SUMMARY PROJECT REPORT (SPR)

FOR THE PROPOSED KARIUNGA-MUTIRITHIA-NAIBOR (KAMUNA) INTEGRATED IRRIGATION WATER PROJECT IN SEGERA WARD, LAIKIPIA NORTH SUB-COUNTY

PROJECT SPONSOR

GOVERNMENT OF KENYA/COUNTY GOVERNMENT OF LAIKIPIA

WITH SUPPORT FROM THE WORLD BANK

CLIENT	LEAD EXPERT	ASSOCIATE EXPERT
Kenya Climate Smart Agriculture Project (KCSAP) **Laikipia County,** **P.O Box 31 – 10400,** **Nanyuki.**	**Fredrick Karani Kirera,** **NEMA Reg. No. 7442**	**Dickson Kimathi Muthaura** **NEMA Reg. No 6235**

NOVEMBER, 2020

DECLARATIONS

This Summary Project Report (SPR) for the proposed Kariunga-Mutirithia – Naibor (KAMUNA) integrated irrigation water project on registration section Nanyuki/Marura Block 11/Kariunga, parcel 37 measuring approximately 10.62 hectares, registration sheet No. 3(106/4/15) in Segera ward, Laikipia North Sub-County, Laikipia County has been prepared in accordance with EMCA 2015, EIA/EA regulations, 2019 and Word Bank Environmental and Social Safeguards Policies under the guidance and supervision of a registered NEMA Lead Expert. It meets statutory provisions stipulated in EMCA 2015, the Legal Notice No. 32 and the Summary Project Report Regulations, 2019; World Bank KCSAP triggered policies OP 4.01, OP 4.10, OP4.12 and OP 4.09. We hereby certify that the details herein are correct and true to the best of our knowledge.

Fredrick Karani Kirera	Dickson Kimathi Muthaura
Lead SPR/EIA/EA Expert	SPR/EIA/EA Associate Expert
Reg. No. 7442	Reg. No. 6235
Date _____	Date _____
Signature _____	Signature _____

PROPONENT

I **Muriuki Kiboi** on behalf of **Kenya Climate Smart Agriculture Project (KCSAP)** declare that this Summary Project Report for the proposed rehabilitation of KAMUNA dam is accurate and factual and confirm that I shall ensure the implementation of the environmental management plan contained in this report. I further assure that I shall adhere to any recommendations or conditions issued by NEMA and other relevant authorities with regard to the proposed project.

Signature: _____ Date _____

Designation: County Project Coordinator

ACKNOWLEDGEMENT

The EIA/EA Experts are sincerely grateful to Mr. Kiboi Muriuki the County Project Coordinator, Kenya Climate Smart Agriculture (KCSAP), Laikipia County and the entire management team for commissioning us to conduct this study report for the proposed Kariunga-Mutirithia-Naibor (KAMUNA) Integrated Irrigation water Project. We also would like to further acknowledge with great appreciation all those key stakeholders and neighbours for their cooperation in providing information throughout the study process. Special thanks goes to the Environmental and Social Safeguards Compliance officer (CESSCO), Mr Moses Njagi Muchangi, Ward Livestock Officer, Mr Eliud Too, Assistant Chief Mr. Mwenda, Ward agricultural officer, Mr. Paul Mwangi and PMC members Fredrick Karani Kirera, Dickson Kimathi Muthaura and Martin Murithi that helped in data collection, analysing and coming up with this report without whose assistance/support during the fieldwork and subsequent writing of this work would not have been possible.

The technical views expressed in this report are owed to them. The final report is the result of a collaborative process which drew on the effort, knowledge, expertise and patience of the Experts in availing additional information. Others that have not been named here; their efforts are earnestly recognized.

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ACRONYMS

a.s.l	Above Sea Level
CPCU	County Project Coordination Unit
EIA	Environmental Impact Assessment
EMCA	Environmental Management Coordination Act
KCSAP	Kenya Climate Smart Agriculture Project
NEAP	National Environmental Action Plan
NEMA	National Environmental Management Authority
PDOs	Project Development Objectives
SPR	Summary Project Report
TDS	Total dissolved Solids
TOR	Terms of Reference
UN	United Nations
UNEP	United Nation Environmental Programme
UNCEF	United Nations Children Fund
WHO	World Health Organization
WRM	Water Resource Management
WRMA	Water resource Management Authority

EXECUTIVE SUMMARY

The proposed Kariunga –Mutirithia -Naibor (KAMUNA) Integrated Irrigation Water Project is located in Segera Ward, Laikipia North Sub-County, Laikipia County. The proposed project site lies within **GPS Coordinates N 0.127109** and **E 37.010788** at an altitude of **1772m above sea level**. The proposed Kariunga– Mutirithia - Naibor integrated Irrigation Water Project is a project covering three villages namely Kariunga, Mutirithia and Naibor (KAMUNA). The estimated project cost for KAMUNA dam project was determined to be Ksh 39,900,000.

In pursuit of implementing environmentally sensitive development and enhancing provision of safe and adequate water for domestic and agricultural use, The Kenya Climate Smart Agriculture Project – KCSAP (herein referred to as the proponent) intends to initiate implementation of the proposed reticulation and distribution of water from Kariunga earth dam and Mutirithia borehole and rehabilitation of Mutirithia water pan with a purpose of not only to restore the dam and reservoir into their original condition, but also to upgrade the structure where possible.

The project objectives and goals are in line with KCSAP PDOs which entails **increasing agricultural productivity, enhancing resilience to impacts of climate change and contribute to reduction in Greenhouse Gas emissions.** Environmental Management and Co-ordination (EMCA), Amendment Act 2015 requires that all projects of such nature and magnitude to undergo Environmental Impact Assessment study and a Summary Project Report (SPR) submitted to National Environmental Management Authority (NEMA) for review and necessary approval before commencement. The aim of this SPR project report is to identify the possible social, economic and environmental impacts that may arise from the construction and operations of this project and propose suitable mitigation measures in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and Environmental Impact Assessment & Audit Regulations, 2003.

The objective of this study is to prepare a Summary Project Report(SPR) that specifically identifies, evaluates and documents the set of mitigation, monitoring and institutional actions to be taken before and during site construction and to eliminate adverse environmental and social impacts, offset the impacts or reduce the impacts to acceptable levels.

The methodology of this study followed Kenyan policy and regulatory frameworks and legislation. It also followed World Bank's policies on environmental assessment (OP 4.0) and related policies and guidance documents. Available reference documents were reviewed for purposes of identifying pertinent environmental and social issues. Different methodologies were employed to carry out the task that included; site inspection, observation and photography, desk review of the relevant documents in regards to the project, public consultations through focused group discussions and interviews.

The ESIA-SPR study, was conducted in accordance with the Legal requirement stipulated in the Environmental Management and Coordination Act (EMCA) of 1999 and its subsequent supplements; the Environmental (Impact Assessment and Audit) Regulation, 2003 (Rev. 2009); EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006; the Land Acts, the Water Act 2002 and the Irrigation Act among other pertinent legal and institutional frameworks regulating major development including the World Bank Environmental and Social Safeguard Policies. Other relevant legislations included the public health, physical planning and land use planning Act, policy on gender and sexual based violence, HIV/AIDS prevention and control Act, and sexual offences Act, among others.

The project is implemented by the Kenya Climate Smart Agriculture Project (KCSAP) – Government of Kenya (GoK) initiated funded by World Bank/ International Development Association (IDA). The development objective is to increase agricultural productivity and profitability of targeted rural communities in the selected Counties. The targeted agricultural value chains include tomatoes, onions, beans, sheep and dairy. The livelihoods of the communities living in these villages are mainly pastoralists and agro pastoralists. Due to the increasing population and reduction of land for livestock grazing, the pastoralists are changing their way of livelihood towards crops farming

The main sources of water in the project area are boreholes and Kariunga earth dam. Mutirithia dam has silted up and its spill way broken and requires rehabilitation. Though dams exist in the area, there is no adequate water that is available for crop production given that it’s a pastoral area where livestock is given first priority and less emphasis been put in farming. The proposed water projects will be utilized for micro irrigation using water from Kariunga earth dam located

near Jua kali market Centre, with a capacity of 100, 000 cubic metres occupying an area of 20 acres of public land. The boreholes are located at Mutirithia village and Kariunga village. The earth dam will act as water conservation structure, for supply of water to livestock during the dry months and recharge of the underground springs within the area.

The public participation meetings were conducted to capture the neighbours and other stakeholders' views and concerns regarding the proposed project. Some of the main issues of concerned were: how the residents will be involved during the project implementation, transformation of pastoralist to agro-pastoralist and how the project management will avoid political interference. The project will ensure that the residents are involved in implementation of project through provision of labour, capacity building and provision of the inputs to the beneficiaries and the project should engage the political class and ensure they are fully aware of the project.

The anticipated negative environmental and social effects of the proposed Kariunga-Mutirithia-Naibor (KAMUNA) integrated irrigation water project are; loss of water through evaporation, loss of flora and fauna, temporary restriction of access to water, soil erosion in all phases, solid waste, increased waterborne diseases, drowning, vector breeding sites and occupational health and safety hazards, siltation, noise and dust, earth dam failure and outbreak of livestock diseases, conflict over water resource, mismanagement, altered social and cultural norms that support undesirable behavior, increased cases of HIV and AIDs, risk of transmission of the COVID 19 disease at construction work site and community members during consultations, labour risks including labour influx and associated Gender Based Violence (GBV) in form of Sexual.

