavy metals(mercury) in the water*
- ✓ *the contractor should ensure there is a temporal toilet/pit latrine and a standard pipe for water*

6.5.5. Downstream flooding

Though this is low risk event in the context of the project implementation, contingency plan is necessary in the event unusually heavy rainfall events in the future

Proposed Mitigation

- ✓ *Encourage beneficiaries to implement soil and water conservation measures through sensitization*
- ✓ *Undertake re-vegetation/ grassing around disturbed sections and in the catchment*

6.5.6. loss of biodiversity

Use of chemicals and pesticides could adversely impact beneficial organisms below and above ground. Water logging may also negatively impact soil micro-organisms. Possible mitigation measures include

- ✓ Training farmers on IPM and safe use of pesticides
- ✓ Promoting agroforestry in the community through the SLM component of the project

6.6. Decommissioning phase impacts

Decommissioning will be based on review of cost, health, safety and ecological risk factors. The monitoring will be a continuous, methodologically and technically standardized process involving *in situ*, and laboratory analysis of physiochemical variables. Both groundwater quantity (e.g., groundwater level and recharge rates) and quality monitoring (analysis of selected physical and chemical variables) will apply. The applicable limits are spelt under water quality regulations and World Health organization (WHO). Decommissioning will apply if any of the parameters pose risk to the health and safety of the users. Several factors as outlined below will guide decisions on whether to decommission.

- **groundwater level (m):** the level of the water table, the upper surface or top of the saturated portion of the soil or bedrock layer that indicates the uppermost extent of groundwater has decreased beyond allowable limits. It can be expressed as a height above a datum, such as sea level, or a depth from the surface.
- **groundwater recharge(m/s):** process that occurs naturally where permeable soil or rock allows water to readily seep into the aquifer. This takes place intermittently during and immediately following periods of rain and snowmelt, which are the principal sources for replenishment of moisture in the soil water system. This depends on the rate and duration of rainfall, the subsequent conditions at the upper land surface boundary, the antecedent soil moisture conditions, the water table depth and the soil type. Monitoring of groundwater recharge will allow for estimation of its temporal variability and areal distribution.
- **groundwater discharge(m/s):** process in which groundwater that enters the terrain in recharge areas, leaves the aquifer at discharge points. When the water table intersects the land surface there is a discharge zone. Discharge points typically occur as seepage into wetlands, lakes and streams. Monitoring of natural groundwater discharge (springs, bank seepage, baseflow) will provide data needed for calculation of groundwater balance and storage.
- **water quality** is the composition of constituents dissolved or contained within the water in the functioning of natural processes and human activities. Chemical composition is the most invoked factor in characterizing water quality. Biological, physical, and radiological factors

are also considered in water quality. Water quality guidelines or the WHO framework on water quality standards will apply.

- **Structural integrity**

As Intake and conveyance structures ages, they weaken to undermine the objectives of the scheme. Construction standards to a great extent determines the age at which demolition is done.

- **Restoration of habitat diversity**

water is necessary for habitat and natural physical processes that sustain river structure, fish and other river-dependent animals as priorities in water resource allocation. The intention is to fully restore the natural flow of the surface runoff if the situation warrants the action

6.6.1. Possible Positive impacts during decommissioning

6.6.1.1. Employment

Demolition of various structures such as intake works, weirs and canals will require hiring of both skilled and manual labour thus creating short term employment opportunities. It also provide employment to community members who provide services such as transport and catering services for workers.

6.6.1.2. Habitat restoration

The rehabilitation of the scheme has both onsite effects such as water logging, interference with fish migration, disturbance for microhabitats and loss of biodiversity. These will be reversed with decommissioning.

6.6.1.4. Grazing land restoration

An extra 20 Ha of pasture land is being put under irrigation. The loss of grazing land will affect availability of pasture to the livestock. With decommissioning the pasture land will be restored

6.6.2. Possible Negative impacts

Decommissioning is expected every 10 years for desiltation or if the capacity is to be upgraded in future. Possible decommissioning impacts are primarily related to disposal and handling of the inert and non-biodegradable and plastic wastes from demolition.

6.6.2.1 Solid waste Generation

The demolition exercise will entail removal of structures that will lead to accumulation of solid wastes that will emanate from the following activities:

- ✓ Demolition and removal of all the concrete works
- ✓ Demolition and removal of all the sanitary utilities
- ✓ Demolition and removal of the wooden and roofing materials
- ✓ The scrap metal and plastic water tanks

Proposed mitigation and management measures

To control the generation of noise and ensuring compliance with relevant noise standard include:

- ✓ *Contractor to Provide Personal Protective Equipment and clothing (PPE/C) to those actively engaged in the works at the site*
- ✓ *Contractor to provide for waste collection equipment and stations*
- ✓ *Contractor to organize with registered waste management handler and County government of Kisumu for waste collection and disposal*

6.6.2.2 Noise and Vibration Generation

Noise and vibration produced during decommissioning may lead to impairing verbal communication, temporary hearing problems/temporary threshold shift (TTS), noise annoyance or even interference of the normal behavior of domestic.

Proposed mitigation

To control the generation of noise and ensuring compliance with relevant noise standard include:

- ✓ *Contractor to instruct drivers to avoid idling of machinery or engine when not in use.*
- ✓ *Contractor restrict activities that create noise to daytime only*
- ✓ *Provision of PPEs and clothing including ear muffs to workers*
- ✓ *Construction activities to be undertaken during day, preferably between 8.00am and 5pm*

6.6.2.3. Agricultural machinery and motor vehicle emissions

The potential sources of air pollution include traffic emission from excavator and material transport vehicles. During the decommissioning phase

Proposed mitigation measures are

- ✓ *Ensure that maintenance on all machinery is done regularly to avoid the emission of noxious gases.*
- ✓ *Drivers and machine operator to avoid unnecessary running of motor vehicle engines and machinery when not in use*

6.6.2.4. Oil spills/Fuels and Lubricants

Oils and grease spillage on the ground may cause contamination to the soil and groundwater. Proposed mitigation and management measures are:

- ✓ *Proper maintenance of vehicles and other equipment (using petroleum products) to avoid fuels and lubricants spills at the project site.*
- ✓ *The contractor should properly handle, storage, and disposal off oils and greases and their wastes during construction by ensuring that servicing is strictly done at designated servicing yard or external petroleum station*

6.6.2.5. Dust emission

Demolition works will cause emission of dust which can adversely affect the health of workers and / or community.

Possible mitigation measures;

- ✓ Contractor to provide PPEs to all workers on site during demolition

6.6.2.6. Occupational Health and Safety risks

Human labour and machinery will be used in demolition works with possibilities of injuries to workers. Possible mitigation measures include;

- ✓ The work site will be registered with Directorate of Occupational Safety and Health (DOSH) and the contractor will be required to *ensure all necessary records on workers are kept during construction phase by providing PPEs, registration of workers, train workers on emergency preparedness and response while ensuring all SOPs on Covid 19 containment are adhered to*

6.6.2.7. Loss of livelihoods

With decommissioning of the project, cropping intensity will ensure as crop water moisture will be irregular and inadequate. The cascading effects includes loose of employment, poverty and reduced welfare. Mitigation measures include

- ✓ CPCU to train farmers on alternative livelihoods such as fish rearing and business development skills
- ✓ CPCU to promote Kitchen gardens and horticultural crops

6.6.2.8. Food insecurity and nutrition

Irrigation can increase yields by 100-400 % (FAO, 2009) and is one of the most strategies in adaptation and mitigation to climate change. Awach irrigation scheme will increase cropping intensity hence food security. However, its decommissioning will revert to the status quo characterised by low productivity and high risks of crop failure hence food insecurity. Possible mitigation measures include

- *The CPCU to promote alternative climate smart strategies and precision agriculture using drip irrigation*

- *Promotion of alternative livelihoods such as livestock farming and business*
- *Skill development and entrepreneurship*

CHAPTER SEVEN

7.0 ANALYSIS OF PROPOSED PROJECT ALTERNATIVES

7.1 Project Alternatives

Alternatives analysis in ESIA is designed to bring environmental and social considerations into the “up-stream” stages of development planning, project identification and earlier, as well as the later stages of site selection, design and implementation. Since the introduction of the ESIA process and subsequent development of ESIA methodologies and legislative provisions, the analysis of alternatives has been one of the main tenets of ESIA policy and procedures. Unbiased and transparent assessment of investment alternatives from an environmental and social perspective (as well as a technical and economic standpoint) is thus considered as one of the most important contributions ESIA can make in improving decision-making.

During the course of formulating the proposed project, several project alternatives were considered to ensure that the best option of project development was adopted. This included a no project alternative which meant that the current status quo remains where debilitated infrastructure including toilets continue posing drowning and waterborne diseases. No project alternative would imply, the funds are not utilized and the community is exposed to increased vulnerability to extreme weather episodes that negatively impact livelihoods.

7.1.1. Project Site

Alternative location for the subproject is not viable as the project is site specific provided the mitigation measures are implemented. The project area has the necessary head over irrigation fields making it possible for adequate pressure and water flow to all the fields. The alternatives to the current site will involve land acquisition, involuntary resettlement, a costly and socially untenable alternative. Given that the land is already under irrigation, rehabilitation and expansion is economically viable as well as in line with the County’s CIDP 2018- 2022. Further the area into which some expansion is being considered is a brown area and has no wildlife of any conservation significance. This is in addition being relatively flat terrain with clayey soil texture that support water retention.

7.1.2. Scale and demand alternatives

Rising demand for food, employment and food is driven by population increase and increasing frequency of climate related crises such as drought. This creates the need to supplement the watering of crops. Specifically, the proposed project addresses the limitation of existing scheme to supply water

throughout the year, as well as likelihood of climate induced conflicts including clan competition over resources between the current irrigated area and the tail end water use access rights.

7.1.3. Process and Input alternatives

This is dictated by the 3R principle (Reduce, recycle and reduce). In line with energy policy and environmental regulation and policies on health, safety and sustainable resource utilization, there is need to decrease greenhouse emissions and environmental pollution. Reduction of emissions from petroleum sources calls for alternatives such as gravity fed irrigation schemes which the scheme fulfills.

7.1.3.1. Water Acquisition Technology Alternatives and conveyance

There are number of water acquisition technologies available for irrigation. They include use of pump sets and conveyance systems such as gravity and pumping. The water sources include rainwater harvesting, water pans, groundwater abstraction, boreholes and stream water abstraction.

7.1.3.2 Irrigation type technology alternatives

7.1.3.2.1. Sprinkler irrigation

This type of irrigation uses sprinkler system to distribute water to crops as droplets under pressure. Initial high capital outlay, as well as the climatic conditions (high evapotranspiration) and soils limit the use of this technology in the subproject area.

7.1.3.2.2. Surface irrigation

This is gravity driven system driven by headworks with supply to the field being through a network of conveyance of canals and pipes. The water for irrigation could be from storage or direct. The advantage of the system lies in its ability to put a large area under irrigation, however where water is from a reservoir, the costs limit its appeal.

7.1.3.2.2. Flood irrigation

In this type of irrigation, no intake structures to divert water to fields are constructed. Hence it requires significant and constant supply of water from upstream area is required to sustain crop production. It is also limited to rainy seasons and short periods after the rains. Due to climate change, there are high risks of inundation and / or soil erosion, presenting significant environmental degradation risks.

7.1.3.2.3. Drip irrigation

The system is one of the climate smart, precision agriculture technologies as it significantly increases water use efficiency. However, it may be limited in open fields under high temperatures. It is cost effective and thus sustainable. The high maintenance costs are usually incurred under high silt load

water supply regimes. Regular replacement of the drip kits as is mostly likely for the heavily silted Awach Kano scheme reduces its appeal.

7.1.4. Potential Environmental and social Impacts

Though irrigation exhibit similar adverse social and environmental impacts, the magnitude of the impacts become a critical criterion in guiding the choice of alternatives. In most cases tradeoffs are based on socio economic criteria such as effect on production, preventive expenditure, cost effectiveness and replacement costs. In this subproject the designs are characterized with similar environmental impacts; hence the potential environmental impacts were not used as a criterion for selection. The project does need damming of the river, a course of action that comes with high social and financial costs as well involuntary displacement of population. The gravitational system is the best alternatives as it reduces production and maintenance costs. It greatly enhances the farm planning process and reduces GHG emissions during operation phase. Comparatively, the subproject emerges favorably among similar interventions where damming, involuntary displacement and pumping of water is needed to operationalize irrigation interventions.

7.1.5. Sustainability

Food security and nutrition is a cascading objective that cuts across several sectors such as health, security and employment. Increased access to food increases resilience of communities. The use of gravity fed system will reduce emission of GHGs. Reduction in GHGs emissions is a disaster risk reduction strategy to mitigate global warming and climate change. The use of green energy enhances the country capacity to implement international protocols such as on Kyoto/ UNFCCC. The low maintenance costs positively impact on sustainability of the project.

7.1.6. No project scenario

Irrigation projects are especially critical in the mitigation of adverse climate change impacts on agriculture and downstream flooding. The current project addresses multiple objectives whose outcomes cascade across local and national development objectives. Failure to implement the project will imply increased vulnerability of communities to droughts, poverty, food and nutrition insecurity. The community will thus resort to alternatives that harm the environment such as charcoal burning and sand mining along the river banks. The no project scenario will imply the County CIDP and ASDS priorities are missed. This will negatively impact resilience of the community to increasing climate change impacts. The funds committed for the project implementation will not be utilized missing on the multiplier impacts in the economy. The project is thus the best alternative and is justified from social, environmental and economic point of view. The no construction alternative also imply waste

of already invested capital. This decision will imply continued resource conflict over the inadequate water resource, as well as missing on associated food security projects and downstream flooding. The no construction alternative would imply that the current situation of low agricultural productivity and production risks due to weather variability is not mitigated. This decision will imply high risk of malnutrition, insecurity and low employment. From the above project alternative analysis, it is evident rehabilitation of the irrigation scheme is unavoidable, more so on the basis of high gross margins possible through intensified sequential cropping.

7.2. The Proposed Development Alternative

After analysis of various alternatives, NEMA is requested to issue an EIA License for the project described in this ESIA report and the recommended ESMP. In issuing the license, NEMA would approve the proponent's proposed development of the Project, provided all environmental measures are complied with during the construction and operational phases.

CHAPTER EIGHT

8.0. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1: Introduction

Environmental and Social Management Plan (ESMP) provides a logical framework within which the negative environmental and social impacts identified during the ESIA study can be mitigated and any beneficial environment effects can be enhanced. Monitoring and management practices as well as monetary compensation are considered and cost estimates included as applicable. Responsibilities and time frames for the implementation of the various aspects of the ESMP will be identified. The ESMP will be provided to prospective bidders for the construction contracts to ensure that environmental mitigation costs are factored into their costings. The Contractor(s) will also be required to prepare a contractor specific ESMP (C-ESMP) for their works in order to control construction impacts and ensure compliance with applicable environmental and health and safety legislation and standards. KCSAP, especially the County Project Coordination Unit and County Environment and Social Officer (CESSCO) will ultimately be responsible for ensuring that the EMSP is implemented.