The mitigation measures for the anticipated impacts have been provided in the ESMP to be implemented to avoid or reduce the negative environmental and social impacts and an annual Environmental Audit should be carried out once the project is in operation. The mitigation measures include, but not limited to: sensitization of the public on the proposed project, to prevent spread of COVID-19 the contractor should ensure strict adherence to Ministry of Health COVID-19 guidelines and protocols, enforcing strict use of personal protective equipment (PPEs) on site during construction, practicing Integrated Solid Waste Management (ISWM) in the site during construction and operational phases, sensitizing the community on

soil and land management practices in the earth dam catchment, putting in place a grievance redress mechanism, capacity building the project management committee, developing and implementing a Sexual Exploitation and Abuse (SEA) action plan with an accountability and response framework as part of Contractor Environmental and Social Management Plan (C-ESMP).

On completion of the proposed project, the community is expected to take over and run the project with minimal or no external support through management committee. The estimated cost of implementing the ESMP is Ksh 2,690,000. In view of the positive and negative impacts, this project will not result to significant, cumulative, or irreversible negative impacts. All the predicted impacts will be easily mitigated through the ESMP. The Proponent should share the ESMP with the contractor and the latter will be required to develop and implement a Contractor-Specific ESMP. The CPCU will follow up and monitor implementation of the ESMP. Based on the assessment, the project is, thus, recommended for approval by the National Environment Management Authority (NEMA) for issuance of an SPR license subject to annual environmental audits after operating for one year.

CHAPTER ONE
INTRODUCTION

1.1 Background Information

The proposed Kariunga-Mutirithia-Naibor (KAMUNA) Integrated Irrigation water Project is located in Segera Ward, Laikipia North Sub-County, Laikipia County. The proposed project site lies within GPS Coordinates **N 0.127109 and E 37.010788** at an altitude of **1772m** above sea level. The proposed Kariunga– Mutirithia - Naibor integrated Irrigation Water Project is a project covering three villages namely Kairunga, Mutirithia and Naibor (KAMUNA). The estimated project cost for KAMUNA dam project was determined to be Kshs 39,900,000.

The project area consists of 3 villages Kariunga – Mutirithia - Naibor (KAMUNA) in Segera Ward, Laikipia North Sub County. The proposed areas were selected based on poverty incidences and likelihood for project success and impacts; population density, level of degradation and socio-cultural-economic factors e.g. vulnerability. There is substantial degradation of the area coupled with degradation of other nearby natural ecosystems. The ultimate effect is decreased long term viability and substantial loss in other forms of biodiversity and ecosystem support to local livelihoods. The main livelihood system in the project is pastoralism. Land productivity in the project area is low with harsh environmental conditions leading to food insecurity. Moreover, the project area face inadequate water for farming, human and livestock use coupled with effects of climate variability and change. The proposed project targets 300 Households who will be direct beneficiaries of the scheme with an average of 6 members per household thus increasing the number of beneficiaries to 1,800. These beneficiaries will include farmers, the poor and the vulnerable.

The proposed project is funded by Kenya Climate Smart Agriculture Project – KCSAP a purpose of not only restoring the dam and reservoir into their original condition, but also to upgrade the structure where possible. This will be in line with the achievement of the KCSAP main objectives that include: increasing agricultural productivity, enhancing resilience to impacts of climate change and contribute to reduction in Greenhouse Gas emissions in the proposed project area.

1.2 Project justification

The proposed project is in line with KCSAP objectives of: (a) increasing agricultural productivity, (b) increasing resilience to climate change (adaptation), and (b) decreasing incidences of greenhouse gas (GHG) emission (mitigation). The objective of the proposed project is to reticulate and distribute water from Kariunga earth dam and Mutirithia borehole and rehabilitation of Mutirithia water pan. This will increase water supply for domestic and irrigation purpose. The targeted agricultural value chains include sorghum, finger millets and dairy.

The following specific considerations were important in supporting the implementation of the Kairunga-Mutirithia – Naibor (KAMUNA) integrated irrigation water project.

- The project is located in a community land set aside for earth dam hence there will be no issues of displacement and compensation whatsoever.
- Location is convenient and easily accessible to the community sharing the water resource.
- The Kariunga earth dam and Mutirithia borehole are significant source of water to the surrounding with three major villages namely namely Kairunga, Mutirithia and Naibor villages that fully depending on the water resource for their livelihood.

1.3 ESIA-SPR study justification

The undertaking of environmental screening for the proposed project was to determine the degree of risk posed by the proposed project on the environment and, based on this risk, the categorization of the project under the second schedule of the Environmental Management and Coordination Act (2015 Amendment). This SPR was as a result of recommendation of the County Director Environment (CDE) based on the screening report.

1.4 SPR Objectives

The specific objectives of the study are:

a) To present an outline of the background of the proposed project;
b) To review existing legal and institutional policy framework related to the proposed project;

c) To establish the environmental baseline conditions of the project area and review all available information and data related to the proposed project;
d) To identify key areas for environmental, social and safety concerns as well as the anticipated impacts associated with the proposed project implementation and commissioning;
e) To predict likely environmental and social impacts of the proposed project;
f) To establish a comprehensive Environmental Social Monitoring and Management Plan (ESMMP) covering the construction, operation and decommissioning phases of the proposed project;
g) To raise community awareness on the impacts of the proposed project on the environment;
h) To highlight environmental issues with a view to guide policy makers, planners, stakeholders and the government agencies to help them understand the implications of the SPR report and make the necessary decisions concerning the proposed project and future planning;
i) To establish benchmarks for the various environmental aspects relating to the proposed project;
j) To establish a framework for environmental management system that aims at environmental sustainability;
k) To prepare a comprehensive project report in accordance with the environmental legislation and submission to NEMA for further instruction and /or approval.

1.5 ESIA-SPR Approach and Methodology

1.5.1 Introduction

The purpose of the SPR is to identify environmental impacts likely to occur as a result of the implementation of the proposed project. To adequately achieve this purpose, the study also evaluates environmental factors likely to affect the project and how the project can be aligned with the environmental considerations to ensure minimal negative impacts and maximal positive impacts. Environmental screening was performed to identify the class under which the project fell in EMCA's classification of projects as per risk. Environmental scoping was later undertaken to assess the potential environmental impacts and benefits likely to occur from the

implementation of the project. Questionnaires and interviews were also employed to gather the community's views on the project's implementation. This section analyzes the project's TOR and the methods utilized to gather and analyze data.

1.5.2 Site Inspection and Evaluation

Principles of effective project evaluation provide that experts must physically inspect and evaluate the proposed site on which the proposed project activities are to be undertaken. This is done with the aim of identifying physical parameters likely to influence the sustainability of the project with key focus on the characteristics of the local ecosystem and the adjacent communities. In this project, the experts conducted a site visit to assess the cultural setting of the local community, the geology, climatic patterns, area demographics, and land ownership issues. More specifically, the team held a public consultation forum where local community members were encouraged to air their views on the proposed project. This was made possible through a public education exercise to enhance the members' awareness on the proposed project. The site visit also included a data collection exercise on water, agriculture, and land aspects of the project area. Major outcomes of this process were the identification of how the proposed project is expected to affect the local environment and communities.

1.5.3 Environmental Screening

The undertaking of environmental screening for development projects determines the degree of risk posed by the proposed project on the environment and, based on this risk, the categorization of the project under the second schedule of the Environmental Management and Coordination Act (2015 Amendment). Specifically, the implementation of the project is expected to provide adequate water for domestic use and small irrigation purpose that are a key benefit to the community. The outcomes of the environmental screening process indicated that the project requires an SPR study to measure the intensity of the expected outcomes.

1.5.4 Environmental Scoping

The purpose of environmental scoping is to determine the intensity of the expected environmental impacts and the people likely to be affected. In this study, environmental scoping involved evaluating the expected environmental impacts and discussing them with relevant stakeholders to determine their views on the same. Most importantly, the proposed

project site was assessed adequately to determine its suitability and the adjacent communities and areas of special concern that may be affected. Major results of the scoping process included potential impacts, identification of stakeholders, and prevention and control measures to the expected impacts.

1.5.5 Approach to data collection

1.5.5.1 Public consultation

EMCA (1999) requires every proponent to a proposed project to involve the surrounding communities in the designing and planning phase of the study with the aim of identifying potential impacts likely to face them and proposed mitigations. The public consultation exercise was guided by a standard questionnaire developed by the experts with key focus on the area environment, community needs, potential risks, and benefits of the project. It is important to note that the respondents were given the opportunity to fill the questionnaires themselves to give them the autonomy to express their free opinions on each question. This was in exemption of those unable to read or write (or both) and these were helped accordingly by the experts. The questionnaires are annexed at the end of this report. In addition to the questionnaires, direct interviews were used to gather the community's concerns and opinions on the project. Their responses were gathered by the SPR/EA experts and included in the public participation chapter of this report.

1.5.2.2 Literature review

Examining current and past literature addressing environmental impacts related to dams both in Kenya and outside countries. Specific concern was given to evidence examining the experience of other similar projects, impacts to the environment, benefits, and community concerns. Literature review of statutes and laws affecting construction projects, public health, ecosystem, and culture related to dams was also conducted to guide the implementation of the project.

1.5.2.3 Observation

The experts used observational methods to assess and quantify environmental risks posed by the proposed project. The application of this technique was based on the expert's long-term knowledge and experience in environmental impact assessment and environmental

management. Key types of data gathered using this methodology included the soil type, area ecosystem, environmental risks, population density, and potential waste management strategies.

1.5.2.4 Photography

The team of experts took photos of the site to document the local environment including vegetation cover, existing structures, area topography, and infrastructure among other physical features. This method was important in providing evidence of the land location and physical features or structures that might affect or get affected by the project's implementation.

CHAPTER TWO

PROJECT DESCRIPTION

2.1 Introduction

This section highlights details pertaining to the proposed Kariunga –Mutirithia –Naibor (KAMUNA) Integrated Irrigation Water Project. The proposed project will involve clearing of bush within the reservoir area, excavation of the reservoir storage, excavation of the core trench and spillway, embankment construction and protection and ancillary works and will be undertaken within a period of four months. On completion, the proposed project will serve over a thousand livestock and help in supplementing irrigation within the project area. The project will be funded Kenya Climate Smart Agriculture Project (KCSAP).

2.2 Project siting

2.2.1 Site Description

The proposed Kariunga-Mutirithia-Naibor (KAMUNA) Integrated Irrigation water Project is located in Segera Ward, Laikipia North Sub-County, Laikipia County. The proposed project site lies within GPS Coordinates N0.127109 and E37.010788 at an altitude of 1772m above sea level. The proposed Kariunga– Mutirithia - Naibor integrated Irrigation Water Project is a project covering three villages namely Kairunga, Mutirithia and Naibor (KAMUNA).

2.2.2 Land Ownership

The proposed Kariunga-Mutirithia – Naibor (KAMUNA) integrated irrigation water project situated on a public land, registration section Nanyuki/Marura Block 11/Kariunga, parcel 37 measuring approximately 10.62 hectares, registration sheet No. 3(106/4/15) in Segera ward, Laikipia North Sub-County, Laikipia County.

2.3 Project Design

2.3.1 Design of the Water Pan

The rehabilitated Mutirithia water pan will have an embankment and a spillway thus giving it the shape of a pan. The contracted project engineer will follow the design/ layout and he will also be involved in supervision of the works including: Site layouts; confirming quality of

materials and workmanship; compaction testing; adapting design based on unanticipated site conditions; recording design changes; and calculating quantities.

2.3.2 Plan layout

The figure below shows the topographic map and the general layout of the Mutirithia water pan.

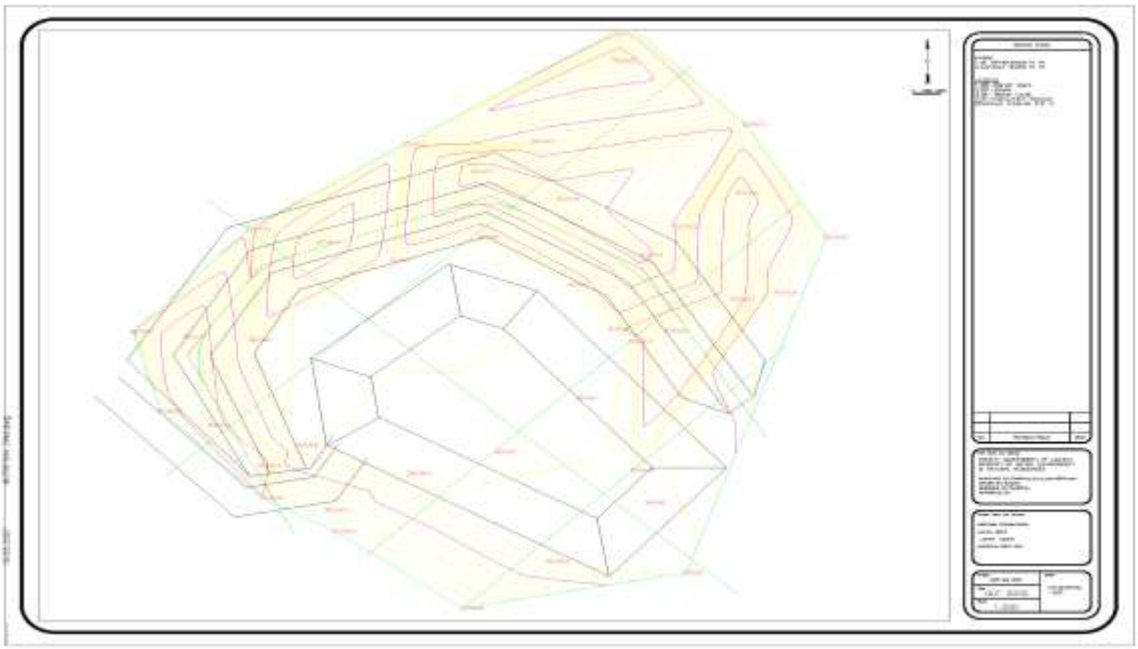

Figure 1: General layout of Mutirithia Water Pan

2.4 Project Activities

2.4.1 Mutirithia Water Pan desilting

The activities to be undertake in the desilting and rehabilitation of Mutirithia water pan will comprise of the following:

- Survey and design of the water pan.
- Compiling bills of quantities for the water pan and ancillary facilities.
- Mobilization of necessary plant and equipment for de-silting the water pan.
- Water pan de-silting and reconstruction.
- Grassing water way and spillway.
- 30 acres of public land adjacent to the dam to be well utilized, with irrigation of horticultural crops, agro forestry nursery and other community projects.

- Fencing of the water pan perimeter to minimize drowning accidents and incidents
- Water tank, solar-powered pumps, water draw points and cattle troughs installed.
- Bathrooms and toilets to be constructed downstream to prevent pollution.
- Water use efficiency to be enhanced by using drip irrigation kits as opposed to overhead and furrow irrigation.

2.4.2 Reticulation and distribution of water from Kariunga earth Dam using piped system.

- Survey and design of the reticulation and water distribution system.
- Compiling bills of quantities for the piping and ancillary facilities
- Excavating and laying pipelines with necessary accessories.
- Installation of solar-powered pumps, water draws points and cattle troughs.

2.4.3 Construction of two 225 M^3 water storage tanks.

One at Mutirithia, second one near Jua kali market at a suitable site near Mutirithia borehole elevation to allow water to flow by gravity, installation of solar water pumps

- Survey and design of the water storage tanks.
- Compiling bills of quantities for the construction and auxiliary facilities.
- Storage tanks construction.
- Connecting tank with pipelines with necessary accessories.
- Solar-powered pumps, water draw points and cattle troughs installed.
- Fencing the perimeter wall.

2.4.4 Establishment of Agro forestry Tree Nursery

- Training of members on establishment of Agro forestry tree nursery.
- Sourcing and procurement of assorted forestry and fruit tree seedlings.
- Routine nursery management practices.
- Grafting, budding of fruit tree seedlings.
- Sale of forestry and fruit tree seedlings.
- Follow ups / monitoring and evaluation

2.4.5 Establishment of 300 acres of horticulture

- Training members on horticulture establishment and good agronomic practices.
- Training members on Conservation Agriculture/minimum tillage.
- Procurement of farm inputs and planting materials.
- Training members on Integrated Pest Management practices.
- Train members on value addition and market linkages.
- Form marketing group to avoid exploitation by middlemen.
- Follow ups.

2.4.6 Stocking Kariunga earth dam with 100,000 Tilapia and mud fish fingerlings

- Training members on Fish farming and management.
- Sourcing and procurement of 100,000 Tilapia and mud fish fingerlings.
- Feeding, predator control and management practices.
- Fish harvesting and marketing.

2.4.7 Catchment protection and conservation through soil and water conservation structures

- Training of members on catchment protection and conservation.
- Construction of gabions and check dams.

2.5 Operation Phase Activities

The activities at operation phase will be water provision for domestic use and small scale irrigation. The operation and management activities of the dam shall entail periodic desilting, maintenance of the inlet and the spill way, protection and maintenance of the fence, and the livestock ramp. During the operation phase;

- Establishment and strengthening of Water User's Association (WUA) is key in conflict management.
- Improvement of operation and maintenance system and regulations through training program.

2.5.1 Project Monitoring and Review

This stage involves a continuous process of monitoring and improvement the proposed project activities. Some of the areas of concern include; public safety issues, sanitation and hygiene issues, water quality; and soil erosion issues

2.6 Decommissioning phase

This phase involves closure of the project, removal of the pipes, concrete materials, fittings and backfilling of the earth dam. This could be as a result of natural calamities, legal requirement and public safety concerns. An Environmental Impact Assessment of the decommissioning activities should be undertaken. Backfilling of the site should be done and landscaped with indigenous tree and vegetation cover. This will be in line with set requirements of the relevant laws and regulations.

2.7 Project Sustainability

The proposed project will be sustainable only if the project proponent and the contractor will adhere and comply with the existing regulatory legislations regarding the proposed works. The proponent must comply with the planning and the National Construction policies and Water Act, 2016 on the development of proposed project. The use of energy efficient equipment, approved engineering designs and use of approved materials are important in guaranteeing the sustainability of the proposed project. *(Engineering drawings and designs of the proposed project are appended to this report).*

2.8 Expected Benefits

With the implementation of the proposed project, the local community of KAMUNA project area will enjoy wide range of benefits from the dam, among them:

- 300 acres of land will be planted with various horticultural crops mainly tomatoes, onions, cabbages, capsicum, butter nuts among others. Estimated income from onions or tomatoes; 300 acres yielding 20 tons/acre gives 6,000,000 kgs @ Ksh 30/kg earning Ksh 180,000,000 annually.
- Over 300 farmers will be engaged in full time farming and over 600 employed as casuals labourers in farms

- 300 farmers will be trained on good agronomic practices, value addition and marketing.
- 3,000 beneficiaries will experience the positive impact of project outputs e.g. increased availability of various Horticultural crops, Fish, and fruits within the locality.
- Water harvesting and storage capacity enhanced and accessibility increased by constructing 2 storage water tanks; rehabilitation of 1 sub-surface dam, and reticulation and piping of harvested water: It will be undertaken by the contractor under supervision of KCSAP and project management committee. Moreover, community labour will supplement this activity.
- Increase in the amount of water available for livestock and human use on a sustainable basis. This water will be used for irrigated farming. This will diversity livelihood sources and resilience strengthened.

2.9 Project Budget

The table below illustrates the estimated costs and description of the major activities in regards to the proposed integrated irrigation project.