The ESMP has been developed to assist in prioritization of key findings of the ESIA mitigation measures. The ESMP is based on ISO 14001 principles comprising the following: The environmental issues of concern, recommended mitigation measures, responsibilities, timeframes and costs (Table 4). The Environmental and Social Management Plan also includes environmental monitoring measures with the following objectives:

- ✓ To verify the execution of the measures proposed in the ESIA and to evaluate the effectiveness of these measures.
- ✓ To verify if the impacts anticipated in the ESIA have occurred and to detect environmental problems that could not have been identified previously, in order to adopt solutions adequate for the conservation of the environment.
- ✓ To provide reliable information to be used for the verification of environmental impacts with the purpose of improving the techniques of prediction of environmental impacts and the quality and opportunity of application of corrective measures. The monitoring program will cover, among others, the following aspects.

8.2. Construction and Operation ESMP

Table 14: Social Management & Monitoring plan for Construction phases of Awach Kano Irrigation scheme

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|--|---|-------------------|---|----------------|--|---|
| Health Operation and safety | Provide PPEs to all workers and register the site as place of work with DOSH | 0.25M | Supervisors with assistance of external experts where necessary | Continuou s | Work injury incidence register | DOSH licenses Audit report |
| Risks of Increased HIV and Aids transmission in the area | Institute HIV/AIDS awareness and prevention campaign amongst workers for the duration of the contract Training of facilitators within the workers, information posters in more frequented areas in the campsite and public areas | 0.1M | All Workers responsibility Contractor | continuou s | Number of Trainings Held Attendance list of participants during the training sessions | Minutes and records of training Invitation register Proceedings of the training Interviews with trainees |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|------------------------|--|-------------------|---|----------------|--|---|
| GBV at community level | <ul style="list-style-type: none"> • Effective and on-going community engagement and consultation, particularly with women and girls • Undertake sensitization around gender-equitable approaches to compensation and employment • Put in place referral mechanisms to address GBV at the community level and report to the relevant authorities • Separate toilets for different gender | 0.2M | -Supervisors with assistance of external experts where necessary GBV Exert Local CBO/NGO | continuous | Number of Trainings Held Availability of Training reports Attendance list of participants during the training sessions | Minutes and records of training Invitation register Proceedings of the training Interviews with trainees |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|------------------------------------|---|-------------------|---|----------------|--|--|
| Spread of COVID-19 amongst workers | <ul style="list-style-type: none"> • Develop a SOPs for managing the spread of Covid-19 during project execution • Use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including • Avoid concentrating of more than 15 persons or workers at one location. • Observe social distancing at least 2 meters • Put in place means to support rapid testing of suspected workers for covid-19; | | All Project components Supervising Eng. & Contractor(s) County Health Department Irrigation management committee in collaboration with the contractor | continuous | Availability of SOP(s), Training material, PPE, sanitizing facilities among others | Requisition invoices Site observation Interviews, Records Reported cases |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|----------------------|---|-------------------|-----------------------|----------------|-------------------|------------------------------|
| | <ul style="list-style-type: none"> • Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites | | | | | |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|--|---|-------------------|---|------------------------|---|---|
| <p>COVID -19 Spread among community members during consultations</p> | <ul style="list-style-type: none"> • Electronic means of consulting stakeholders and, holding meetings, whenever possible, shall be encouraged whenever feasible. One-on-one engagements for the PAPs while observing social distance and adhering to PPE wearing shall be enforced; • Avoid concentrating of more than 15 community members at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters | <p>0.02</p> | <p>The proponent, County Project Coordination Unit at the ward level. CESSCO Communications Expert/ Stakeholder Engagement Expert</p> | <p>Continuou s</p> | <p>Availability of SOP(s), Training material, PPE, sanitizing facilities etc.</p> | <p>Records and minutes of the consultation meetings</p> |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|---------------|---|------------|----------------|---------|------------|-----------------------|
| | <ul style="list-style-type: none"> • The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate • PPE for the number of people they intend to meet; • Use traditional channels of communications (TV, newspaper, radio, dedicated phone-lines, public announcements and mail) when stakeholders do not have access to online channels or do not use them frequently • Ensure to provide and allow participants to | | | | | |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|---|--|------------|--|-----------|---|------------------------------------|
| | <p>provide feedback and suggestions;</p> <ul style="list-style-type: none"> • Hold meetings in small groups, mainly in form of FGDs if permitted depending on restrictions in place and subject to strict observance of physical distancing and limited duration. • Disseminate information through digital platform (where available) | | | | | |
| Increased incidence of water borne diseases | <ul style="list-style-type: none"> • Manage irrigation and drainage to prevent breeding of malaria vectors | 0.1m | Public health to provide leadership, CPCU, IWRUA | Quarterly | Training and awareness sessions, Type and No. of toilets in place | Interviews Proceedings observation |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|-------------------------------------|---|------------|-------------------------------|---------|---|---------------------------------------|
| | <ul style="list-style-type: none"> • Educate community about vector borne diseases and their control • Provide mosquito nets • Integrated production systems for biological control and management of mosquito larvae • Provide mobile toilets during operation • Create awareness on biogas toilets | | | | | |
| Increased inequity in the community | <ul style="list-style-type: none"> • Strengthen local institutions in water rights to champion and manage access to irrigation resources • Promote and support alternative livelihoods and skills | 0.2M | Ministry of Agriculture, CPCU | Ongoing | Training sessions Business development plans | Interviews Observation/ reports |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|--|---|-------------------|---|----------------|--|--|
| | <ul style="list-style-type: none"> • Diversify type of crops such as vegetables, fodder and fuel wood • Provide seed capital to the youth and women groups for catchment conservation and employment creation | | | | | |
| Conflict over access of water for irrigation in individual plots | <ul style="list-style-type: none"> • IWRUA and Management Committee to formulate and register rules on use, control through participatory process with social services department | 0.02M | Management committee, IWRUA scheme Management Committee | As need arises | <ul style="list-style-type: none"> • Number of conflict mitigation meetings • Number and category of persons | Meetings and records of the meetings |
| Downstream flooding | <ul style="list-style-type: none"> • Adhere to structural standards for water storage projects • Encourage beneficiaries to implement soil and water | 1.2 M | Contractor Management committee | Continuou s | <ul style="list-style-type: none"> • Number of trees planted around the catchment | Report on the performance of the pan and flood mitigation measures |

| Social Impact | Specific Mitigation plan | Cost (Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|---------------|---|------------|-----------------------------|---------|---|-----------------------|
| | <p>conservation measures through sensitization</p> <ul style="list-style-type: none"> • Undertake re-vegetation/ grassing in the catchment | | Scheme Management committee | | <ul style="list-style-type: none"> • Acreage of grass planted • Length and number of conservation measures in place | |

Table 15: Environmental Management and Monitoring plan for Construction phases of Awach Kano Irrigation scheme

| Environmental impact | Specific Mitigation Plan | Cost(Kes) | Responsibility | T/Frame | Indicators | Means of Verification |
|--|--|-------------------|--|---|--|---|
| Clearance of vegetation, soil erosion and loss of biodiversity | Replant disturbed areas with grass and indigenous tree species to replace the lost plants The CPCU will develop catchment conservation plans to address soil erosion in the catchment | 0.5M | Design Engineer and contractor Contractor, CPCU CPCU in conjunction with Ministry of Agriculture | 2 months 2months 1month | No. of seedlings replanted and surviving Catchment and soil conservation Management plans | Requisition invoices Site observation Interviews Site observations Documentation and implantation plans |
| Waste management | Installation of waste management facilities that prevent contamination to water sources Incorporate suitable facilities for collection and safe disposal of solid wastes | 0.15M | Design engineer and contractor, environmental consultant | 1 month | Number and type of waste handling equipment/ stations | Requisition invoices Site observation |

| | | | | | | |
|--|--|----------------------|------------------------------|----------------|---|--|
| | <p>Provide for possibilities of waste recycling</p> <p>Organize with local authorities for suitable waste disposal arrangements</p> | | | | | <p>Licenses/ MOU</p> <p>Observation</p> <p>Interviews</p> |
| Environmental degradation from use of pesticides | <p>Formulate an IPM guideline</p> <p>Train farmers on safe use of pesticides</p> <p>Procure PPE demo kits and hold demonstrations at farm level</p> | 0.3 M | PMU, CPU, Farmers | Continuou s | <p>Number of Trainings Held</p> <p>Attendance list of participants during the training sessions</p> <p>Committees on IPM formed</p> | <p>Minutes and records of training</p> <p>Invitation register</p> <p>Proceedings of the training</p> <p>Interviews with trainees</p> |
| Sedimentation and local erosion | <p>Regularly maintain water channels to prevent seepage and reduce inefficiencies resulting from siltation and weeds</p> <p>Allow access to channels for maintenance</p> | 0.12M annual y | IWRUA, WRMA contractor | Monthly | Turbidity levels | <p>Baseline data</p> <p>Sampling</p> |

| | | | | | | |
|--|---|-------------|-----------------------|----------------|---|------------------------------|
| | The CPCU will develop catchment conservation plans to address soil erosion in the catchment | | | | | |
| Environmental Impact | Specific Mitigation Plan | Cost | Responsibility | T/Frame | Indicators | Means of Verification |
| Poor surface water quality | <p>Enforce water quality standards for drainage water</p> <p>Regularly monitor water quality</p> <p>Designate land for disposal of water</p> <p>Educate farmers on safe use and disposal of pesticides</p> <p>Promote IPM technologies including use of disease and pest tolerant cultivars and crop rotation</p> <p>Provide for leaching of salts</p> <p>Provide for biodigester toilet technologies</p> | 0.5m | | | PH, turbidity , SAR, , CA, Mg, nitrates | Baseline data, monitoring |
| depletion of ground water and deterioration in quality | <p>Monitor water levels during low flows</p> <p>Weir management</p> | 0.05M | | | Total solids, PH, salt levels | Baseline data, sampling |

| | | | | | | |
|---|---|--------------------------|--|--------------|--|---|
| Degradation of irrigated land (soil salinity , soil structure | Analyse soils and monitor changes so that potential changes can be managed Provide drainage for excess water | O.1M per annum as per BQ | Management committee, Ministry of Agriculture, CPCU | | PH, turbidity, SAR, , CA, Mg, nitrates Level of soil erosion Turbidity | Soil sampling and testing , baseline data |
| Alteration in microhabitats especially wetlands | Survey the habitats for any changes including inventory of invasive plant species | 0.1M | WRMA, Ministry of Agriculture, CPCU, fisheries department, | continuou s | Types of invasive species Inventories done Status reports, ponding | Sampling, observation, interviews |
| Hydrology (flood regime, low flow regime, fall of water table, rise of water table) | Monitor water levels during low flows and weir management | As in BQs | Wrma. Management committee, IWRUA | Continuou s | Base flows Water table Ground Water quality parameters | Sampling, observation, baseline data, interviews in community |
| Interference with fish migration | Provide for fish ladder at the weir and intake point | As per BQ | Fisheries dept. Contractor | At the onset | Fish ladders installed | Observation BQ |
| Total Kes | | 4.89M | | | | |

8.4. EMSP for the Decommissioning phase

Decommissioning refers to the formal process of removing something from the operational status. This being the final phase in the project cycle, decommissioning may present possible opportunities associated with the return of the land for alternative use. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operation ceased. The ESMP will direct the initial stages of decommissioning phase. The table below shows the EMMP of the commissioning phase for the proposed water pan project.

Table 16: EMSP for decommissioning phase of proposed project

| Expected Negative Impacts | Recommended Mitigation Measures | Performance Monitoring Indicator | Means of Verification | Responsibility Monitoring Implementation | Time Frame | Cost |
|----------------------------------|--|---|------------------------------|---|-------------------|-------------|
| Demolition Waste | <p>-A decommissioning ESIA will be done</p> <p>Use an integrated solid waste management system i.e. Through a hierarchy of options: Source reduction; Recycling Reuse; Sanitary land filling</p> <p>-Provide facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage</p> <p>-Use materials that have minimal packaging to avoid the generation of excessive packaging waste.</p> | Registered waste collector engaged | Inspection and observation | Contractor | One-off | 700,000 |

| Expected Negative Impacts | Recommended Mitigation Measures | Performance Monitoring Indicator | Means of Verification | Responsibility Monitoring Implementation | Time Frame | Cost |
|---------------------------------------|--|---|------------------------------|---|-------------------|-------------|
| | Ensure adequate collection and storage of waste on the site and safe transportation to the disposal sites and disposal methods at licensed disposal sites | | | | | |
| Noise and vibration generation | Avoid idling of machinery when not in use. Provision of PPEs and clothing including ear muff to workers. Construction activities to be undertaken during day time. | | Inspection and observation | Contractor | On - off | 20,000 |
| Motor vehicle emissions | Ensure that maintenance of all machinery is done regularly | | Inspection and observation | Contractor | Weekly | |
| Spills /fuels and lubricants | Proper maintenance of vehicles and equipment | | Service records | Contractor | weekly | |

| Expected Negative Impacts | Recommended Mitigation Measures | Performance Monitoring Indicator | Means of Verification | Responsibility Monitoring Implementation | Time Frame | Cost |
|---|---|---|------------------------------|--|-------------------|-------------|
| Food insecurity | Provide alternate | | | Contractor, CESSCO, CPC, Environmental sub committee | continuous | Variable |
| Flooding and inundation downstream | Early warning to downstream communities | | | Contractor, CESSCO, CPC, Environmental sub committee | continuous | Variable |
| Loss of livelihoods | Alternative livelihoods and diversification | | | Contractor, CESSCO, CPC, Environmental sub committee | Continuous | variable |

CHAPTER NINE

9.0 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

This ESIA (CPR) has ascertained that the construction of the proposed Awach-Kano irrigation scheme will have both negative and positive impacts on the physical and the surrounding human environment. Positive impacts social impacts increased employment, livelihood diversification, food security and nutrition, increased crop intensity and associated household income, infrastructure improvement, as well employment during construction and operation phases and increased agricultural productivity. Negative impacts include increased incidences of water-borne diseases, risk of accidents, loss of grazing land, increase in social inequities, burdening of women, child labour, sexual exploitation and HIV/ AIDS, risks of occupational hazards and risk of soil erosion in all phases. The negative environmental impacts include noise and dust pollution during construction, removal of vegetation, risk of increase in invasive species, loss of biodiversity, oil spills, solid waste generation, habitat disturbance and soil erosion. The project design has integrated measures to mitigate the adverse impacts with a view to ensuring compliance with applicable laws and procedures. Overall, the ESIA study concludes that the rehabilitation of the medium scale irrigation project will not generate significant negative and irreversible impacts that can compromise the ecological, social and environmental wellbeing of the area as well as health and safety of the residents. It is thus recommended that on submission of this report to NEMA, a conditional EIA license for the proposed sub-Project activities is granted.