Table 1: Summary of Bill of Quantities and Cost Estimates

PROJECT COMPONENT	Target/quantity	Unit cost (Ksh)	TOTAL COST KSH
Water reticulation and distribution			10,000,000
Solar panels and water pump			600,000
Construction of a pump house			300,000
Drip irrigation kits	drip irrigation kit for 300 families	26,667	8,000,000
Rehabilitation of Mutirithia water pan	Rehabilitation and de-silting of 1 water pan	7,000,000	7,000,000
Avocado (Hass variety) establishment	5000 avocado seedlings issue to each household	200	1,000,000

Assorted certified horticultural Seeds	Assorted certified horticultural Seed for 300 families	4,000	1,200,000
Fertilizers, herbicides, fungicides, insecticides for 300 families and 2 special kits for demonstration	300 kit of mentioned items 2 kits for demo	3,300 5,000	990,000 10000
construction of 2 Greenhouses	2 units	250,000	500,000
Construction of 2 masonry storage tank (225 M^3 each)	2 tanks	2,900,000	5,800,000
Establishment of agroforestry and fruit trees nursery	Assorted agroforestry seeds, nursery equipment, and inputs	750,000	750,000
Procurement of 50,000 Fish fingerlings for Kariunga and Mutirithia water pans	50000 fingerings for the 2 water pans	15 per fingering	750,000
Catchment conservation and protection	laying and excavation of terraces and gully control		600,000
Total (Amount requested from KCSAP			**37,500,000**
Community Contribution			**2,400,000**
Grand total			**39,900,000**

CHAPTER THREE

ENVIRONMETAL AND SOCIAL BASELINE INFORMATION

3.1 Introduction

This chapter gives a description of the environmental and social setting of the proposed sub-project area and its environs in terms of its physiographic and natural conditions, biological and socio-economic environment.

3.2 Physical Environment

3.2.1 The Site Location

The proposed Kariunga-Mutirithia-Naibor (KAMUNA) Integrated Irrigation water Project is located in Segera Ward, Laikipia North Sub-County, Laikipia County. The proposed project site lies within **GPS Coordinates N 0.127109 and E 37.010788** at an **altitude** of **1772m above sea level.**

3.2.2 Climatic Conditions

Laikipia County experiences a relief type of rainfall due to its altitude and location. The annual average rainfall varies between 400mm and 750mm.The areas nearest to the slopes of Mt. Kenya and the Aberdare Ranges record higher annual rainfall totals. Due to its location along the equator and proximity to Mount Kenya, the county experiences a cool temperate climate, with mean annual temperatures of between 16°C and 26°C.

3.2.3 Topography

The land is generally flat with an average slope of 0 - 5%. Steep slopes are encountered at the banks of rivers and water ways. Water way floors have a general slope of 0.5%.The land terrain is suited for irrigation development.

3.2.4 Soils

The soils vary from sandy loams to clay loams. Thus, pans for storing rainfall run-off must not have to be lined if they have to keep the water for a long duration of time.

3.2.5 Topography

The land is generally flat with an average slope of 0 - 5%. Steep slopes are encountered at the banks of rivers and water ways. Water way floors have a general slope of 0.5%.The land terrain is suited for irrigation development.

3.2.5 Hydrology

There is no river draining in the area except for seasonal spring from a series of dams. However, run-off from the higher ground has formed wide shallow water ways. These water ways supply water to some of the water storage structures. Thus, there is a high potential for run-off harvesting.

3.2.6 Biotic factors (flora and fauna)

3.2.6.1 Flora

The vegetation cover of the sub-project area comprises the following*;* natural grasses, papyrus reeds near the earth dam and indigenous trees such as acacia and exotic. The common trees around the earth dam include eucalyptus and acacia trees. The project site is not in a protected area and does not have plants that have been marked for protection.

3.2.6.2 Fauna

The major animals observed in the sub project area includes; *cattle, goat and sheep.* 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 also does not have a corridor for any animals. There are no protected wildlife in the sub project area or any wildlife that has been identified for special protection.

3.3 Socio economic factors

3.3.1 Land use and Land tenure system

3.3.1.1 Land Use

Land is a primary factor of production in an economy and has aesthetic, cultural and traditional values. The major land use in the project area is mainly for agricultural activities that include crops farming and livestock-keeping. Other uses include cultural and forestry conservation.

Other crops grown in the county include maize, beans, sorghum, millet, onions, tomatoes, potatoes, cabbages, carrots and kales among others.

3.3.1.2 Land tenure system

The main land tenure system in the sub project area is freehold tenure governed by the Land Registration Act of 2012 and is mainly utilized for farming. The percentage of landowners with title deeds is 65.3. The land where the project is located is a public land set aside for the proposed Kamuna project.

3.3.2 Demography

Laikipia North has a total population of 36,184 that comprises of 18,067 males, 18,116 females and 1 intersex (KNBS, 2019). The predominant communities in the project area are Kikuyu, Maasai, Borana and small sections of other tribes e.g. Meru, Turkana.

3.3.3 Livelihood Activities

The main livelihoods are pastoralist, ranching, conservancies and mixed farming A few commercial horticultural farms using irrigation are spread in the county along the river line. The livestock kept are mainly indigenous, crossbreeds and pure breeds. Other livestock include poultry. The other sources of livelihood are small businesses mostly conducted in the market centers and towns.

3.3.4 Education and literacy levels

Laikipia County has 581 ECD Centers with a total enrolment of 30,976 pupils, 340 primary schools with a total enrolment of 98,018 pupils and 96 secondary schools with a total enrolment of 29,939 students. Tertiary institutions include 5 technical and vocational institutes, Laikipia University and 2 University campuses namely Laikipia University Town Campus in Nyahururu and Kenya Methodist University Nanyuki Campus. Other colleges include Kenya Institute of Management, St Anne Catholic College, NICAT, among others.

3.3.5 Trade and Businesses

The main commodity markets in the county are in Nanyuki and Nyahururu whereas main livestock markets are at Rumuruti, Doldol and Kimanjo. Other market centers include Olmoran, Sipili, Wiyumiririe, Lamuria and Debatas. The major type businesses are wholesale

and retail enterprises totalling to 119 and 96 respectively mainly in trading centers across the County.

3.3.6 Human health Facilities

The health infrastructure consists of five sub county hospitals at Kimanjo, Ndindika, Lamuria, Doldol, Rumuruti and two County referral hospitals; Nanyuki and Nyahururu. The county has six public health centres and four FBO managed health centres. There are 64 public dispensaries, 12 FBO managed dispensaries, 10 NGO managed dispensaries and 36 private run clinics. In addition, there are four private hospitals, one nursing home; one private health centre, six private dispensaries and 35 private clinics.

3.3.7 Cultural and Religious practices

3.3.7.1 Cultural and Religious Practices

Laikipia County is a cosmopolitan area that boasts of diverse cultures, people and ethnicity from the Samburu, Turkana, Pokot, Kikuyu, Masai, Borana, Kalenjin, Meru, Asians and Europeans. Yaaku is the main cultural site located in Laikipia North whereas Twala is the main cultural campsite in the county. Christians and adherents of traditional religions all inhabit the area. Close to 80% living in the area are Christians, and 20% adhering to other religion and traditional believes.

3.3.8 Source of Energy

The main sources of energy for the households in the project area are firewood and charcoal with a few households using solar energy. Shops and business premises utilize electricity for charging phones, lighting and other uses.

3.3.9 Infrastructure

The total classified road network in the county is 4,520 Km out of which over 80 % are feeder roads. The bitumen, gravel, and earth surface stand at 230, 1824 and 2,466 kilometres, respectively. The county is served by two airstrips, one near Nanyuki Town and the other near Nyahururu Town. The road network in the project area comprises of tarmac road and long sections of Murram road to the proposed dam site. Electricity in the area is supplied by KPLC, with a few households using solar. Mobile phone coverage extends to the area, ranging from Safaricom mobile service connectivity Airtel and Telkom services.

3.3.10 Security

Policing and promotion of law and order in County is supported by 5 police divisions with a total of 7 police stations, 67 police posts and 2 ASTU units. Most of these police stations are located in high-density population areas such as Urban and Peri-Urban areas whereas the ASTUs are located in areas prone to cattle theft. Stock theft routes are mainly along ranches and forest corridors.

3.4 World Bank Environmental Safeguards

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

3.4.1 OP/BP 4.01 (Environmental Assessment)

The principal objective of OP/BP 4.01 is to ensure that World Bank financed projects are environmentally sound and sustainable. The policy is triggered if a project is likely to have potential (adverse) environmental risks and impacts in its area of influence. OP/BP 4.01 covers impacts on the natural environment, human health and safety, and trans-boundary and global environment. *The proposed project was screened for environmental and social risks and subjected to ESIA-SPR, which is the subject of this report. This report has established all the significant impacts that need to be addressed and proposed appropriate measures to prevent or minimize 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 (Natural Habitats)

The policy is designed to promote environmentally sustainable development by supporting the protection, conservation, maintenance and rehabilitation of natural habitats and their functions. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats. *The proposed site has no known species of biological conservation significance. The proponent through this SPR and ESMP has taken serious measures for protecting, preserving and conserving the environment in the project setting from predicted and emergent adverse impacts.*

3.4.3 OP/BP 4.11 (Physical Cultural Resources)

The objective of this policy is to avoid or mitigate adverse impacts on physical cultural resources from development projects. The policy considers Physical Cultural Resources (PCR) to be resources of archaeological, paleontological, historical, architectural, and religious, aesthetic or other cultural significance. *The proposed project shall not traverse any homes. There are no physical or cultural object/resource that the proposed development may interfere therefore this policy is not triggered.*

3.4.4 OP/BP 4.12 (Involuntary Resettlement)

The policy states that "Where large-scale of population displacement is unavoidable, a detailed resettlement plan, timetable, and budget are required. *The project site lands a public land. The area had an old water pan which has since silted; therefore, this project will not result in physical or economic displacement of the community, and Resettlement Action Plan will not be required.*

3.4.5 OP/BP 4.09 (Pests Management)

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. *The project will support agricultural production through irrigation and therefore use Integrated Pest Management (IPM) as stipulated and guided by KCSAP pest management plan in the ESMF.*

3.4.6 Grievance Redress Mechanism

Grievance redressal is a critical component of effective ESMP implementation. The purpose of GRM is to provide a forum to the internal and external stakeholders to voice their concerns, queries and issues with the project. An effective GRM will provide all relevant stakeholders with a way through which they can channel their queries and complaints and receive timely response. *The proponent will establish the SAIC sub- committee from the main PMC that will address all concerns and complaints from the stakeholders before the work starts. The proponent has a well-established GRM committee at County level and at project level.*

CHAPTER FOUR

PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATIONS

4.1 Introduction

Public participation is an integral part of SPR in accordance with EMCA, Amendment Act. 2015 It is usually conducted to gauge whether the project in its present design is acceptable by the local community, and aid the proponent/contractor to incorporate in within the environmental management plan, the concerns of the members of the public who could potentially be affected.

4.2 Objective

EIA expert with consultation with the proponent came up with main objectives of public participation and stakeholder consultation. They include the following:

- Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.
- Obtain the main concerns and views of the public regarding the proposed project;
- Provide clear and accurate information about the project to the communities;
- Facilitate the development of appropriate and acceptable entitlement options;
- Increase long term project sustainability and ownership;
- Obtain opinions, suggestions and comments directly from the affected communities on their preferred mitigation measures.

4.3 Categorization of Community Participants and Stakeholders

Public participation and stakeholders' consultation was conducted at the proposed project site on 5th of November 2020 and the participants were drawn from the sub project target community comprising of three villages namely; Kariunga, Mutirithia and Naibor, within Segera Ward of Laikipia North Sub-County. 75% of the participants were men and 25% were Female and out of the total number of participants 30% were youth. The other respondents were from the departments of Environment, Livestock, Veterinary, Crops, Fisheries; Social Development, Water Resources Authority (WRA), National Environmental Management Authority (NEMA) and KCSAP personnel.

4.4 Methodology of Public participation and Consultation

The methods used in the public participation and consultations were interviews, 2 Focus Group discussions (one mixed group and the other for the youth), administering of questionnaires, community. Key informant interviews, a formal meeting for the government departments and use of mails to obtain additional information. In the meeting, we ensure that ministry of health COVID -19 guidelines and protocols are observed by the participants.

4.5 Summary of Issues Raised by the Community and Stakeholders and Response

- **Degradation of the catchment:** This was attributed to anticipated increased anthropogenic activities. The community to be sensitized on soil and water conservation as well as other mitigation measures as underlined in ESMP.
- **Disturbance of source of water during desilting and rehabilitation:** It is necessary to for the members of the community to find an alternative source of during the desilting and rehabilitation process.
- **Employment of locals during construction phase:** The proponent and the contractor will ensure that the community members are given priority in employment during construction phase of the project.
- **Solid waste management:** The proponent and the contractor will ensure that they practice Integrated Solid Waste Management during project implementation period.
- **Noise disturbance during construction:** Machines and vehicles engines to be shut off while not in use or in motion as will be provided for in the ESMP
- **Low knowledge on irrigation and farm management:** The community to be sensitized by officers from the department of agriculture and irrigation
- **Spread of COVID – 19:** It was agreed that all Ministry of Health Guidelines and Protocols for Covid-19 control including keeping social distance, washing of the hands, and putting on face masks shall be adhered to in all public meetings with the community during the construction and operation phase of the proposed project.
- **Conflict over water resources:** It was pointed out that this may arise as a result of increased demand of water for growing crop, livestock and domestic use. The proposed project will develop establish a water use committee to oversee and handle conflicts arising from water usage during the operation phase of the project.

CHAPTER FIVE

ANTICIPATED IMPACTS AND MITIGATION MEASURES

5.1 Introduction

This section entails impacts that may arise during implementation of the proposed project. Proposed project activities may bring about several potential impacts during implementation and operation of the proposed project. The potential Impacts to the environment can be positive or negative, direct or indirect, reversible or irreversible. Most of these key issues were identified during the scoping exercise and are clearly elaborated as follows:

5.2 Environmental Impacts

5.2.1 Positive Environmental Impacts

5.2.1.1 Water Conservation

During rainy season, surface run off water and the ephemeral streams water goes to waste. The earth dam will immensely conserve the water by tapping the rain water. Retained water would be used in further construction works, farming activities etc. reducing pressure on available water resources.

Enhancement measures:

- Ensure regular maintenance of the earth dam.
- Planting shade trees to minimize loss of water through evaporation.

5.2.1.2 Promote afforestation and re-afforestation

The target community will use water from the earth dam to establish tree nurseries and plant trees in the degraded parts of the catchment area and also on farm (agroforestry). This will increase tree cover in the area.

Enhancement measures

- Sensitize the community members on importance of afforestation and re-afforestation.
- Train community members on the best trees species suitable in the area for planting.

5.2.1.3 Flood control

The dam will receive run off from ephemeral seasons streams, during rainy season the streams can control flood havoc in the area. Run off and the water from the streams will be stored averting possible flood in the area. The cover crops that will be grown will enhance water infiltration thus reducing flooding.

Enhancement measures

- Ensure the earth dam is regularly well maintained.
- Sensitize the community to use the water from the earth dam to plant trees on public and communal land.

5.2.2 Negative Environmental Impacts

5.2.2.1 Vegetation disturbance

There will be vegetation disturbance especially during construction because of vehicles that will be used to deliver construction materials.

Mitigation Measures:

- Clearing of vegetation shall be kept to a minimum
- Trees should be trimmed rather than removed wherever possible.
- Contractor to ensure that specific routes are used for vehicle haulage and by the construction workers.
- Sensitization of construction workforce on environmental and ecological conservation
- Compensatory planting of trees in the pan catchment by the contractor
- The proponent to support establishment of a community tree nursery for indigenous trees

5.2.2.2 Vibration and Noise pollution

Loud noise can be a nuisance, while exposure to very loud noise over a long period of time can cause deafness. Noise produced during the implementation of the project will be highest at the de-silting stage.

Mitigation Measures:

- All employees likely to be exposed to ear noise to be provided with ear protectors;

- Contractor to ensure strict enforcement on use of ear protectors
- Contractor to ensure the use of well-maintained machineries and vehicles
- All construction work to be limited to daytime only;
- Immediate neighbors to be notified on the date of commencement of construction work.
- Machines and vehicles engines to be shut off while not in use or in motion.

5.2.2.3 Excavated Earth Material

The debris from excavation is expected to be of a large volume during construction, the material could be reused in the embankment.

Mitigation Measures:

- Contractor to use excavated soil for the pan wall/embankment.
- Contractor to dump unused excavated materials and debris in designated places approved by NEMA.

5.2.2.3 Air Pollution/Dust and Motor vehicle Emission generation

Air quality will only be affected by dust that will be emitted during de-silting stage and some exhaust fumes from the engines. This impact will be negative but short-term.

Mitigation Measures:

- Earth stockpiles should be sprinkled with water to minimize blowing of dust.
- The work crew should be provided with dust masks.
- The excavator and compressor should be in good operating condition to avoid unnecessary exhaust fumes due to inefficient fuel combustion.

5.2.2.4 Soil erosion and Soil quality degradation

With poorly designed inflow and under estimated spillway dimension, water flow can easily cause erosion. The following measures should be put in to consideration to protect the area from erosion.

Mitigation Measures:

- Supervising engineer to ensure proper compaction of embankment
- Vehicles supplying materials to use marked routes to prevent loosening the soil

- Clearance of vegetation should wait until the contractor is ready to undertake excavation
- Excavated earth should be held on locations of the site not susceptible to storm water runoff.
- Supervising engineer to ensure that excavated materials not reusable should not be disposed on productive land that may result in degradation.
- Control of livestock number in the vicinity of the pan (avail alternative watering point)
- Sensitization of farmers on soil erosion control.
- Growing of trees by the community
- Growing of grass on the embankment and around the pan and in the neighboring farms
- Establishment of community tree nursery

5.2.2.5 Generation of solid waste

Solid waste generated will be minimal mainly vegetation debris from clearing of the dam and soils from de-silting. However, most of the soil will be used in embankment of the dam.

Mitigation Measures

- Excavated soils during de-silting should be used in embankment of the dam and the vegetation debris should be disposed of appropriately.
- The contractor will maintain all site vehicles and equipment to a serviceable state.
- Provision of temporary septic pit for workers on site
- The Contractor to liaise with the County Government of Laikipia and NEMA office for guidance on licensed waste collectors and suitable dumping sites for generated wastes.
- Supervising Engineer to ensure recycling, reuse, reduction or disposal of waste in the designated and approved dumpsite.
- Provision of solid waste collection facilities (waste bins).
- Sensitization of construction workers on proper disposal of solid wastes
- The Proponent to make sure that the selected contractor supplies the dry reeds to the community farms for use as manure

5.2.2.6 Risk to Leaks and Spills from fuels and lubricants

There may be some oils and grease spillage on the ground from the machine that will be used in the rehabilitation works of the Kariunga earth dam and Mutirithia water pan. Such oils can suffocate the grass around as well as have negative impact on the microbial life. However, the occurrence of these wastes is expected to be only minimal.

Mitigation Measures

- Scooping the affected earth and disposing of contaminated material in a designated site.
- Water from cleaning of equipment should be not be discharged into water courses.
- Regular maintenance of site equipment and machinery should be carried out to ensure any leakages are detected and controlled. The motor vehicles and heavy equipment should be serviced according to manufacturer's requirements to limit the exhaust emissions.
- Site staff to be sensitized by the supervising engineer on safety procedures for fuel storage and re-fueling should be well understood and implemented by site staff
- The contractor to set up designated site equipped with oil sump for servicing and refueling of vehicles/ machinery. Alternatively, servicing and fueling should be done at designated dealer stations or approved fuel stations.