9.2 Recommendations

It is recommended that the proposed project proponent be allowed to go ahead provided the outlined mitigation measures are implemented to as outlined in the ESMP. The ESMP should be translated into Contractor-Specific Environmental and Social Management Plan (CESMP) and shared with the contractor who wins the subproject bid. The CESMP is binding on the contractor. Accordingly, the contractor is required to engage a qualified Environmental and Social Safeguards specialist as well as Safety and Health consultant to oversee implementation of the satisfactory implementation of the ESMP. On approval, it is recommended that the proponent should implement the proposed project based on the proposed plans and if alterations are necessary, advice should be sought from the CESSCO and subsequently environmental expert.

- ✓ The proponent should share the ESMP with the Contractor and other responsible stakeholders and that the ESMP form part and parcel of the Contractor's contract to ensure that their obligations as outlined in the ESMP are executed
- ✓ The proponent will be required to undertake annual environmental and social audit pursuant to the provisions of the Act and World Bank ESS guidelines

In case of future decommissioning of the scheme, key stakeholders and the community should be involved in the planning and execution of the closure to ensure that direct and indirect users are well prepared and able to adjust to the decommissioning, all environmental and socio-economic impacts arising are addressed, alternative livelihood sources for the community are created and the land is reclaimed and restored to achieve its initial ecological and ecosystem functions.

9.2.1. Compliance with the provisions on water abstraction

The proponent has complied with the standards set out in the Fourth Schedule of Water Act 2016 by applying for the WRA water permit to regularize water abstraction from River Awach. The contractor will thus commence construction upon written authorization by WRA as specified in this report as permit processing proceeds. Hydrological assessments should be carried out regularly (every 3 months or as may be agreed upon by the relevant authority) for the relevant parameters and mitigatory action thereof.

9.2.2. Emergency Response Plan (ERP)

During the project construction, commissioning, operation and decommissioning, sustainable environmental management practices and adherence to stipulated structural designs and regulations will be observed. The proponent is committed to working closely with NEMA, environmental experts and relevant government agencies in adherence and implementation of the ESMP. In particular, the proponent will institute regular monitoring of ground and surface water as part of the ESMP, public health surveillance and ecosystem integrity. The proponent should train the IWRUA management committee on detecting and responding to any risk situation and be part of the ERP team together with the local administration. All relevant departments should be alerted early enough on water quality and quantity deterioration for timely remediation. Accordingly, proper channel of information and risk communication need to be established.

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- Republic of Kenya the Public Health Act. Government Printer, Nairobi

Appendix. I: Assessment Checklist

| Assessment factors | Permits | Standards | Length of impact | | | Effect on Environment | | | Mitigation Required |
|--|---------|-----------|------------------|---|------|-----------------------|----|------------|---|
| | | | T | P | None | MA | SA | Beneficial | |
| Regulatory Factors | | | | | | | | | |
| 1. Air Pollution Control (including CFCs) | | | x | - | | X | - | x | Maintenance of machinery |
| Drinking Water Management | | | x | - | | X | - | | Discourage community from using canal water for domestic purposes |
| Water Pollution | | | x | | | X | | | Community sensitisation, sampling and training of farmers on effective and safe use pesticides and disposal of wastes |
| Hazardous Waste Management | | | x | - | | - | | | |
| Solid Waste Management | | | x | - | | X | - | | |
| PCB Management | | | x | - | | X | - | | |
| Radioactive Materials Management | | | - | | | - | | | |
| Environmental factors | | | | | | | | | |
| Natural Factors | | | | | | | | | Habitat restoration and installing fish ladders at the weir |
| 1. Fish and Wildlife | | | - | | | x | | | |
| 2. Vegetation | | | x | | | - | | | |
| 4. Endangered Species | | | - | | | x | | | |
| 4. Water and Hydrology | | | x | | | x | | | |
| 3. Air and Noise | | | x | | | x | | | |
| 6. Physiography | | | x | | | - | | | |
| 6. Soils and Erosion | | | x | | | - | | | |
| 8. Historical, Archaeological, Paleontological Resources | | | - | | | - | | | |
| 9. Prime Farmlands | | | - | | | - | | | |

| | | | | | | | | |
|---|--|--|---|--|--|---|---|--|
| 10. Wetlands | | | | | | | | |
| 11. Floodplains | | | - | | | - | | |
| 12. Wild and Scenic Rivers | | | - | | | - | | |
| 13. National Wilderness | | | - | | | - | | |
| B. Human Factors | | | | | | | | |
| 1. Demography | | | - | | | - | | |
| 2. Housing | | | - | | | - | | |
| 4. Utilities | | | - | | | - | | |
| 4. Fire hazards | | | X | | | X | | |
| 3. Social Services | | | X | | | X | | |
| 6.Recreation and Aesthetics | | | X | | | x | | |
| 6. Land Use | | | x | | | x | | |
| 8.Traffic and Transportation | | | - | | | | x | |
| 9. Quality of Life | | | | | | | | |
| C.Socio-economic Factors | | | | | | | | |
| 1.Residential Dwellings | | | | | | | | |
| 2. Local Employment | | | - | | | | X | |
| 4. Public Health and Well-Being | | | - | | | | X | |
| 4. Relocation of Utilities | | | | | | | | |
| 3.Traffic and Congestion | | | - | | | | | |
| 6. Safety | | | x | | | x | | |
| 6. Effect on Population Trends | | | - | | | | | |
| 8 Adverse Community Reaction to the Project | | | - | | | | | |
| 9. GBV | | | X | | | - | | |
| 10.SH | | | X | | | | | |
| 11. Child Labour | | | | | | | | |

MA =Moderately adverse; SA = Significantly adverse; T= Temporal; P= Permanent; (-) = absence of the issue (benefit), (x) = presence of the issue

FORM 7



(r.15(2))

**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/14731

Application Reference No: NEMA/EIA/EL/19076

M/S **Agroecord Consult Ltd**
(individual or firm) of address

P.O. Box 223- 50200, Bungoma


is licensed to practice in the


capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **11416**

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

Issued Date: **4/20/2021**

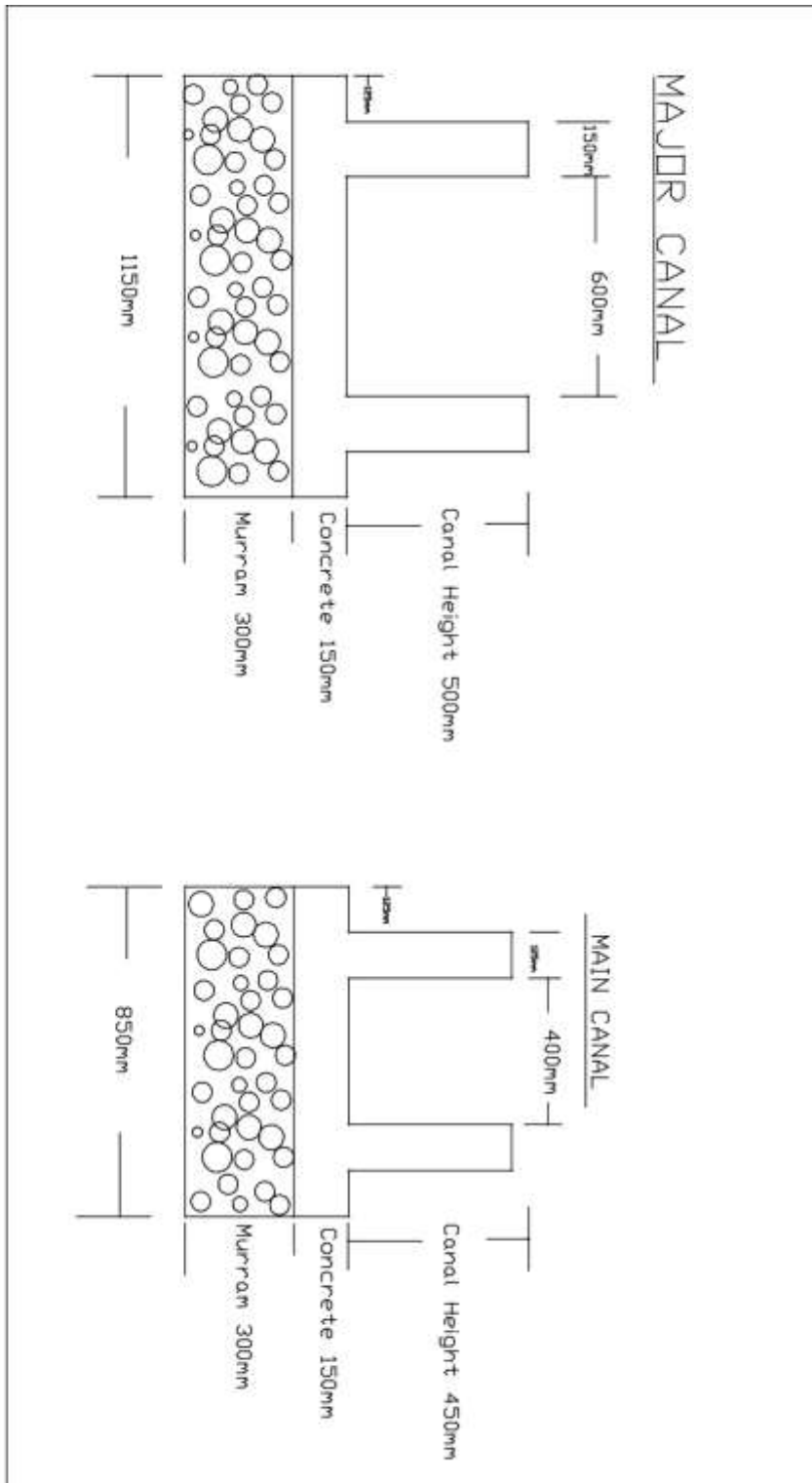
Expiry Date: **12/31/2021**

Signature.....


(Seal)
 **Director General**
**The National Environment Management
Authority**



Appendix III: Awach Kano Main Canal



Appendix IV: Project Area And Site Baseline Information Collection Tool

| NAME OF THE PROJECT | | | |
|--|--|---------------|----------------|
| LOCATION OF THE PROJECT GPS | | | |
| BRIEF DESCRIPTION OF THE PROJECT | | | |
| Village/location/ division / District | | | |
| Main natural and man-made features | | | |
| SN0. | DESCRIPTION | NUMBER | REMARKS |
| | Environmental and Climate Change Issues | | |
| 1. | Natural resources | | |
| | Forests (private/Gazetted) | | |
| | Wetlands | | |
| | Sand mines | | |
| | Quarries | | |
| | Hills | | |
| 2 | Land size and type of tenure | | |
| 3 | Water resources | | |
| | Springs | | |
| | Rivers | | |
| | Reservoirs/dams | | |
| | Shallow wells | | |
| 4 | Water sources | | |
| | River | | |
| | Streams | | |
| | Borehole | | |
| | Wells | | |
| | Rain water | | |
| | Reservoir/dam | | |
| 4 | Biodiversity: | | |
| | Unique wildlife at site | | |
| | Unique plants species on site | | |
| 5 | Rainfall in the area | | |
| | Temperature range | | |
| 6 | Incidents: flooding | | |
| | Drought | | |
| | Frost | | |
| | SOCIAL issues | | |
| 7 | Demographics project specific | | |
| | No. Females | | |
| | No. Males | | |
| | Persons with Disability | | |
| 8 | No of households currently in the scheme | | |
| | Average number of members per Household | | |
| | Distance to farthest household | | |
| | Average shoats using per household | | |
| | No of cattle per household | | |
| | No of chicken per household | | |
| 11 | Types of dominant shelters(House) | | |

| | | | |
|----|---|--|--|
| | Grass thatched/mud walls | | |
| | Iron/timber | | |
| | Iron sheets/masonry stone | | |
| 12 | Education facilities in project area and enrolment by gender | | |
| | ECDs | | |
| | Primary schools | | |
| | Tertiary | | |
| 13 | Health facilities in project area | | |
| | Dispensary | | |
| | Health centers | | |
| | Hospital | | |
| 14 | Type of sanitation facility used and coverage(%) | | |
| 15 | Diseases prevalence | | |
| | HIV prevalence in the scheme against subcounty/ County | | |
| | COVID 19 | | |
| | Malaria in the scheme against SubCounty/ County | | |
| 16 | Communication services: | | |
| | Mobile network providers and coverage | | |
| 17 | Unique cultural site or heritage | | |
| 18 | Types of road surface in the area | | |
| | Earth road | | |
| | Murram | | |
| | Tarmac | | |
| 19 | Energy sources and adoption level by Households in the area | | |
| | Wood fuel | | |
| | Liquefied Petroleum Gas (LPG) | | |
| | Electricity | | |
| | Biogas | | |
| 20 | Land tenure | | |
| 21 | Main Land use | | |
| 22 | Security: nearest police station | | |
| 23 | No of persons to be displaced by project | | |
| | CURRENT PROJECT | | |
| | Area under cultivation | | |
| | Variety grown | | |
| | Km of canals | | |
| | Are canals lined? If no do you intend to line | | |
| | Source of water | | |
| | What are main pests (birds, snails, etc) | | |
| | What are the main chemicals used and quantity | | |
| | Source of water (River) | | |
| | Rotational crops grown acreage and average yield | | |
| | Amount of water consumed per crop cycle | | |

| | | | |
|--|---|--|--|
| | Amount of water to be consumed per cycle | | |
| | Cost of rehabilitation | | |
| | Management committee by gender (number) | | |
| | Registered with WRMA/ WRUA | | |
| | Licensed by any statutory body | | |

Appendix V: Questionnaire Instruments and sample responses

Appendix V: Questionnaire Instruments and sample responses

Project name Village..... Sublocation..... Location.....

Name..... ID.no.....

TEL..... Email.....

Date..... Signature.....

Age..... Gender.....

i). How long have you lived in this place?.....

ii). Were you aware of this project before today ?.....

iii). In your opinion what are the likely impacts of the project on the community(use table below)

| Impact category | Positive | Negative | Comment (if any) |
|--------------------------------|----------|----------|--------------------|
| Environmental | | | |
| i. Biodiversity | | | |
| ii. Aesthetics(natural beauty) | | | |
| iii. Erosion | | | |
| iv. Water/Air pollution | | | |
| v. Water borne diseases | | | |
| vi. Malaria | | | |
| Social | | | |
| i) HIV/AIDS AND STIs | | | |
| ii) Culture dilution | | | |
| iii) Gender relations | | | |
| iv) Control of income | | | |
| v) Child labour | | | |
| vi) | | | |
| Economic | | | |
| i) Employment | | | |
| ii) Business and trade | | | |
| iii) Value of Land | | | |
| iv) Household income | | | |

iv).In your opinion, are there better alternatives to the project in terms of the listed factors?

| Category | Yes | No |
|-----------------------------------|-----|----|
| Technology (irrigation type etc) | | |
| Siting | | |
| Raw material | | |

v).In your opinion, can the project design be improved ? Yes..... No.....

vi).Briefly explain your answer.....

vii). Based on your opinion (iii to v), do you support project implementation? Yes..... No.....

viii). Briefly give your comment on why you support/Oppose the project?