5.2.2.7 Siltation of earth dam

The erosion of the inlet water course and the degradation of the earth dam catchment will result in the siltation of the earth dam resulting in increased water turbidity and reduced volume of the earth dam.

Mitigation Measures:

- Construction of silt trap (terraces and check dams upstream)
- Sensitization of community to undertake regular maintenance of the silt traps.
- Sensitization of the community to undertake SLM practices in the water pan catchment.
- Regular maintenance of the silt traps.

5.2.2.8 Water pollution

Sources of surface water pollution include livestock drinking water directly from the pan and the degradation of the catchment of the water pan due to deforestation and poor agricultural practices.

The pollution of surface water would lead to the deterioration of water quality algal blooms, proliferation of aquatic weeds and eutrophication.

Mitigation Measures

- Improved waste management should be considered for the upper catchment area.
- Periodically sample water, test, treat and release
- Sensitize the community on the treatment of water before use.
- Sensitize the community on development of alternative water sources for domestic use such roof rainwater harvesting for households with iron roofs.
- Sensitization of farmers around the pan catchment on SLM practices
- Fencing of the water pan site
- Water troughs and community water drawing points have been provided in the design

5.2.2.9 Loss of water through evaporation

The general rate of surface water loss from the water area could increase through exposure to weak geological points and also increased surface area. Fractures and fissures provide a potential for infiltration of water into the sub-surface and possibly creating springs on the lower areas. Other mode of water loss would be the high temperatures in the project area and inadequate vegetation coverage leading to high evaporation rates.

Mitigation Measures

- The Contractor to plant indigenous trees and shrubs that have low water dissipation capacity in the water pan buffer zone and at a safe distance to avoid damage to the pan wall and floor.
- Sensitize the community on efficient water use practices and on alternative water sources.

5.2.2.10 Breaking of earth dam wall

During the operation phase unprecedented above normal rains over a longer period which has been the case due to climate change effects and/or damage to the earth dam walls and a lack of maintenance could result in the earth dam walls breaking and suddenly discharging its water. The outcome may be destruction of property, land degradation and risk to people.

Mitigation Measures:

- The proponent to sensitize the community on the danger of establishing settlements on the downstream of the earth dam.
- The proponent to undertake Environmental Audit for the earth annually as required by NEMA.
- Train the Project Management Committee (PMC) and the local administration on scouting which will lead to early detection and responding to any risk situation/establish ER team.
- The PMC to carry out monitoring and assessment of the earth walls and project site particularly before the onset of the rains and as the rains progress.
- Develop Emergency Response Plan
- Act upon the findings from scouting.

5.3 Socio-Economic Impacts

5.3.1 Positive Socio-Economic Impacts

5.3.1.1 Increase in Land value

With availability of adequate water for cultivation, livestock and domestic use the land neighbouring the dam will increase in value. The land can be used for crop production through drip irrigation utilizing water from the dam.

Enhancement measures

- Awareness creation on the increased value of the land in the area to avoid exploitation by brokers.
- Promote water conservation practices to conserve water from the earth dam.

5.3.1.2 Injection of money into the local economy

The proposed project is expected to attract a large amount of money during its implementation and most of this money will be into the local economy especially during the construction phase. This money will be in form of wages and salaries for skilled and unskilled labour; procurement of construction materials including payments for local provisions including fuel, foods and accommodation. This will enhance more circulation of money and income in the local community and thus enhancing improved livelihoods.

Enhancement measures

- Ensure the locals are employed to provide skilled and unskilled labour.
- Ensure that where necessary and possible the construction materials are procured from the local suppliers.

5.3.1.3 Market for Construction Materials

The project will require materials, most of which will be locally sourced within the project area. Some of this include sand and hardcore for the construction of the structures packaged with the earth dam including the water trough, latrine etc. Local suppliers will be given first priority for the supplies of construction materials.

Enhancement measures

- Ensure that the construction materials such as sand and hardcores are procured from local suppliers.

5.3.1.4 Environment Conservation

During rainy season, surface run off water and the ephemeral streams water goes to waste. The earth dam will immensely conserve the water by tapping the rain water. Retained water would be used in further construction works, farming activities etc. reducing pressure on available water resources. Agroforestry farming will help improve environmental set up of the area by planting more trees and thus enhancing carbon sequestration in the project area.

Enhancement measures:

- Train community members on environmental conservation including planting trees and cover crops.
- Sensitize community members on protection and conservation of trees in the catchment area.
- Train farmers on Integrated Pest Management to avoid or minimize use of agro-chemicals.

5.3.1.5 Improved food security

With water distribution through piping from the dam, the locals can do farming to grow crops and hay for the livestock. Food production will be greatly boosted in the area. Food production of diversified food sources like Fish, fruits, vegetables, pulses and cereals will be enhanced.

Enhancement measures:

- Train farmers on crop production using irrigation to increase crop produce.
- Train farmers on post – harvest storage to avoid or minimize wastage of farm produce after harvest.
- Train farmers on the best variety of crops to plant that are suitable in the area.

5.3.1.6 Employment Creation

The proposed construction activities will require skilled and unskilled labour; this will provide employment opportunities for the local community. Economically, this will mean that most of the unskilled labour in the project area will be used. Socially these people will be actively engaged in productive employment and other income generating activities and thus minimize social ills like use of alcohol and drug abuse including theft.

Enhancement measures:

- Ensure that the locals are employed as skilled and unskilled labour as much as possible.
- Inform the locals the availability of job in time for them to prepare the required documents for employment.
- Ensure there is gender equality in the process of employing the locals.
- Avoid employing children to provide labour.

5.3.1.7 Provision of water

The operation of this project will provide the most needed water for domestic use and small scale irrigation farming to the residents of the area. Overall, the status of sanitation, hygiene and health of the community is expected to improve tremendously. The water will also reduce the distance covered in search of water. A committee on conflict management and resolution should be formed to deal with any emerging dispute on utilization of water.

Enhancement measures

- Regular maintenance of earth dam.
- Sensitize community on water conservation practices.
- Plant and protect trees on the catchment area.

5.3.2 Negative Socio-Economic Impacts

5.3.2.1 Occupational Health and Safety risks

Construction works and movement of trucks delivering materials will create dust, air and noise pollution which are likely to impact on public health. Oil waste from vehicle is likely to impact on public health if it finds its way into the water sources. Sanitation and hygiene during construction is likely to result into outbreak of diseases such as typhoid, hepatitis and intestinal worms. Construction works are associated with an increase in sexually transmitted diseases such as STIs and HIV/AIDS due to the influx of workmen interacting with the local people. It is expected that employees are likely to encounter occupational health risks due to accidents at the construction site. Because of construction activities, workers are exposed to risks of accidents and injuries. Injuries can arise from use of tools and equipment general site preparation. The injuries can include cuts and bruises. Injuries from construction work can include falling from height and colliding**.**

Mitigation Measures:

- Provision of suitable protective gear – PPE/C. The contractor should provide face overalls, helmets, safety boots, earmuffs, nose masks and gloves to the workers.
- Erect the appropriate safety signage along the construction route cautioning against various health and safety risks and prescribing particular mandatory actions
- The contractor should ensure that there are no spills of petroleum, no smoking, no sources of ignition and proper use of warning signs in an explosive environment.
- Sensitize site staff on basic first aid practices
- Discourage unauthorized people from the project site
- Provide adequate PPE's to workers during construction
- All sub-project workers should have insurance and workmen's compensation.
- Provision of fully equipped first aid kit at the site.
- Ensure the availability of Emergency contacts for police, ambulance, etc.
- Emergency plans should be communicated and well understood.
- Comprehensive HIV/AIDs/COVID 19 sensitization programs for workers and the local community

5.3.2.2 Risk of increase spread of COVID – 19 at work place

The World Health Organization declared COVID-19 a global pandemic after assessing both its alarming levels of spread and severity, and the alarming levels of inaction. Consequentially, World Health Organization (WHO) issued various guidance and measures to prevent the spread of the virus. The measures have been adopted worldwide. Similarly, the Kenyan government has since then issued several guidance and directives after the first case was registered on March 13th, 2020. These included complete cessation of movement to and from areas considered hot spots and night curfew, social distancing guidelines, closure on non – critical and essential enterprises, closure of places of worship and public gatherings, mandatory use of masks in public places, among others. During project execution (civil works), large numbers of workers will be required to assemble together in 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. The presence of international workers, especially if they come from countries with high infection rates, may also cause social tension between the foreign workers and the local populations.

Recently, the WHO has warned that the virus is here to stay for a long time and might persist and become our new way. The Government of Kenya has also lifted some of the initial movement controls and allowed the resumption of business, with certain industry specific guidelines being enforced. The duty of care has now been transferred to individual citizens and enterprises. Recognizing the potent risk this may present.

Mitigation Measures:

- The contractor shall put in place measures to prevent and manage the spread of the Covid-19.
- The Contractors will develop a 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;

- Mandatory provision and 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. Where more than one person are gathered, maintain social distancing at least 2 meters
- All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
- The project shall put in place means to support rapid testing of suspected workers for covid-19;
- Install handwashing 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 workstations, door knobs, and hand

5.3.2.3 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:

- Develop and implement a 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
- 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.

5.3.2.4 Risk of increased HIV/AIDs

The influx of people may bring communicable diseases to the project area, including sexually transmitted infections (STIs), or the incoming workers may be exposed to diseases to which they have low resistance. This can result in an additional burden on local health resources. Local health and rescue facilities may also be overwhelmed and/or ill-equipped to address the industrial accidents that can occur in a large construction site.

Mitigation Measures:

- Contractor to sensitize workers and community members on HIV/AIDS Awareness other communicable diseases to be instituted and implemented as part of the Contractor's Health and Safety Management Plan to be enforced by the Supervising Engineer.
- This will involve periodic HIV/AIDS and other communicable diseases Awareness Workshops for Contractor's Staff.
- Controlled access to Contractor's Workforce Camps by outsiders.
- Contractor to provide standard quality condoms at the construction site during the construction period.

5.3.2.4 Danger of Drowning

This is a real hazard associated with the earth dam. Children are the most vulnerable to drowning if they resort to drawing water directly from the water pan. Livestock are also at the risk of drowning if they drink water directly from the water pan. This also applies to livestock who are expected to consume water from a constructed water trough. Community members drawing water for domestic use are also at the risk of drowning if adequate measure is not put in place to restrict the water access points in the water pan

Mitigation Measures:

- Erecting a perimeter fence around the water pan with a gate which should be kept under lock and key by water pan management committee
- The community be sensitized on the potential risk of drowning
- Employ a guard from the community
- Construction of domestic water drawing point and a cattle trough.

5.3.2.5 Increase in water borne diseases

The presence of the water pan creates a stagnant water body that provides good breeding ground for disease vectors such as mosquitoes which cause malaria. Some community members may opt to use the water for domestic purposes in case of an acute water shortage during drought.

Mitigation Measures:

- Introduce fish fingerlings in the water pan in collaboration with the fisheries department
- Sensitize the community on malaria prevention through use of mosquito nets, local spraying and bush clearing near households
- Community through the local administration to liaise with department of water for water trucking
- The proponent sensitize the community on water purification methods
- Encourage roof water harvesting and storage at household level

5.3.2.5 Gender – Based Violence

This impact refers to gender-based violence that women and girls may experience because of Project implementation. This includes, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce potential

for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of water and sanitation projects that do not adequately consult women and adolescent girls in the community about safety and security issues related to the delivery of water and sanitation services.

Mitigation Measures:

- 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; delivery of water supplies; etc.
- Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; water services; etc.
- Ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.

5.3.2.6 Conflict over water resources

This may arise as a result of increased demand of water for growing crop, livestock and domestic use. The proposed project will develop establish a water use committee to oversee and handle conflicts arising from water usage during the operation phase of the project.

Mitigation Measures:

- Putting in place grievance resolution mechanisms.
- Capacity building of the PMC and SAIC on conflict resolution

5.3.2.7 Outbreak of Livestock Diseases

The coming together and mixing of livestock from different households will increase the chance for the spread and outbreak of livestock pest and diseases.

Mitigation Measures:

- Regular disease surveillance by the veterinary department and community
- Sensitization of the community on disease spread, monitoring and control
- Livestock disease management plan be put in place by the veterinary department to ensure disease incidences are promptly responded to and addressed.

CHAPTER SIX

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

Effective implementation of mitigation measures highlighted in this document will ensure the appropriateness of the project. Commitments detailed in this project report are designed to avoid environmental damage in accordance with the Environmental Management and Coordination Act, 1999, Environmental (Impact Assessment and Audit) Regulations Legal Notice 101 (2003) and the Water Act, 2016. The environment management enhancement procedures and techniques to conserve and improve the ecological and social environmental aspects should be incorporated in the ESMP as summarized.

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
Preparation Phase	**a) Risk of Spread of covid-19 during the consultations among community members**	Ensuring that MoH guidelines and protocols on COVID -19 are strictly observed. Use electronic means of consulting stakeholders Use traditional channels of communications (TV, newspaper, radio etc. Disseminate information through digital platform e.g. Facebook, WhatsApp, twitter etc.	All the Project components Client Supervising Eng. & Contractor(s) Communicatio n Expert/ Stakeholder Engagement Expert	No. of SOPs availed. No. of workers with PPEs No. of sanitizing facilities. No. of hand washing equipment installed.	Copy of SOPs Project assessment reports Purchase orders/receipts Photos Site visits	During meetings	350,000
Construction Phase	**a) Vegetation disturbance**	Clearing of vegetation shall be kept to a minimum Ensure specific routes are used for vehicle haulage. Sensitize workforce on environmental conservation Compensatory planting of trees Establishment of a community tree nursery for indigenous trees	Contractor/sup ervising engineer Proponent Community	Area cleared off vegetation No. of trees removed Marked routes for vehicle movement No. of tree nursery established.	Work Reports Photos Attendance register	Weekly	150,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
	b) Vibrations and Noise Pollution	Provide ear protectors to workers Ensure use of ear protectors Ensure machineries and vehicles are well maintained Construction work to be limited to daytime only; Machines and vehicles engines to be shut off while not in use	Contractor/Supervising engineer	No. of PPEs purchased. No. of workers using PPEs. No. of vehicles and machinery not on idling when not in use.	Local purchase orders Reports Receipts	Weekly	50,000
	c) Earth Excavated material	Use excavated soil for the dam wall/embankment. Dump unused materials and debris in designated places.	Contractor/Supervising Engineer	Designated site for safe disposal available	Engineers report Photos	Throughout construction period	20,000
	c) Air pollution (Dust and Motor vehicle Emission Generation)	Regular sprinkling of water to be done on dusty grounds • Enforce strict use of personal protective clothing. • Construction workers to be provided with dust masks	Contractor/Supervising Engineer	No. of PPEs purchased. Amount of water sprinkled No. of sprinklings done.	LPOs Reports. Signed contracts between Contractor & employees	Weekly	70,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Ensure machineries and vehicles are well-maintained • Switch off engines when the machineries and vehicles are not in use		No. of vehicles in good working conditions.			
	d) Soil erosion and soil quality degradation	• Ensure proper compaction of embankment • Vehicles to use marked routes to prevent loosening the soil • Excavated earth to be held on sites safe from storm water runoff. • Ensure excavated materials are not disposed on productive land that may result in degradation. • Control of livestock number in the vicinity of the pan	Contractor/supervising engineer Proponent Dept. of Agriculture Dept. of Environment Community	Time of clearing and excavation. Designated site for stock pile No. of compactions runs made Marked routes for vehicles available. No. of meetings held. No. of water troughs available.	Engineers reports. Photographs. Attendance registers. Sectoral Field reports. CESSCO reports	Monthly	500,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Sensitization of farmers on soil erosion control. • Growing of trees by the community • Planting indigenous tree species along the catchment • Establishment of community tree nursery		Area of land grown with vegetation. Number of trees planted in catchment. Tree nurseries established.			
	e) Generation of Solid waste	• Maintain vehicles/equipment in a serviceable state. • Provision of temporary pit latrine for workers on site • Liaise with NEMA office for guidance on licensed waste collectors • Ensure appropriate recycling, reuse, reduction of waste is done	Contractor/ work foreman NEMA Proponent	No. of litter bins. Waste disposal site. Licensed waste handler in place. No. of trainings on ISWM.	Receipts Attendance Register Photos	Daily	70,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Provision of solid waste bins • Sensitization of workers on proper solid wastes disposal					
	f) Risk of leaks and spills from fuels and lubricants	• Regular maintenance of equipment and machinery to ensure any leakages are detected and controlled. • Vehicles and heavy equipment should be serviced to limit the exhaust emissions. • Scooping contaminated material and disposing it in a designated site. • Water from cleaning of equipment should not be discharged into water courses.	Contractor/supervising engineer	Designated site for disposal of contaminated materials available Servicing bay available. No. of sensitization meetings held. Storage facility or equipment for residual oils, lubricants available. No. of vehicles serviced.	Servicing receipts/cards Reports Attendance registers	Daily	50,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Site staff to be sensitized on safety procedures for fuel storage and re-fueling • Oil residuals should be carefully collected and stored for safe disposal		No. of motor vehicle services undertaken.			
	g) Occupation health and Safety risks	• Provision of suitable protective gear – PPEs • Erect the appropriate safety signage along the construction route • Use physical barriers and warning signs to warn the public on the danger of construction activities. • Sensitize site staff on basic first aid practices.	Contractor/supervising engineer Directorate of Occupational Health and Safety (DOSH	No. of Physical barriers developed No. of protective gears procured. No. of trainings on first Aid held. No. of first aid kits procured. Type of material used in enclosure/fencing of the water pan.	Purchase receipts Reports Attendance register		30,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Discourage unauthorized people from the project site. • Provision of fully equipped first aid kit at the site. • Comprehensive HIV/AIDs/COVID 19 sensitization programs for workers /local community. • Ensure the availability of Emergency contacts for police, ambulance, etc. • Emergency plans should be communicated and well understood.		No. of contingency plans prepared. No. of M&Es undertaken			
	h) Risk of increased spread of covid-19 at work sites	• Put in place measures to prevent and manage the spread of the Covid-19.	KCSAP(CPCU) Contractor Supervising engineer	No. of COVID -19 measures implemented on site.	Incidence report Purchase orders/receipts		200,000 for management of

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Develop a SOPs for managing the spread of Covid-19 during project execution • The SOPs shall be in line with the World Bank guidance on COVID-19and MoH protocols • Avoid more than 15 persons or workers at one location. • Maintain social distancing at least 2 meters • Introduce Covid-19 screening which may e.g. temperature check and other vital signs; • Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites		No. of Covid-19 cases PPE procured	Photos Site visits		covid-19 cases.

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Ensure routine sanitization of shared social facilities and other communal places • Mandatory provision and use of appropriate Personal Protective Equipment (PPE)					
	i) Sexual Exploitation and Abuse by project workers against community members	• Develop and implement a SEA action plan with an Accountability and Response Framework • 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:	Contractor(s) Supervising Engineer Consultant GBV Expert Local CBO/ Local NGO	Reduced cases of sexual abuses. SEA Action Plan with an accountability framework SEA Action Plan. Community Liaison trained in PSEA.	SEA action plan Attendance registers	Monthly	200,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Prevention of SEA: including COCs and ongoing sensitization of staff • Response to SEA: including survivor-centered coordinated assistance to complainants • Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; • Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract		Code of Conduct Number of staff trainings SEA FP.			