Appendix VI: Key Informant (KI) Interview schedule

The world Bank funded AWACH IRRIGATION - KCSAP Project is being implemented in KISUMU County. As the project falls under the second schedule of EMCA, an Environmental Impact Assessment is to be undertaken. This is in addition to mainstreaming of World Bank ESS guidelines and operational procedures. As a Key informant, your contribution in decision making and ultimate licensing of the project is critical. Please make your comments regarding the following

- ✓ Are you aware of the project? Yes..... No.....
- ✓ What are the main statutes in your docket that touch on this project?
- ✓ Are there any issues (positive or negative) of concern (Social, economic and environmental) that you think should be considered in this project?
- ✓ In your Professional judgement does the implementation of the project require licensing/ permits from your department/ Authority/ Ministry?
- ✓ Based on your opinion (iii to v), do you support project implementation? Yes..... No.....
- ✓ Briefly give your comment on why you support/Oppose the project?
- ✓ Any other comment?

Thank You for your cooperation

KEY INFORMANTS list

- Agriculture department
- Project Engineer
- Public Health
- National Museums of Kenya
- Water Resource Authority
- NEMA
- County Government (Ward administrator and governor's office)
- Community FGDs
- County Environment Officer
- Fisheries Officer
- Kenya wildlife office
- National irrigation Board
- Area chief

Appendix VII: Record of issues (minutes) of the baraza held on at proposed Awach Irrigation site

MINUTES OF PUBLIC PARTICIPATION FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED REHABILITATION OF AWACH KANO RICE IRRIGATION SCHEME HELD BETWEEN 11:30 AM – 1:30 PM ON THURSDAY, FEBRUARY 4, 2021 AT ACHEGO, EAST KANO WARD IN NYANDO SUB-COUNTY IN KISUMU COUNTY

Agenda

- 1) Welcome and introductory remarks
- 2) Discussion
- 3) Any other business (AOB) and adjournment

Present

32 people (see the attached list of participants)

Minute 1.0-04/02/2021: Welcome and introductory remarks

Barrack Odiambo opened the meeting with a prayer. Vincent Odiambo of KCSAP welcomed all the participants and thanked them for attending the meeting. He introduced the project by first explaining to the community the meaning and objective of KCSAP and then giving a detailed account of what KCSAP is going to support in relation to the proposed project. He explained that KCSAP stands for Kenya Climate Smart Agriculture Project and that its development objective is to increase agricultural productivity and enhance resilience/ coping mechanisms to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response. He informed the community that the meeting was meant to collect the views and contributions of the stakeholders especially the community about the Proposed Rehabilitation and Improvement of Awach Kano Rice Irrigation Scheme. He added that the proposed improvement would increase the acreage under irrigation rice production by more than 100 acres on the current 500 acres.

Vincent welcomed Mr. Obingo Oduor, the lead Engineer in designing the project to give an elaborate account of the project design. Mr. Obingo explained that the proposed project will entail rehabilitation of the existing water intake on River Awach. He said that the existing weir is still intact and the rehabilitation works will include the repair of the apron, downstream and upstream the weir; repair and extension of the gabions; lining of the 600 m main canal and the 1.8 Km northern canal and the 1.2 Km southern canal; and creation of diversion boxes, box culverts, offtake gates, foot bridges and silt traps among other structures. He added that the rehabilitation works on the river would require diversion of the river over a stretch of 200 m through private farms along the river regime.

Vincent again welcomed William, representing the ESIA consultants to take over the meeting. The community welcomed the proposed project. One of the community members said that they did not have any reason to object it. The members of the community were more curious to know how long the project will take once approved, the people that will work during the construction and how much they would be paid.

William reiterated that the proposed project would increase food production in the area especially rice which is the main cash crop grown in the scheme. He added the project would also create employment opportunities to the area residents during the period of rehabilitation.

Minute 02-04/02/2021: Discussion

William led the discussion by asking some questions as the community responded. Below are the leading questions and reactions from the community.

- a) What other benefits do you foresee with the Proposed Rehabilitation and Improvement of Awach Kano Rice Irrigation Scheme?

The people noted that there are about 300 rice farmers in the scheme on about 210 hectares equivalent to about 817 plots each which is 0.25 acre. They added that with increased water supply, there will be production of short season crops such vegetables in the fields during the period when rice will have been harvested.

- b) How will the proposed rehabilitation works affect your farming activities and how can we ensure that you continue with your activities during the period of rehabilitation?

They suggested that if the proposed project is approved, then the rehabilitation works should take place during the fallow season. They said that during this time, they usually do not have farming activities and also do not need/ use water in scheme and, therefore, it would be easier to carry on with the rehabilitation works. They added that, during this period they will adapt with the little water supply during the rehabilitation period.

- c) What problems do you foresee with the implementation of the proposed project and how can we handle these problems?

They explained that they see no new problems because they have been farming rice under flood irrigation in the area for over 20 years and they have always managed.

The people however reported that marketing of rice is a major problem in the area saying that their rice is under priced by brokers leaving them with little income. They urged KCSAP to intervene in marketing of rice saying that it is not encouraging them to increase rice production and yet the market prices are very low.

- d) How have you been managing waterborne diseases and mosquitoes?

The people admitted that cases of water borne diseases such as typhoid and other water-related diseases such as malaria are common in the area. They said that they use gumboots while working in the rice fields in order to prevent attacks by dangerous works and snakes.

They added that they always ensure that their family members sleep under treated mosquito nets since the rice fields are favourable breeding grounds for malaria-causing mosquitoes. They said that malaria is a common disease in the area and affects farmers since they cannot work efficiently when they are sick.

- e) How will the proposed rehabilitation works affect your use of water e.g. for domestic purpose and for livestock?

The people said that some members of the community along the canals and even downstream use the canal water for domestic purpose. They said that the rehabilitation works could affect them. They however said that they will be collecting water directly from the river during period of rehabilitation.

Voting and proposal approval

The community unanimously voted for the project asking KCSAP to expedite the process as it would greatly alleviate the water scarcity in the area.

Barrack Odhiambo closed the meeting at 1:30 pm with a word of prayer.

Minutes prepared by:

Bella Kerubo

Signature: Date:
.....

Confirmed as a true recording of the events of the day by:

Name:
.....

Signature: Date:
.....

Name:
.....

Signature: Date:
.....

Encls: Present (See Appendix viii)

- The people said that the project proponent should carry out a survey to identify the farms and assets that are likely to be affected by the rehabilitation works through river diversion, movement of machines and extension of canals. They added that proper consultations and consent seeking should be done before the project begins.
- The community members suggested that the project make provision for anti-malarial drugs and treated mosquito nets at health care centers as a way to give back to society.
- The community pointed out that both the men and women have control over their household incomes and they envisage no household conflicts over control of income from rice.
- They emphasized that the very few cases of sexual harassment and gender-based violence are not always a result of the rice irrigation in the area and have always been managed by the local administration and the parties involved. They added that there will be no issues of women exclusion in the scheme.
- Child labour is a common problem in farming communities. How will you manage child labour and school dropouts resulting from the children preferring to work in the rice farms and earn money rather than going to school?
- Regarding child labor, the community emphasized that children under the age of 10 years are not allowed in the fields. They said that those who are allowed are given portions of work that they can manage based on their ages and abilities.

- Regarding school dropouts, the people said that the parents and the local administration are very strict and do not only tolerate children dropping out of school but also children failing to attend school without valid reasons
- The people said that some members of the community along the canals and even downstream use the canal water for domestic purpose. They said that the rehabilitation works could affect them. They however said that they will be collecting water directly from the river during period of rehabilitation.
- The people pointed out that excessive use of fertilizer in the fields often pollute water in the canals. They urged the project proponent to consider constructing a borehole for the community and installing end-user points at various places where the community can access them.
- They suggested that if the proposed project is approved, then the rehabilitation works should take place during the fallow season. They said that during this time, they usually do not have farming activities and also do not need/ use water in scheme and, therefore, it would be easier to carry on with the rehabilitation works. They added that, during this period they will adapt with the little water supply during the rehabilitation period.

They suggested that if the proposed project is approved, then the rehabilitation works should take place during the fallow season. They said that during this time, they usually do not have farming activities and also do not need/ use water in scheme and, therefore, it would be easier to carry on with the rehabilitation works. They added that, during this period they will adapt with the little water supply during the rehabilitation period.

The people pointed out that excessive use of fertilizer in the fields often pollute water in the canals. They urged the project proponent to consider constructing a borehole for the community and installing end-user points at various places where the community can access them.

The people suggested that the proposed rehabilitation works should be synchronized with the appropriate time that is either during the dry season or after rice has been harvested.

- a) Child labour is a common problem in farming communities. How will you manage child labour and school dropouts resulting from the children preferring to work in the rice farms and earn money rather than going to school?

Regarding child labor, the community emphasized that children under the age of 10 years are not allowed in the fields. They said that those who are allowed are given portions of work that they can manage based on their ages and abilities.

Regarding school dropouts, the people said that the parents and the local administration are very strict and do not only tolerate children dropping out of school but also children failing to attend school without valid reasons.

- b) Do you foresee cases of gender-based violence e.g. sex for jobs as it has been "sex for fish" in places like Homabay County?

The community vehemently said that there will be no issues of sexual harassment or immorality in the fields. They emphasized that the very few cases of sexual harassment and gender-based violence are not always a result of the rice irrigation in the area and have always been managed by the local administration and the parties involved. They added that there will be no issues of women exclusion in the scheme.

- c) Are there any sacred places or structures that will be affected by the proposed project?

The people were in agreement that there are no sacred structures and trees that would be affected by the project.

- d) What problems do you foresee relating to control of household income especially from rice farming?

The community pointed out that both the men and women have control over their household incomes and they envisage no household conflicts over control of income from rice.

- e) What arrangements do you have regarding the use of your pieces of land for the proposed rehabilitation activities?

The people said that the project proponent should carry out a survey to identify the farms and assets that are likely to be affected by the rehabilitation works through river diversion, movement of machines and extension of canals. They added that proper consultations and consent seeking should be done before the project begins.

- f) What are some of the projects that would benefit the community through corporate social responsibility?

The community members suggested that the project make provision for anti-malarial drugs and treated mosquito nets at health care centers as a way to give back to society.

Minute 3.0-04/02/2021: AOB and adjournment

There being no more things to discuss about the proposed project, William thanked the people for coming and taking part in the discussions. He assured them that their comments and views would be considered during the project implementation. He concluded by saying that NEMA and other lead agencies will review the ESIA report and give feedback.

Appendix VIII : Attendance List



Kenya Climate Smart Agriculture Project
KISUMU CPCU



ACTIVITY Public Participation for Pwani Kano Rice Irrigation Scheme Improvement

VENUE Ambigo

DATE 04/02/2021

ATTENDANCE LIST

| S/N/O | NAME | GENDER | ORGANIZATION | POSITION | TELEPHONE | EMAIL ADDRESS | SIGN |
|-------|---------------------|--------|------------------|-----------|------------|-------------------|------|
| 1. | DRISTO B. OSWALD | M | KICAP | Lead | 0735247874 | dristo@kicap.org | |
| 2. | BURE A. MUYA | F | SACHEME | COMMITTEE | 0718078283 | | |
| 3. | Richard D. Hanga | M | Scheme | Farmer | 0723396265 | | |
| 4. | George Ngugi Sison | M | Kenya | NAT | 999355333 | g.ngugi@kenya.net | |
| 5. | Gal Van OMADI Sison | M | Kenya | farmer | 0766102026 | | |
| 6. | Richard D. Hanga | M | Kenya | committee | 0700011111 | | |
| 7. | Charles O. MUYA | M | Scheme | farmer | 0700507332 | | |
| 8. | Victor Sison D. | M | Scheme | committee | 0700594112 | | |
| 9. | Lawrence D. MUYA | M | Scheme | committee | 0717011111 | | |
| 10. | JAMES KIRIATU MUYA | M | Scheme | FARMER | 075704009 | | |
| 11. | Richard Othman | M | Scheme | FARMER | 072087368 | | |
| 12. | SEM O. SULE | M | Scheme | FARMER | 070045301 | | |
| 13. | Henry Abenye Jibaga | M | Scheme | FARMER | 0713405530 | | |
| 14. | JESCA AKAHAWA | F | Scheme | FARMER | 0729471360 | | |
| 15. | Richard O. MUYA | M | Autorano | committee | 075987819 | | |
| 16. | Charles O. MUYA | M | Authorano | FARMER | 0702344161 | | |
| 17. | Richard Othman | M | Authorano | FARMER | 0767475725 | | |



**Kenya Climate Smart Agriculture Project
KISUMU CPCU**



ACTIVITY _____

VENUE

ATTENDANCE LIST

DATE

| S/NO | NAME | GENDER | ORGANIZATION | POSITION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|---------------------|--------|-----------------------|---------------------|------------|-------------------------|------|
| 1 | Vincent Odiambo | M | KCSAP | CESSCO | 0722567357 | vinipett@gmail.com | |
| 2 | Edmond Omwa | M | AGROCORD | ESIA EXPERT | 0714762745 | omwaredwan@gmail.com | |
| 3 | Hazel ALAI | F | CGK ENVIRONMENT | ENVIRONMENT OFFICER | 0117628345 | hazel_alai@yahoo.com | |
| 4 | SILVSTER ONGUDI | M | CGK-Environment | Environment OFFICER | 0710917705 | Davinongudi@gmail.com | |
| 5 | WALTER RABENO BSELE | M | FAHNERA | V-SUPER | 0714525624 | | |
| 6 | KENNEY. O. OLSAK | M | ORHOMANI | ORHOMANI | 0757731286 | Davyngaleon@gmail.com | |
| 7 | FREDRICK D. OGETA | M | FARVER | Committee | 0724605507 | fred.ogeta@gmail.com | |
| 8 | Doreen Apundi Okuo | F | " | FARMER | 0721800291 | doreen.apundi@gmail.com | |
| 9 | Pius Okumu Muga | M | FARMER | FARMER | 0725321128 | Okumu Pius Muga | |
| 10 | THEODOR OMBANDA | M | FARMER | FARMER | 072457257 | ombanda Theodore | |
| 11 | JOHN SMENDI | M | MUGITHI | " | 07585704 | smendi John | |
| 12 | ELIAS OMONDI | M | FARMER | Committee | 0727997338 | omondi Elias | |
| 13 | BARACK ODHAMBA | M | FARMER | W. SUPER | 0716221161 | odhamba Barack | |
| 14 | William Ouma | M | ESIA Expert AgroBoard | ESIA Expert | 0720123110 | williamouma@gmail.com | |
| 15 | Bella Kenbo | F | AgroBoard | Training minutes | 0714150506 | belalokamba77@gmail.com | |



Kenya Climate Smart Agriculture Project
KISUMU CPCU



Kenya Climate Smart Agriculture Project

ACTIVITY _____

VENUE:

ATTENDANCE LIST

DATE:

| S/NO | NAME | GENDER | ORGANIZATION | POSITION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|----------------------|--------|--------------------------|-------------------------------------|------------|--------------------------|------|
| 1 | Vincent Odiambo | M | KCSAP | CESSCO | 0722567359 | vinu.pett@gmail.com | |
| 2 | Edmund Omona | M | AGROECORD | ESIA EXPERT EMBAWANGI OFFICER | 0714705743 | omondun@esec@gmail.com | |
| 3 | Hazel Alai | F | CGK KWS/MBWET | Environment OFFICER | 0117628345 | hazel_alai@yahoo.com | |
| 4 | SILVSTER OMBUDI | M | CGK-Environment | Environment OFFICER | 0710917705 | silvsterombudi@gmail.com | |
| 5 | WALTER BENOLO OSELE | M | FARMER | V. SLBER | 0714525624 | | |
| 6 | KENNEDY O. ONSIEK | M | ORHOMANI | ORHOMANI | 0727737088 | onyoga@com of soil | |
| 7 | FREDRICK O. OGETA | M | FARMER | Committee | 0726055010 | fred.ogeta@gmail.com | |
| 8 | Doreen Apundi Othico | F | " | FARMER | 0721800291 | othico.doreen@gmail.com | |
| 9 | Pius Omon Muga | M | FARMER | FARMER | 0725371128 | Omon Muga | |
| 10 | THEODOR OUYANLO | M | FARMER | FARMER | 0724553557 | uyant@ | |
| 11 | JOHN SMONDI | M | MYTHUP | " | 07585704 | smondi@ | |
| 12 | ELIAS OMONDI | M | FARMER | Committee | 0727897338 | elias@ | |
| 13 | BARCKE ODHAMBA | M | FARMER | Committee | 0796227181 | barcke@ | |
| 14 | William Omona | M | ESIA Expert AgroEcord | ESIA Expert | 0720123110 | william@omona.com | |
| 15 | Bella Kenbo | F | AgroEcord | Taking minutes | 0714150506 | belakalamba79@ | |

Appendix (IX): Chance Find Procedures

1. Purpose of the chance find procedure

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure, is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

2. Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

3. Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

4. Chance find procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify a foreman. The foreman will then notify the Resident/Supervising Engineer and the Environment Officer (EO)/Environmental Manager (EM);
3. Record details in Incident Report and take photos of the find;
4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. Preliminary evaluation of the findings by archaeologists. The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
6. Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule

of the Contractor. The results of all archaeological work must be reported to the National Museums of Kenya (NMK), once completed.

7. In case of significant find the National Museums of Kenya (NMK) should be informed immediately and in writing within 7 days from the find.

8. The onsite archaeologist provides the NMK with photos, other information as relevant for identification and assessment of the significance of heritage items.

9. The NMK must investigate the fact within 2 weeks from the date of notification and provide response in writing.

10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;

11. Construction works could resume only after permission is granted from the responsible authorities.

12. In case no response received within the 2 weeks' period mentioned above, this is considered as authorization to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photo log, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports - kept.

5. Additional information

Management options for archaeological site

- a) **Site avoidance.** If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option)
- b) **Mitigation.** If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.)
- c) **Site Protection.** It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

Replicable heritage¹

¹ Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.

Appendix (X): Integrated Pest Management Plan (IPM) framework

INTRODUCTION

Pests are populations of living organism (animals, plants, or microorganism) that interfere with use of healthcare and other facilities for human purposes. Integrated Pest Management (IPM) is an approach that establishes a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. KCSAP, Kisumu will adopt this Integrated Pest Management Plan for Horticultural and agricultural sub and micro projects. The plan outlines procedures to be followed to protect the health and safety of farmers the environment and operators from pest and pesticide hazards. The plan is designed to voluntarily comply with policies and regulations promulgated by World Bank Pest Management (Operational Policy, OP/BP 4.09)

Objectives of this IPM plan include:

- ✓ Elimination of significant threats caused by pests to the health and safety of farmers, and the public.
- ✓ Prevention of loss or damage to structures or property by pests.
- ✓ Protection of environmental quality inside and outside buildings.

This IPM plan will be oversighted by the CPCU and provide for adaptation to all micro and subproject committee.

IPM COORDINATOR

The CESSCO or designee shall be the responsible for the implementation of the IPM plan and coordinate pest management-related communications between subprojects/ microprojects, farmers and the CPCU. The CESSCO shall designate a leader for each subproject and micro Project of KCSAP funded groups to serve as the IPM Site Coordinator.

IPM COMMITTEE

The microproject/ subproject committed will maintain an IPM or other safety-related committee with responsibility for quarterly review of the IPM program and for assisting the IPM Coordinator in resolving pest-related issues. The committee will address IPM issues as needed and at least quarterly. Minutes will be taken of committee meetings and kept on file by the IPM Coordinator. Membership will include the IPM Coordinator and IPM Site Coordinators, and may also include community members, health advocates, and representatives from the KCSAP-Kisumu IPM program.

POSTING AND NOTIFICATION OF PESTICIDE APPLICATIONS

The IPM Coordinator shall be responsible to annually notify farmers and guardians of the procedures for requesting notification of planned applications of pesticides on crops. The Service Providers and the committee shall provide notification in accordance with law, including:

- Posting a pest control information sign with the date, time and location of the application and the product applied in an appropriate area and including contact information for additional details.
- Providing this information to all sprayers.
- Providing this information to all farmers who have requested notification of individual applications of pesticides.

RECORD KEEPING & PUBLIC ACCESS TO INFORMATION

The Awach Kano irrigation Management committee and IWUA will maintain records of all Service Provider visits and pest control treatments for at least three (3) years. Information regarding pest management activities will be made available to the public at the administrative office. Requests to be notified of pesticide applications may also be made to KCSAP- Kisumu.

TRAINING

All farmers and staff will be provided with training on IPM policy before the onset of the project agricultural activities and during annual update training. Training will include the rationale for the IPM policy and program and specific elements including use of the pest-sighting log and prohibition on pesticide applications by non-certified individuals. Additionally, designated committee member for the subproject including the IPM Coordinator, IPM Site Coordinators and those who conduct regular inspections of the farms will receive advanced training on identifying pest infestations and pest-conducive conditions. This training will improve the ability of the farmers and Project staff to oversee Service Providers and compliance IPM policy and plan.

GENERAL IPM STRATEGIES

Pest management strategies may include education, exclusion, sanitation, maintenance, biological and mechanical controls, and pre-approved, site-appropriate pesticides. An Integrated Pest Management decision at the community shall consist of the following steps:

- Identify pest species.
- Estimate pest populations and compare to established action thresholds.
- Select the appropriate management tactics based on current on-site information.
- Assess effectiveness of pest management.

KEEP APPROPRIATE RECORDS

Decisions concerning whether or not pesticides should be applied in a given situation will be based on a review of all available options. Efforts will be made to avoid the use of pesticides by adequate pest proofing of facilities, good sanitation practices, selection of pest-resistant plant materials, and appropriate horticultural practices. When it is determined that a pesticide must be used in order to meet pest management objectives, the least-hazardous material, adequate for the job, will be chosen.

All pesticide storage, transportation, and application will be conducted in accordance with the requirement of Plant protection Act (Cap324), Pest Control Products (Cap 346), Pest Control Products(registration) Regulations 1984 and Pest Control Products (Disposal) regulations 2006 and World Bank Pest Management (Operational Policy, OP/BP 4.09). In accordance with above stated;

- No person shall apply, store, or dispose of any pesticide prescribed by law
- All pesticide applicators will be trained in the principles and practices of IPM and the use of pesticides approved for use
- All applicators must comply with the IPM policy and follow appropriate regulations and label precautions when using pesticides.

ROLES AND RESPONSIBILITIES

The KCSAP administration will provide support to assist the IPM Coordinator in maintaining an IPM program that relies on minimal pesticide use. Such support will include efforts to promptly address any structural, horticultural, or sanitation changes recommended by the coordinator to reduce or prevent pest problems. Furthermore, the CPU will assist the Coordinator in developing and delivering materials and programs for staff, farmers, and the public to educate them about the importance of good sanitation and pest control. The CESSCO is responsible for ensuring farmer compliance with the IPM policy and plan, including the attached check list.

Appendix XI : Sample of filled questionnaires

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: REHABILITATION OF ANKASH VANDI BRITANNIA SHORE
 Village: SOMERVA Sub-location: ANKASH Location: S. VANDI
 Name: GEORGE ANNA ANKASH ID. No.: 2345678
 Age: 36 Gender: MALE
 Tele/mobile phone No.: 0722-53902 Email address:

- a) How long have you lived in this place? 1984 to 2004
 b) Were you aware of this project before today? (Tick appropriately)
 Yes (✓) No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | — | | |
| ii. Aesthetics (natural beauty) | — | | |
| iii. Erosion | | — | |
| iv. Water/Air pollution | | — | |
| v. Water borne diseases | | — | |
| vi. Malaria | | — | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | — | — | |
| ii. Culture dilution | — | | |
| iii. Gender relations | — | | |
| iv. Control of income | — | | |
| v. Child labour | — | | |
| vi. | | | |

| Impact category | Positive | Negative | Comment (if any) |
|------------------------|-------------------------------------|----------|------------------|
| Economic | | | |
| i. Employment | <input checked="" type="checkbox"/> | | |
| ii. Business and trade | <input checked="" type="checkbox"/> | | |
| iii. Value of Land | <input checked="" type="checkbox"/> | | |
| iv. Household income | <input checked="" type="checkbox"/> | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-------------------------------------|-------------------------------------|------------------|
| i. Technology | | <input checked="" type="checkbox"/> | |
| ii. Siting | | <input checked="" type="checkbox"/> | |
| iii. Raw material | <input checked="" type="checkbox"/> | | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes () No

f) Briefly explain your answer in e) above.

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes No ()

h) Briefly give your comment why you support or oppose the proposed project?

To change the interest of the community around.

Date: Signature:

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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION
QUESTIONNAIRE**

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: AWACH KANU IRRIGATION SCHEME
 Village: SEHENE Sub-location: ACHEGA Location: EAST KANU
 Name: Fredrick Dgwera Dgwera ID. No.: 26191642
 Age: 32 Gender: MALE
 Tele/mobile phone No.: 0726053410 Email address: fred.dgwera-dgwera@gmail.com

- a) How 28 long have you lived in this place?
 b) Were you aware of this project before today? (Tick appropriately)

Yes No

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | ✓ | |
| iii. Erosion | | | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | | ✓ | |
| vi. Malaria | | ✓ | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | ✓ | ✓ | |
| ii. Culture dilution | ✓ | | |
| iii. Gender relations | ✓ | ✓ | |
| iv. Control of income | | ✓ | |
| v. Child labour | | ✓ | |
| vi. | | ✓ | |

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: ANACH - KANO IRRIGATION SCHEME -
 Village: SEHEME Sub location: ACHEGO Location: E. KATIO/WARIDHI
 Name: JAMES DOUGEN MBUA ID. No.: 2546394
 Age: 63 Gender: MALE
 Tele/mobile phone No.: 0725-769-049 Email address:

- a) How long have you lived in this place?
- b) Were you aware of this project before today? (Tick appropriately)
 Yes (✓) No ()
- c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | ✓ | | |
| iv. Water/Air pollution | | ✓ | |
| v. Water borne diseases | | ✓ | |
| vi. Malaria | | | |
| vii. | ✓ | | |
| Social | | | |
| i. HIV/AIDS and STIs | | ✓ | |
| ii. Culture dilution | | ✓ | |
| iii. Gender relations | | ✓ | |
| iv. Control of income | ✓ | | |
| v. Child labour | ✓ | | |
| vi. | | | |

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: A WACH KANO R, SCHEME

Village: ACHEGO Sub-location: L KANO Location: E. KANO/WA

Name: JESCA ADHAMBO ID. No.: 12706811

Age: 47 Gender: F

Tele/mobile phone No.: 0729481360 Email address:

a) How 20 long have you lived in this place? year

b) Were you aware of this project before today? (Tick appropriately)

Yes () No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | ✓ | | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | ✓ | | |
| vi. Malaria | | | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | | ✓ | |
| ii. Culture dilution | | ✓ | |
| iii. Gender relations | | ✓ | |
| iv. Control of income | | | |
| v. Child labour | | ✓ | |
| vi. | | | |

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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION
QUESTIONNAIRE**

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: REGULATION AWACH KANDIRICTION SCHEME
 Village: Seltema Sub-location: Achege Location: E. KANDIRICTION
 Name: Pius Okumu Mwa ID. No.: 8189978
 Age: 55 yrs Gender: MALE
 Tele/ mobile phone No.: _____ Email _____ address: _____

a) How long have you lived in this place? 55 yrs

b) Were you aware of this project before today? (Tick appropriately)

Yes (✓) No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | ✓ | | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | ✓ | | |
| vi. Malaria | ✓ | | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | ✓ | | |
| ii. Culture dilution | ✓ | | |
| iii. Gender relations | ✓ | | |
| iv. Control of income | ✓ | | |
| v. Child labour | ✓ | | |
| vi. | | | |

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| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|------------------|
| i. Technology | ✓ | | |
| ii. Siting | ✓ | | |
| iii. Raw material | ✓ | | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes (✓) No ()

f) Briefly explain your answer in e) above.

To create more income

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

Date: 6/15/21

Signature: 

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: Aviach irrigation scheme rehabilitation
 Village: Kano Sub location: Achege Location: E. Kano
 Name: Richard Ochieng Adongo ID. No.: 8194250
 Age: 56 years Gender: male
 Tele/mobile phone No.: 0723396268 Email _____ address: _____

- a) How long have you lived in this place? From 1965 up to today
 b) Were you aware of this project before today? (Tick appropriately)
 Yes () No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | | ✓ | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | | ✓ | |
| vi. Malaria | | ✓ | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | | | |
| ii. Culture dilution | | | |
| iii. Gender relations | | | |
| iv. Control of income | | | |
| v. Child labour | | | |
| vi. | | | |

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| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|------------------|
| i. Technology | | ✓ | |
| ii. Siting | | ✓ | |
| iii. Raw material | ✓ | | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes () No (✓)

f) Briefly explain your answer in e) above.

.....

.....

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

.....

.....

Date: 4/2/2021 Signature: 

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION
QUESTIONNAIRE**

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: AWACH KANO IRRIGATION CANAL
 Village: AWACH Sub-location: ACHEGO Location: EAST KANO
 Name: RICHARD O. DUNDUA ID. No.: 2650131
 Age: 72 Gender: M
 Tele/mobile phone No.: 0726987819 Email address:

- a) How long have you lived in this place? 1949
 b) Were you aware of this project before today? (Tick appropriately)

Yes () No ()

- c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|-------------------------------------|-------------------------------------|------------------|
| Environmental | | | |
| i. Biodiversity | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| ii. Aesthetics (natural beauty) | <input checked="" type="checkbox"/> | | Very erosion |
| iii. Erosion | | | |
| iv. Water/Air pollution | <input checked="" type="checkbox"/> | | |
| v. Water borne diseases | <input checked="" type="checkbox"/> | | |
| vi. Malaria | <input checked="" type="checkbox"/> | | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | | <input checked="" type="checkbox"/> | |
| ii. Culture dilution | | <input checked="" type="checkbox"/> | |
| iii. Gender relations | | <input checked="" type="checkbox"/> | |
| iv. Control of income | | <input checked="" type="checkbox"/> | |
| v. Child labour | | | |
| vi. | | | |

| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|-------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project?(Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|-------------------|
| i. Technology | | ✓ | |
| ii. Siting | ✓ | ✓ | |
| iii. Raw material | | | |
| iv. | | | |

e) In your opinion, can the project design be improved?(Tick appropriately)

Yes () No (✓)

f) Briefly explain your answer in e) above.

.....

.....

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

We can get food security

Date: 4-2-2024 Signature: [Signature]

44b

| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-------------------------------------|-------------------------------------|------------------|
| i. Technology | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| ii. Siting | | <input checked="" type="checkbox"/> | |
| iii. Raw material | | <input checked="" type="checkbox"/> | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes (✓) No ()

f) Briefly explain your answer in e) above.

.....
.....

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

Very soon
.....
.....

Date: 4/2/2021

Signature: 

T

5a

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: A WACH KANO R, SCHEME

Village: ASHEGO Sub-location: L. KANO Location: E. KANO/WA

Name: JESCA ADHAMBO ID. No.: 12706811

Age: 47 Gender: F

tele/ mobile phone No.: 0729481360 Email address:

- a) How 20 year long have you lived in this place?
- b) Were you aware of this project before today? (Tick appropriately)

Yes () No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | ✓ | | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | ✓ | | |
| vi. Malaria | | | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | | ✓ | |
| ii. Culture dilution | | ✓ | |
| iii. Gender relations | | ✓ | |
| iv. Control of income | | ✓ | |
| v. Child labour | | ✓ | |
| vi. | | | |

| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household Income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|------------------|
| i. Technology | | ✓ | |
| ii. Siting | | ✓ | |
| iii. Raw material | | ✓ | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes () No (✓)

f) Briefly explain your answer in e) above.

because the proposed one is the best for us.

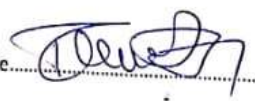
g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment why you support or oppose the proposed project?

I support it because it will increase the production of the product and improve living standards

Date: 6/2/2021

Signature: 

| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|------------------|
| Economic | | | |
| i. Employment | ✓ | | |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|----------------------------|
| i. Technology | ✓ | ✓ | -Combined harvester - |
| ii. Siting | | ✓ | |
| iii. Raw material | ✓ | | Green grams Water Melon |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes () No (✓)

f) Briefly explain your answer in e) above.

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

It will make work easy for the farmer and also
it will enable us to do crop rotation

Date:

4/2/21

Signature

Blues

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC PARTICIPATION
QUESTIONNAIRE

Section 58 of the Environmental Management and Coordination Act, 1999 (Cap. 387) (Amendment 2015) and section 17 of its subsidiary legislation, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides that any proposed project based on its potential to pose both environmental and social impacts requires undertaking of an ESIA. As a requirement under this law, you are advised as a member of the public to give your comments on the project. Your comments assist the National Environment Management Authority (NEMA) and other stakeholders make informed decisions on the proposed project. Your involvement in the ESIA process assures the quality, comprehensiveness and effectiveness of the assessment and ensures that your views are adequately taken into consideration in decision making process. We therefore request your input in the proposed project by responding to the questions below.

Project name: AMATCH KANO RICE IRRIGATION SCHEME (CBO)
 Village: SCHEME Sub-location: ACHEFO Location: E. KANO
 Name: KENNELLY ONYANGO DNDIEK ID. No.: 20671608
 Age: 47 yrs Gender: MALE
 Tele/mobile phone No.: 0727781086 Email onyangodcm123@gmail.com address:

a) How long have you lived in this place? 47 yrs

b) Were you aware of this project before today? (Tick appropriately)

Yes No ()

c) In your opinion what are the likely impacts of the project on the community (Fill in the table below)

| Impact category | Positive | Negative | Comment (if any) |
|---------------------------------|----------|----------|------------------|
| Environmental | | | |
| i. Biodiversity | ✓ | | |
| ii. Aesthetics (natural beauty) | ✓ | | |
| iii. Erosion | ✓ | | |
| iv. Water/Air pollution | ✓ | | |
| v. Water borne diseases | | ✓ | |
| vi. Malaria | | | |
| vii. | | | |
| Social | | | |
| i. HIV/AIDS and STIs | | ✓ | |
| ii. Culture dilution | | ✓ | |
| iii. Gender relations | ✓ | | |
| iv. Control of income | ✓ | | |
| v. Child labour | ✓ | | |
| vi. | | | |

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| Impact category | Positive | Negative | Comment (if any) |
|------------------------|----------|----------|---------------------|
| Economic | | | |
| i. Employment | ✓ | | ii) Leech of market |
| ii. Business and trade | ✓ | | |
| iii. Value of Land | ✓ | | |
| iv. Household income | ✓ | | |
| v. | | | |

d) In your opinion, are there better alternatives to the proposed project? (Tick appropriately and give your suggestions on your preferred alternative)

| Category | Yes | No | Comment (if any) |
|-------------------|-----|----|------------------|
| i. Technology | | ✓ | |
| ii. Siting | | ✓ | |
| iii. Raw material | | ✓ | |
| iv. | | | |

e) In your opinion, can the project design be improved? (Tick appropriately)

Yes () No (✓)

f) Briefly explain your answer in e) above.

.....

.....

g) Based on your opinions (c to f), do you support the project implementation? (Tick appropriately)

Yes (✓) No ()

h) Briefly give your comment on why you support or oppose the proposed project?

It will improve productivity and profitability to the farmers.

Date: 4/02/2021 Signature: 

Annex Xii: National Lands Commission Authorization To Undertake The Project.



OFFICE OF THE NATIONAL LAND COMMISSION COUNTY COORDINATOR
KISUMU COUNTY

ARDHI HOUSE
P.O. BOX 1874-40100
KISUMU.

Date: 15th July, 2021.

File Ref: NLC/KSM.CTY/1/6/VOL.II (72)

County Project Coordinator
✓ Kenya Climate Smart Agriculture Project
KISUMU COUNTY.

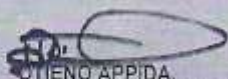
RE: COMMUNITY IRRIGATION SCHEMES – AWACH KANO, KABAYI, SIANY CC3, CHIGA, GEM RAE AND ALUNGO.

This is in reference to your letter ref, KCSAP/KSM/ADMIN/VOL.1 (14) dated 1st July, 2021 on the above subject.

As requested by your office, National land commission took part in the Public Participation exercise as scheduled from 5th July, 2021 to 10th July, 2021, and established that;

- a) The County government of Kisumu is rehabilitating six community irrigation schemes namely: Awach-Kano, Kabayi, Siany CC3, Chiga, Gem Rae and Alungo.
- b) The rehabilitation exercise involves lining of existing scheme canals with concrete in order to improve the efficiency of water flow.
- c) The land owners whose parcels the canals and water pipes pass through and the farmers unanimously consented to the carrying out of the project.
- d) The County government of Kisumu through Kenya Climate Smart Agriculture Project is not constructing new canals in any of the six schemes. They are only rehabilitating the existing ones.
- e) The parcels of land through which the canals and the water pipes pass are privately owned. The only public land in these schemes are road and riparian reserves.
- f) The effective public participation conducted helped clarify some of the concerns and manage stakeholder expectations in terms of their roles and responsibilities in the project.

Based on the above observations, the issue of compulsory acquisition is absolutely unnecessary in the six schemes.


OTIENO APPIDA,
COUNTY COORDINATOR, KISUMU COUNTY
NATIONAL LAND COMMISSION.

Copy to. The Secretary /CEO
National land Commission
NAIROBI.

Appendix XIII : Minutes of land Consent public Participation

REPUBLIC OF KENYA



KENYA CLIMATE SMART AGRICULTURE PROJECT – KISUMU COUNTY

MINUTES OF LAND CONSENTING' PUBLIC PARTICIPATION MEETING FOR THE PROPOSED CANAL CONSTRUCTION AT AWACH KANO IRRIGATION SCHEME IN NYANDO SUB-COUNTY, HELD ON 7th JULY 2021 AT THE SITE OFFICE

Members Present

Attendance list attached.

Preliminary

The meeting started with a word of prayer at 10:00a.m from one of the farmers. A brief round of self-introduction was then done and thereafter the chair invited the County Environment and Social Safeguard Compliance Officer (CESSCO) to take members through the agenda for the meeting.

Agenda

1. Land owners consent
2. Project implementation status report
3. AOB

Min 01/07/07/2021- Land Owners Consent

Mr. Vincent Odhiambo stated that Awach Kano Irrigation scheme is one of the subprojects that is financed by Kenya Climate Smart Agriculture Project (KCSAP). As required by World Bank Environmental & Social Safeguards (ESS) Operating Policies and EMCA of 1999 (CAP 387), Environmental & Social Impact Assessment (ESIA) was conducted and report compiled and shared with the National ESS team. However, evidence of land ownership was found to be inadequate in the report and CESSCO was advised to engage land owners with the objective of getting their consent to construct canals through their land.

Mr. Benard Opaai from National Lands Commission was invited to lead the land consenting exercise.

Mr. Opaai took members through the various land regimes in Kenya. It was noted from the meeting that the scheme is communal but land ownership is private.

Mr. Apida Protas from National Lands Commission also enlighten farmers on public land (riparian areas and roads reserves). He encouraged the farmers to avoid encroaching on public land.

The scheme chair informed the meeting that Awach scheme was started in 1978. In 1982, the European Union Commission (EUC) supported construction of canals during which land owners were consulted and their consent sought for canals to pass through their land. He asserted that they fully support and approve the rehabilitation work done by KCSAP.

When Mr. Opaas put the land matter to vote, **the farmers unanimously gave their consent for the project to continue.**

Min 02/07/07/2021-The project implementation status

Members were taken through the project implementation progress by the lead engineer. He stated that there is a dedicated team of engineers supervising the contractor to ensure that work is done as per design. Most of the concerns raised by farmers were addressed by the team of engineers in the meeting. Issues/challenges raised due to the implementation of the project include;

| Concern | Response/Action |
|--|---|
| How water will flow through the scheme blocks specifically block A. | Survey was conducted prior to project design and it was noted that block A is on a higher elevation. Flow of water in all the blocks (including block A) was factored in the design. |
| There are cracks in some parts of the canal | The cracks could be as a result of various factors Such as improper curing and differentials in drying. It doesn't affect the canal integrity |
| Canal is lower than ground level hence increased chance of siltation | It is taken care of by the structural design. |
| Canal alignment. | Plastering of the canal walls is only done after proper vibration and need for plastering determined. |
| How farmers will access one divide of scheme to the other | Box culverts are factored in the BQs that will allow them to pass through the canals |
| Market challenge for the rice produced. | Farmers should conduct market survey and produce as per the market demand KCSAP developed a market information system (KAMIS) where farmers can get market information. The farmers will be trained on various issues after project commissioning i.e. marketing Farmers should strengthen their cooperative society to assist them in marketing. They should also align the production cycle to help in the management of pests and |

| | |
|--|--|
| | diseases and feedback after every meeting should reach the farmers. |
| Whether contractor is allowed to use stones he found at the site | The contractor is permitted to use materials on site once they are given site handing over certificate |
| Thickness and durability of culverts-quality | It is taken care by the design of the structures. |
| Community/women/youth representation in the PMC | Two community members sit in the PMC. However, it was noted that women are not represented in the PMC |

AOB

During the discussion session, farmers were asked by Mr. Opa to state some the potential benefits and concerns they foresee from the project. They were also to mention the variety and kind of crops grown within the scheme as well as their governance and leadership structure.

Potential benefits and concerns/fears of the project implementation as raised by farmers

- They will be able to diversify crops grown in the scheme
- Canal will help in flood mitigation
- Sustainability and continuity in production
- They will have reliable water for irrigation
- Increased income generation from crop production
- Increased job opportunities for the youths.

2. The crops and the varieties grown within the scheme

The farmers mainly produce rice (Pishori, Sindano and Basmati variety) and face challenges of birds' infestation and lack of ready market.

They were informed that KCSAP has developed a market information system (KAMIS) where farmers can get information on market price for their product. They were also encouraged to adopt alternative birds control strategies such as growing rice at the same time to spread losses as it is not viable to spray small farms.

3. Leadership and governance

The scheme secretary stated that they have an active CBO (Awach Kano Irrigation Scheme CBO) and a Cooperative society (Awach Kano Cooperative Society). Women and youths are mainstreamed in the management and operations.

Adjournment

There being no other business to transact, the Area chief gave a vote of thanks and the meeting was closed by a word of prayer from one of the farmers at 3.00pm.

Minutes signed for circulation

Name: VINCENT ODHIMBO Sign:  Date: 8th July 2021

Annex XIV : Attendance list of members present during the land participation.



Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU



ACTIVITY: PUBLIC PARTICIPATION

VENUE: AYRACHU/KARU

DATE: 01/07/2021

ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|----------------------|--------|-------------------|--------------------|--------------------------|--------------------------|--------------------|
| 1 | LUCAS ABUJO | M | | | 0704139113 | Lucas Abujo @km.com | <i>[Signature]</i> |
| 2 | Samuel Wambui | M | Chiga Rice Scheme | Prm L | 0717314442 | Samuelwambui@gmail.com | <i>[Signature]</i> |
| 3 | Dominic Gwango Amimo | M | Chiga Rice Scheme | Block leader | 0710567016 | - | <i>[Signature]</i> |
| 4 | Lucas Abonyi Opa | M | Chiga Rice Scheme | Block leader | 0750831679 | - | <i>[Signature]</i> |
| 5 | Andrew Ochiado | M | Chiga Rice Scheme | Committee | 0795820327 | - | <i>[Signature]</i> |
| 6 | Florence Dwarango | F | Chiga Rice Scheme | P.M.C | 0728843223 | - | <i>[Signature]</i> |
| 7 | Andrew Ochiado | M | Chiga Rice Scheme | Chairman | 0714232220 | - | <i>[Signature]</i> |
| 8 | Richard Omondi | M | Chiga Rice Scheme | Committee | 0712174809 | richardomonodi@gmail.com | <i>[Signature]</i> |
| 9 | JAPHEIH OKIE | M | Chiga Rice Scheme | Chairman | 0704409974 0717257807 | - | <i>[Signature]</i> |
| 10 | NICHOLAS OUKO | M | Community | Secretary | 0727257803 | - | <i>[Signature]</i> |
| 11 | John Omondi | M | Community | Secretary | 074627378 | - | <i>[Signature]</i> |
| 12 | Dennis W. Wambui | M | Chiga Rice Scheme | Project Supervisor | 0718787916 | - | <i>[Signature]</i> |
| 13 | Bester Anyango | F | Chiga Rice Scheme | Farmer | 07114237407 | - | <i>[Signature]</i> |
| 14 | Paul Ndalo Atali | M | Chiga Rice Scheme | Farmer | | | PNA |



**Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU**



ACTIVITY: public participation

VENUE: Awach Kano Irrigation Scheme

DATE: 07/07/2021

ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|-------------------------|--------|--------------|-------------|-------------|---------------------|-------|
| 14 | Godfrey Duma Ojumu | M | | | 0729497451 | | |
| 15 | SIHEM Olymwo SUSA | M | | | 07291504562 | 254 AHERA | |
| 16 | Lawrence Ojumu | M | | | 0717614011 | 254 AHERA | |
| 17 | Emilia Anyanga Othman | F | | | 0707243399 | 254 AHERA | |
| 18 | Green W. Ojumu | F | NSP | CHA | 0922472449 | Greenojumg@fuhm.gov | |
| 19 | JAKET AKEND OUMA | F | | | 0729667232 | | J.A |
| 20 | BARRACK ODHAMBA | M | | | 0796007106 | | |
| 21 | Melvin Othman Othman | M | AWACH | Secretary | 0729293907 | MelvinOthman@fuhm | |
| 19 | FELIX Othman Othman | M | | | 0757917570 | 254 AHERA | |
| | Valene Chelangat Othman | F | AWACH | | 0707066063 | 214 AHERA | |
| 21 | John Othman Othman | M | AWACH | | 0707971522 | 254 AHERA | |
| 22 | JACOBUS OROTA | M | AWACH | Committee | 07291504562 | fid@fuhm | |
| 23 | KEVIN SHOMBE | M | AWACH | | 074117428 | kevin08@gmail.com | Kevin |



**Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU**



ACTIVITY: public participation

VENUE: Awach Kano Scheme

DATE: 07/07/2021

ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|-------------------------|--------|-------------------|-------------|------------|---------------|------|
| 24 | EMILY A. OMBIA | F | AWACH KANO SCHEME | FARMER | 0711454241 | 254 AHERA | |
| 25 | MARY A. JUMA | F | AWACH KANO SCHEME | FARMER | | 254 AHERA | |
| 26 | JOHN JUMA OBARA | M | AWACH KANO SCHEME | FARMER | 0729777038 | 254 AHERA | |
| 27 | JACKSON NYIRAGARA OMBIA | M | AWACH | FARMER | 0720441292 | 254 AHERA | |
| 28 | Elizabeth Othman | F | Awach Scheme | FARMER | 0713024252 | 254 AHERA | |
| 29 | Rose Achig Othman | F | Awach Scheme | FARMER | 0111289950 | 254 AHERA | |
| 30 | Walter O. Othman | M | " | " | | 254 AHERA | |
| 31 | Moses Mungira | F | AWACH KANO SCHEME | FARMER | 0715000540 | 254 AHERA | |
| 32 | Shirika Aiki-mbo | F | AWACH | FARMER | 072073057 | 254 AHERA | |
| 33 | Peter Anne Juma | F | AWACH | FARMER | 0714907487 | 254 AHERA | |
| 34 | Ernest Othman | M | AWACH | FARMER | 0723927864 | | |
| 35 | Ruth Ojumu | F | AWACH | FARMER | 0726122750 | 254 AHERA | |
| 36 | Lilian Anyanga Othman | F | AWACH | FARMER | 0710956609 | 254 AHERA | |
| 37 | Mary Othman | F | AWACH | FARMER | N/A | 254 AHERA | |



**Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU**



ACTIVITY: Public participation

VENUE: WACHUKANO

DATE: 7/07/2021

ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|-----------------|--------|-----------------|-------------|------------|------------------|--------------------|
| 38 | Lilian Adhiambo | F | AWACI Scheme | Farmer | 0727895012 | lilian@awaci.org | <i>[Signature]</i> |
| 39 | Demas Owar | M | " | " | 0727895012 | demas@awaci.org | <i>[Signature]</i> |
| 40 | Humphrey Oluoch | M | " | " | 0715101952 | oluch@hawaci.org | <i>[Signature]</i> |
| 41 | Fredrick Oloo | M | NPOK MPC/MLC | N.D.P | 0728081113 | fredrick@npo.org | <i>[Signature]</i> |
| | Ben Opa | M | MPC/MLC | Director | 07255330 | ben@mpc.org | <i>[Signature]</i> |
| | Joseph Oloo | F | KCSAP | Member | 0904507604 | joseph@kcsap.org | <i>[Signature]</i> |
| | Kevin Kang'ara | M | KCSAP | CEO | 0725434580 | kevin@kcsap.org | <i>[Signature]</i> |
| | Tipu Shupastana | M | KCSAP | | 0725306747 | tipu@kcsap.org | <i>[Signature]</i> |
| | | | | | | | |
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**Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU**



ACTIVITY: Public participation

VENUE: Awaro Kane Scheme

DATE: 07/07/2021

ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|----------------------|--------|--------------------------------------|------------------|------------|--------------------|--------------------|
| 1 | Samuel Oron | M | CGK | SCA | 0721355299 | myandol@yaho.com | <i>[Signature]</i> |
| 2 | Bilal Oluoch | M | CGK-KCSAP | SCA-LEAD | 0722422774 | bilal@kcsap.org | <i>[Signature]</i> |
| 3 | CAUS OLOCH | M | CGK | SCA-LEAD | 0721587597 | caus@kcsap.org | <i>[Signature]</i> |
| 4 | Wilson Oluoch Othman | M | CGK-IRRI/ICRAT | SCA-LEAD | 0721296218 | wilson@kcsap.org | <i>[Signature]</i> |
| 5 | Ben Opa | M | MLC | MPC-LEAD | 07255330 | ben@mpc.org | <i>[Signature]</i> |
| 6 | Vincent Othman | M | KCSAP | SCA-LEAD | 0722467387 | vincent@kcsap.org | <i>[Signature]</i> |
| 7 | ASTON OTHMAN OTHMAN | M | INTERCOM 2000 NATIONAL SPIN GROUP | SCA-LEAD | 0720587725 | aston@kcsap.org | <i>[Signature]</i> |
| 8 | OMONDI R.F | M | WAKINDI COOP | ENGR. WAKINDI | 0723333343 | omondi@yaho.com | <i>[Signature]</i> |
| 9 | Demas Owar | M | CGK-IRRI/ICRAT | SCA-LEAD | 0727895012 | demas@awaci.org | <i>[Signature]</i> |
| 10 | WALTER OMBORI OMBORI | M | V. P. Scheme | Scheme Committee | 0714525624 | walter@vps.org | <i>[Signature]</i> |
| 11 | Dolphine Oluoch | F | KCSAP | | 0701405777 | dolphine@kcsap.org | <i>[Signature]</i> |
| 12 | Miriam Mutitu | F | KCSAP | | 0710484734 | miriam@kcsap.org | <i>[Signature]</i> |
| 13 | Tipu Shupastana | M | KCSAP | Intercom | 0723087474 | tipu@kcsap.org | <i>[Signature]</i> |
| 14 | David Othman | M | MLC | Driver | 0724040512 | david@mpc.org | <i>[Signature]</i> |
| 15 | PANC Othman | M | KCSAP | Driver | 0724833706 | panc@kcsap.org | <i>[Signature]</i> |
| 16 | Albert Ombori | M | KCSAP | Driver | 0727087171 | albert@kcsap.org | <i>[Signature]</i> |



**Kenya Climate Smart Agriculture Project
(KCSAP)
KISUMU CPCU**



ACTIVITY: Public participation

VENUE: Awach Koro Scheme

DATE: 07/07/2021


ATTENDANCE LIST

| S/NO | NAME | GENDER | ORGANIZATION | DESIGNATION | TELEPHONE | EMAIL ADDRESS | SIGN |
|------|----------------------|--------|-------------------|-----------------|------------|-------------------------|------|
| 1 | JAMES NJESU MUSA | Male | Awach Koro Scheme | Member | 0723506867 | - | |
| 2 | ROBERT OTHMAN | Male | Awach Koro Scheme | Block Committee | 072578720 | - | |
| 3 | BENICE A. MUMU | F | Awach Koro Scheme | Block Committee | 0718078892 | - | B.A |
| 4 | KENNETH D. OMBISI | M | Awach Koro Scheme | Block Committee | 0727731096 | ombisikenneth@gmail.com | |
| 5 | BIRGESS JAMES MUDUGU | M | Awach Koro Scheme | Block chairman | 0722596673 | - | |
| 6 | ANDREW | M | Awach Koro Scheme | Block | 0716774060 | - | |
| 7 | CLAUDE NJESU | M | Awach Koro Scheme | | 0716825664 | - | |
| 8 | DAVID DICKSON JUMA | M | Awach Koro Scheme | | 0700371281 | - | |
| 9 | MARION ANJIRA NJESU | F | Awach Koro Scheme | | 0723261221 | - | |
| 10 | LEONARD NJESU | M | Awach Koro Scheme | | 0723261221 | - | |
| 11 | KENNETH OBIRO | M | Awach Koro Scheme | Farmer | 072356103 | - | |
| 12 | Maurice Otinga | M | Awach Koro Scheme | Farmer | 072802507 | - | |
| 13 | JOHN BENE DANI | M | Awach Koro Scheme | Farmer | 071264224 | - | |

Annex XV: Acknowledgement from local authorities

THE PRESIDENCY
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL GOVERNMENT
NYANDO SUB COUNTY

Telegram "DISTRICTER"
Telephone: 0720582923
All correspondents should be addressed to the head
When responding please quote
Ref RK/ADM/VALIV/200.



OFFICE OF THE CHIEF
EAST KANO LOCATION
P.O BOX 1,
AWASI
DATE 23/02/2021.

THE COUNTY GOVERNMENT OF KISUMU.
DEPARTMENT OF AGRICULTURE,
KENYA SMART AGRICULTURE,
P.O. BOX 1700-40100,
KISUMU, KENYA

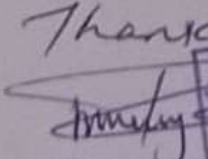
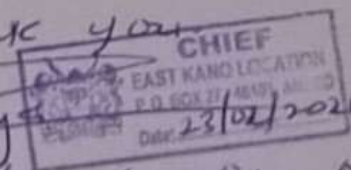
Dear Sir/Madam,

R.R.P: AWASH KANO RICE IRRIGATION
SCHEME.

This is to confirm that the above mentioned scheme is in scheme village, Achege sublocation within East Kano Location. I further wish to notify you that the scheme had existed for more than twenty years and farms are individually owned farms. The crop under production is mainly rice.

I therefore recommend any external assistance to make it more profitable.

Thank you

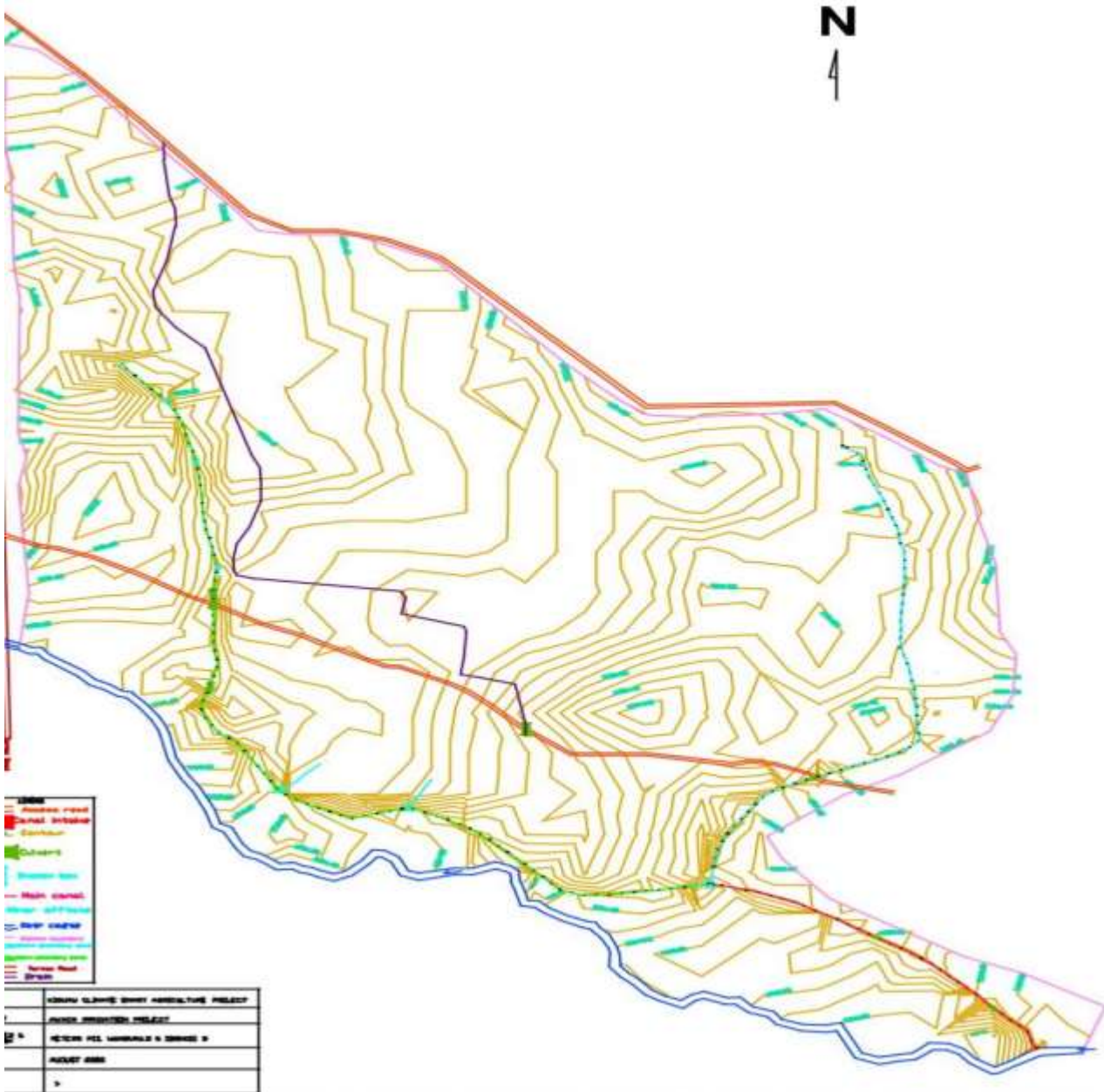
 

Rastus Ombija Oywa
Chief, East Kano Location

Appendix XVI : Topographical map of Awach Kano community irrigation Scheme

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AWACH IRRIGATION SCHEME TOPO MAP 153HA



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Appendix XVII: Terms of Reference (TOR)

- ❖ Provide a detailed description of the proposed project in terms of location, objectives, design, activities, materials, inputs outputs, products and waste and their potential adverse impacts
- ❖ Identify and analyse the environmental and socio-economic impacts of the project, including seeking neighbor's and public views and or/concerns for effective decision making in line with World Bank ESS guidelines, EMCA and County Government Act
- ❖ Review environmental governance (Policy, legislative, institutional), World Bank group ESS policies and other standards related to the operation of the project and concise description of the same in the implementation of the proposed project
- ❖ Provide a detailed description of the baseline environment and socio-economic conditions of the project area while identifying areas likely to be impacted by the project as per the laid down legislation and guidelines on the Environment
- ❖ Analyse the technology and processes to be used during construction and operation, the by-products and waste generation and their potential effects on the environment
- ❖ Provide an analysis of the project alternatives in terms of site, design, implementation technologies and provide reasons for preferred options
- ❖ Undertake biophysical analysis, identify likely significant environmental hazards, risks and impacts of the proposed project, assess these hazards, risks and impacts and evaluate possible alternatives on project site, design, technology and reasons for preferring the proposed site, design and technology
- ❖ Recommend mitigation and action plans as reference for performance on Environmental management for internal and external stakeholders
- ❖ Develop an Environmental and social Management Plan (ESMP) outlining measures for minimizing, eliminating or mitigating the adverse impacts on the environment and ensuring the health and safety of the workers and community, provide cost for offsetting such impacts, timeframes, responsibility and monitoring frequency and indicators to implement the measures
- ❖ Produce an ESIA report that identify key environmental and social aspects impacted on by the proposed project while recommending appropriate mitigation measures in accordance with Environmental Impact and Audit regulations, 2003 policies and relevant legal framework and World bank operation procedures, policies and safeguards OPs.

Appendix XVIII: Environmental and Social Screening checklist for Awach Kano

Irrigation Scheme

AWACH KANO

ANNEX 10: ENVIRONMENTAL AND SOCIAL SCREENING CHECK LIST

(Sub-projects screening process by benefitting communities/Agencies)

Section A: Background information

| | |
|--|---|
| Name of County..... | KISUMU |
| Name of CPCU/Monitoring Officer/Researcher .. | VINCENTI...DHAMBO |
| Sub-project location..... | EAST KANO WAWIDI WARD - KISUMU EAST SUBCOUNTY |
| Name of CBO/Institution..... | AWACH KANO IRRIGATION SCHEME |
| Postal Address..... | N/A |
| Contact Person..... | KENNEDY...DNNEK |
| Cell phone..... | 0727731086 |
| Sub-project name..... | AWACH KANO IRRIGATION SCHEME |
| Estimated cost (KShs.)..... | 52,107,617.60 |
| Approximate size of land area available for the sub-project..... | 625 acres |
| Objectives of the sub project..... | <ul style="list-style-type: none"> - Increase crop production through irrigated farming (Increase area production) - enable farmers grow secondary crops such as Sorghum - Improve efficiency of irrigation scheme |
| Activities/enterprises undertaken..... | Rice farming |
| How was the sub-project chosen?..... | Public participation |
| Expected sub project duration:..... | 6 months |

Section B: Environmental Issues

| Will the sub-project: | Yes | No |
|---|-------------------------------------|-------------------------------------|
| Create a risk of increased soil erosion? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Create a risk of increased deforestation? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Create a risk of increasing any other soil degradation soil degradation? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Affect soil salinity and alkalinity? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Divert the water resource from its natural course/location? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cause pollution of aquatic ecosystems by sedimentation and agro-chemicals, oil spillage, effluents, etc.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Introduce exotic plants or animals? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Involve drainage of wetlands or other permanently flooded areas? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cause poor water drainage and increase the risk of water-related diseases such as malaria? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Reduce the quantity of water for the downstream users? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| | | |
|--|--------------------------|-------------------------------------|
| Result in the lowering of groundwater level or depletion of groundwater? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Reduce various types of livestock production? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Affect any watershed? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Focus on Biomass/Bio-fuel energy generation? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If the answers to any of the above is 'yes', please include an EMP with sub-project application.

Section C: Socio-economic Issues

| Will the sub-project: | Yes | No |
|--|-------------------------------------|-------------------------------------|
| Displace people from their current settlement? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Interfere with the normal health and safety of the worker/employee? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Reduce the employment opportunities for the surrounding communities? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Reduce settlement (no further area allocated to settlements)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Reduce income for the local communities? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Increase insecurity due to introduction of the project? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Increase exposure of the community to HIV/AIDS? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Induce conflict? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Have machinery and/or equipment installed for value addition? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Introduce new practices and habits? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Lead to child delinquency (school drop-outs, child abuse, child labour, etc.)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Lead to gender disparity? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Lead to poor diets? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Lead to social evils (drug abuse, excessive alcohol consumption, crime, etc.)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

If the answers to any of the above is 'yes', please include an EMP with sub-project application.

Section D: Natural Habitats

| | | |
|---|-------------------------------------|-------------------------------------|
| Will the sub-project: | | |
| Be located within or near environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Adversely affect environmentally sensitive areas or critical habitats – wetlands, woodlots, natural forests, rivers, etc.)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Affect the indigenous biodiversity (Flora and fauna)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Cause any loss or degradation of any natural habitats, either directly (through project works) or indirectly? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| | | |
|---|-------------------------------------|-------------------------------------|
| Affect the aesthetic quality of the landscape? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Reduce people's access to the pasture, water, public services or other resources that they depend on? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Increase human-wildlife conflicts? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Will the sub-project: | <input type="checkbox"/> | <input type="checkbox"/> |
| Involve the use of pesticides or other agricultural chemicals, or increase existing use? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cause contamination of watercourses by chemicals and pesticides? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Cause contamination of soil by agrochemicals and pesticides? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Experience effluent and/or emissions discharge? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Export produce? Involve annual inspections of the producers and unannounced inspections? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Require scheduled chemical applications? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Require chemical application even to areas distant away from the focus? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Require chemical application to be done by vulnerable group (pregnant mothers, chemically allergic persons, elderly, etc.)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Use irrigation system in its implementation? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

If the answers to any of the above is 'yes', please include an EMP with sub-project application.

Section E: Pesticides and Agricultural Chemicals

This questionnaire will be used with the farmers groups for purpose of implementing the IPMF

1) Pest Control practices

a) Do you use any pesticides to control pests (Insects, diseases, weeds) of crops each season?

| Yes <input checked="" type="checkbox"/> No If yes, name them: | Name of pesticide | Name of pest, disease, weed controlled | Number of times applied/ season | When did you apply (growth stage or month) Quantity purchased |
|--|----------------------|--|---------------------------------------|---|
| | Durshban | stem borer | On need basis | At Vegetative state |
| | Tata Uneme | stem borer | On need basis | at Vegetative state |

If No, WHY? Fungicide Rice blust on need basis Punnicie state

b) If you use any of the above pesticide types, do you keep records of the:

Application location Yes..... No

Date of application Yes..... No

Pesticide product trade name

Yes..... No

Operator name Yes..... No

If No, WHY? *lack of knowledge (adequate) on record keeping*

c) How do you decide when to use the pesticides (tick all that apply)?

(i) We use pesticides at regular intervals throughout the season (calendar)

(ii) We use pesticides when we see pests in the field (control)

(iii) We use pesticides after field sampling and finding a certain number of pests or a certain level of damage (scouting)

(iv) Told by someone to apply (specify who) _____

(v) Other (specify) _____

d) Do you use a knapsack sprayer? Yes No

If yes,

(i) Do you own it Yes No

(ii) Do you rent it Yes _____ No

(iii) Do you borrow it Yes _____ No

e) From your experience, are there any negative/harmful effects of using pesticides?

Yes No

f) If yes, list the negative effects:

(i) *Breathing complications*

(ii) *Headaches*

(iii) *Nausea*

(iv)

(v)

g) Do you use any kind of protective clothing while applying or handling pesticides? Yes No

Why? *lack the right protective attires*

a) If YES, what kind? _____

2. Knowledge of pesticide handling and storage (tick one in each row)

a) Do you read labels on the pesticide container before using?

Sometimes Always _____ Never _____

b) How often do you wear protective clothing and other accessories like nasal mask, eye goggles, and boots when applying the pesticides?

Sometimes Always _____ Never _____

c) Do you mix pesticides with your hands?

Sometimes Always _____ Never _____

d) Do you observe the pre-harvest waiting periods after applying the pesticides?

- Sometimes Always _____ Never _____
- e) After spraying, do you wait 12 hours before entering the field?
 Sometimes Always _____ Never _____
- f) Do you store pesticides in a secure, sound and well-ventilated location?
 Sometimes Always _____ Never _____
- g) Do you make a cocktail before applying the pesticides? (i.e., mix more than one chemical and apply them at once?)
 Sometimes Always _____ Never _____
- h) Where do you store your pesticides? In homes

Why do you store them there?

It is convenient & also leak stores

- i) What do you do with your pesticide containers after they are empty?
Dispose them into the toilet, at times we re-use them as containers for other items
- j) Do you know of any beneficial insects (insects that eat harmful insects)?
 Yes... No
- k) If yes, name them:
 i) ii) Wasp iii) _____

3. Pesticides and Health

a) Do you find that pesticide application is affecting the health of: Persons regularly applying pesticides?

Sometimes Always _____ Never _____

Persons working in fields sprayed with pesticides

Sometimes Always _____ Never _____

Persons harvesting the produce

Sometimes _____ Always _____ Never _____

4. Options to Pesticides

a) From your experience, are you aware of other methods for controlling insect's diseases and/or weeds besides pesticides?

Yes... No

b) If yes, describe these practices:

i) _____ ii) _____ iii) _____ iv) _____

Biological Control - use of other insects & birds to control

5. Information ^{pestic.}

a) What information do you think you need for improving your crop production and marketing?

TIPs - Modern technology, Innovation & management practices as developed by KASAP

6. Training

- a) Have you ever received any training on any of the following topics related to crop production?
- b) Integrated Pest Management Yes..... No
- c) No. of times/past yr. ...3.....
- d) b).Pesticide Usage Yes..... No
- e) No. of times/past yr. ...3.....
- f) Pesticide Safety Yes..... No
- g) No. of times/past yr. ...3.....
- h) Insect Identification Yes..... No
- i) No. of times/past yr. ...3.....
- j) Disease Identification Yes..... No
- k) No. of times/past yr. ...3.....
- l) Quality aspects of production Yes..... No
- m) No. of times/past yr.....3.....

7) *Is there anything else that you want us to know about your crop production?*

Greatly affected by birds infestation as they mainly farm produce rice

If the answer to the above is 'yes', please consult the IPM that has been prepared for the project.

Section F: Vulnerable and Marginalized Groups meeting requirements for OP 4.10

| Are there: | Yes | NO |
|--|-------------------------------------|-------------------------------------|
| People who meet requirements for OP 4.10 living within the boundaries of, or near the project? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Members of these VMGs in the area who could benefit from the project? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| VMGs livelihoods to be affected by the sub project? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If the answer to any of the above is 'yes', please consult the VMGF that has been prepared for the project.

Section G: Land Acquisition and Access to Resources

| Will the sub-project: | Yes | No |
|---|--------------------------|-------------------------------------|
| Require that land (public or private) be acquired (temporarily or permanently) for its development? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If the answer to any of the above is 'yes', please consult the mitigation measures in the ESMF, and if needed prepare a (Resettlement Action Plan) RAP.

Section H: Proposed action

| (i) Summarize the above: | (ii) Guidance |
|--|---|
| <input type="checkbox"/> All the above answers are 'No' <input checked="" type="checkbox"/> There is at least one 'Yes' | <ul style="list-style-type: none"> • If all the above answers are 'No', there is no need for further action; • If there is at least one 'Yes', please describe your recommended course of action (see below). |

(iii) Recommended Course of Action

If there is at least one 'Yes', which course of action do you recommend?

- CPCUs and County Director of Environment (CDE) will provide detailed guidance on mitigation measures as outlined in the ESMF; and
- Specific advice is required from CDE and CPCUs regarding sub-project specific EIA(s) and also in the following area(s)
- All sub-project applications/proposals MUST include a completed ESMF checklist. The KCSAP-CPCU and CDE will review the sub-project applications/proposals and the CDEs will sign off;
- The proposals will then be submitted to KCSAP PIU for clearance for implementation by communities in the proposed subprojects.

Recommend a Comprehensive Project Report

Expert Advice

- The National Government through the Department of Monuments and Sites of the National Museums of Kenya can assist in identifying and, mapping of monuments and

archaeological sites; and

Sub-project specific EIAs, if recommended, must be carried out by experts registered with NEMA and be followed by monitoring and review. During the process of conducting an EIA the proponent shall seek views of persons who may be affected by the sub-project. The WB policy set out in OP 4.01 requires consultation of sub-project affected groups and disclosure of EIA's conclusions. In seeking views of the public after the approval of the sub-project, the proponent shall avail the draft EIA report at a public place accessible to project-affected groups and local NGOs/CSOs.

Completed by: [type here]

Name: [type here] Kennedy Dndiek

Position / Community: [type here] Chairperson - Awach Kano Irrigation Scheme

Date: [type here]

Field Appraisal Officer (CDE): [type here] Judith Dndiek

Signature: [Signature]



Date: [type here]

Note:

| Project category | Characteristics |
|------------------|---|
| A ✓ | Full and extensive EIA needed- irreversible environmental impacts; impacts not easy to pick or isolate and mitigation cost expensive; EMP design not easily done; Must have the EIA done and future annual EAs instituted |
| B | Site specific environmental impacts envisaged; mitigation measures easy to pick, not costly and EMP design readily done; need an EIA and future EAs |
| C | Have minimal or occasionally NO adverse environmental impacts; exempted from further environmental processes save environmental audits |