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		policies related to SEA, including whistle blower protection					
	j) Risk of Increased HIV/AIDS & STI	• Sensitize workers/community members on HIV/AIDS • Periodic HIV/AIDS Awareness Workshops for • Controlled access to workforce camps by outsiders. • Provide condoms at the construction site	Contractor Proponent Public Health	No. of workers sensitized. Availability of condom dispensing equipment. No. of meetings held	Attendance registers Site visits	Daily	50,000
Operational and Maintenance Phase	**a) Siltation of the earth dam**	• Construction of silt trap (terraces and check dams upstream) • Sensitization of community to undertake regular maintenance of the silt traps	Contractor/Supervising engineer Proponent Community	No. of check dams constructed along the inlet water course. Acreage of land under catchment management and	Site reports Attendance registers Photos	Monthly	20,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Sensitization of the community to undertake SLM practices in the water pan catchment • Regular maintenance of the silt traps		conservation through SLM No. of trainings.			
	b) Water Pollution	• Sensitize the community on water treatment before use. • Sensitize the community on roof rainwater harvesting. • Improved waste management for the upper catchment area. • Periodically test water • Fencing of the water pan site. • Use water troughs and water draw-off points provided	Contractor/supervising engineer Proponent NEMA WRA	No. of water quality tests undertaken. No. of watering points constructed No. of trees planted Amount of grass planted along the embankment.	Water analysis reports. Attendance lists Training manual Site photos	Monthly	90, 000 (laboratory analysis of water parameters -quarterly)

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
	c) Loss of water through evaporation	• Plant indigenous trees and shrubs • Sensitize the community on efficient water use practices	Contractor/supervising engineer	No. of trees planted No. of meetings held	Site report Attendance registers	Quarterly	30,000
	d) Breaking of the earth dam wall	• Sensitize community on the danger of establishing settlements downstream • Undertake Environmental Audits annually as required • Train PMC on scouting for early detection and response to any risk situation • Establish Emergency Response team • PMC to carry out monitoring and assessment of the water pan walls	Contractor/supervising engineer Proponent PMC NEMA	No. of trainings for PMC No. of annual inspections conducted by engineers No. of monitoring and assessments of the water pan No of Annual Environmental Audits Presence of ERP	PMC monitoring reports Emergency Response Plan Quarterly reports		120,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
	e) Danger of drowning	• Erecting a perimeter fence around the water pan • Community sensitized on the potential risk of drowning • Employ a guard from the community • Construction of domestic water drawing point and a cattle trough.	Contractor/supervising engineer Proponent Community	Perimeter fence available with gate No. of sensitizations. Watering points available. Available guard employed by community.	Project assessment report. Attendance register Photos.	Monthly	120,000 (person guarding & community sensitizations)
	f) Increase in waterborne diseases e.g. typhoid, Diarrhoea, Malaria	• Community trained on water purification methods, • Local spraying and bush clearing near households • Sensitize the community on the use of mosquito nets	Department of Public Health CPCU	Households practicing safety rules. No. of people sleeping under bed nets.	Monthly		70,000
	g) Gender-based violence at the community level	• Hold community engagements with women and girls.	Supervision Consultant GBV Expert	No. of GBV mitigation plans.	GBV plans	Monthly	85,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
		• Develop gender responsive action plans. • Develop action plan for implementation of GBV Trainings for PMC, SAIC, CESSCO on GBV and SEA.		No. of GBV cases reported Gender action plans developed. No. of trainings held.	Attendance registers GBV action plans		
	h) Conflicts over water use.	• Putting in place grievance resolution mechanisms. • Capacity building of the PMC and SAIC on conflict resolution	Proponent, PMC and Community	No. of capacity building held on conflict resolution Presence of GRM	Reports Minutes Attendance registers	Monthly	50,000
	i) Outbreak of Livestock Diseases	• Livestock disease management plan in place • Regular disease surveillance. • Monitoring of the livestock by the community/farmers. • Sensitization of the community	County Veterinary department PMC Community	No. of surveillance No. of reported incidences No. of sensitization meetings	Surveillance reports Attendance Registers	Monthly	65,000

Project Phase	Potential Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Persons	Monitoring Indicators	Means of verification	Monitoring frequency	Est. Cost (KShs.)
Decommissioning Phase	**a) Intended use of decommissioned dam**	• Conduct ESIA-SPR for the intended new use.	New user Community EIA Expert				200,000
	b) Inexperienced new management	• Training of new users on key aspects of the project	New user Community				30,000
	c) Abandonment of the water dam	• Proper disposal of waste • Evaluation of best land use option	Community Proponent Contractor				40,000
	d) Different intended use.	• Adherence to ESMP and NEMA recommendation.	New user Community				30,000

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATION

7.1 Findings and Recommendations

7.1.1 Assessment findings

The assessment described in the report identified the below listed main findings;

- The project design has ensured that the project is constructed within existing public land and no private land will be acquired.
- The world Bank Operation Policy OP 4.12 is not triggered due to the fact that the proposed site is clear land free from encroachment.
- The Environmental and Social Screening undertaken for the project revealed that the investment will result in low impact on both social and biological environment; therefore, this project is categorized as a category B project. The level of SPR assessment required is at Project Report Stage which should be approved at the Laikipia County, NEMA office.
- The overall primary objective of the proposed project is to increase agricultural productivity and ultimately enhance adaptation and resilience to the impacts of climate variability and change in Laikipia County. This is in line with KCSAP main objective of increasing agricultural productivity, enhancing resilience to impacts of climate change and contributes to reduction in Greenhouse Gas emissions.

7.1.2 Assessment Recommendation

The project is recommended for implementation provided the mitigation measures identified in the study for the potential negative impacts are implemented, the recommendations will also form part of Environment License that will be issued for the Project. It is thus the expert's recommendation that the proposed project be approved and be licensed to enable implementation of the project subject to the outlined mitigations being adhered to.

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6) Government of Kenya (2007): The Work Injuries Benefit Act, Government Printers, Nairobi, Kenya.
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14) MWI 2015. Practice Manual for Small Dams, Dams and Other Water Conservation Structures in Kenya. State Department for Water, Ministry of Water and Irrigation, Government of Kenya

APPENDICES

i. List of public participants
ii. Minutes of Public Participation
iii. Public participation questionnaires;
iv. Earth dam designs
v. Land Ownership document
vi. NEMA Practicing License for the Lead expert

Appendix i: List of Public Participants

ENVIRONMENTAL IMPACT ASSESSMENT STUDY

PUBLIC PARTICIPATION

ATTENDANCE LIST

Date......05/11/2020..

PROJECT TITLE: PROPOSED REHABILITATION OF ~~MUTIRITHIA~~ KARIUNGA EARTH DAM WITHIN LAIKIPIA NORTH SUB-COUNTY OF LAIKIPIA COUNTY

No.	NAME	ID No.	Phone Number	Plot No. (if applicable)	SIGNATURE
1.	DUNCAN MWENDA	28252864	0701656410		
2.	ELIZABETH KASANA	11419319	0796010548		
3.	VERONICA EKAI	36110979	0759837802		
4.	JAMES KIKANAE NTIMAMA	[illegible]	[illegible]		
5.	GEORGE KAPARO	24744432	0721435171		
6.	JAMES KANYI	29267559	0719507399		
7.	LENKINKAI SAINDIGA	20190413	0721829060		

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Appendix ii: Minutes of Public Participation

MINUTES OF THE CONSULTATIVE PUBLIC PARTICIPATION MEETING

Minutes of the Consultative Public Participation Meeting held on 5th November, 2020 with the Stakeholders within the Proposed Project Site Located within in Segera Ward in Laikipia North Sub-county

Participants Present

1. Duncan Mwenda
2. Elisabeth Kasana
3. Veronica Ekai
4. James Ntimama
5. George Kaparo
6. James Kanyi
7. Lenkinkai Saindiga
8. Douglas Mutai
9. Charles Muthee
10. Makories Minyua
11. Daniel Lengirikai
12. Peter Ngatia

Agenda 1: Preliminary

The meeting was called to order by Dickson Kimathi at 11.00am. Thereafter, he invited the participants to do self-introductions and welcomed all the participants. He explained the essence

of the meeting and that the proposed project would affect them in various ways and thus their input in regards to the proposed project was very important. He invited the environmental consultants to carry on with the main activity of the day. The meeting was attended by stakeholders that were either interested or affected by the proposed project.

Agenda 2: Presentation of the Project Concept

The Lead Expert Mr. Fredrick Kirera addressed the members and explained to them the main objective of the meeting which was to inform them about the proposed project and its likely effects and in turn incorporate their input, views and concerns in regards to the proposed project that would be very important in enhancing decision making by the authority. He went ahead and gave a detailed description of the aspects and the relevance of conducting an environmental impact assessment of the proposed project. The importance of the project in terms of the benefits, risks and mitigation measures for the anticipated adverse effects. The specific objectives of the consultants were geared towards;-

i. Providing an opportunity for the stakeholders to influence the project design and the envisaged operational plan in a positive manner,
ii. Obtaining indigenous knowledge from the participants in regards to the proposed project that may be important in decision making,
iii. Improving transparency and accountability of decision making,
iv. Facilitating the evaluation of the technology, procedures and processes to be used, in the implementation of the project, mitigation measures and trade-offs (if any),
v. Ensuring that important impacts are not overlooked while maximizing the positive impacts and
vi. Increase public confidence in the EIA process.

Agenda 3: Open Session

It was agreed that the proposed project had no major issues since it would enhance the secondary growth of the area and provide market for their Macadamia nuts thus boasting their profit margins and their livelihoods. Moreover, the proposed project was properly and strategically located and conforms well to the existing land use activities.

Suggestions and recommendations

The participants discussed and made the following recommendations and suggestions:

i. Duncan Gitonga, welcomed all the participants and the visitors to the area. He said that all the community members are aware of the proposed construction of the proposed KAMUNA project and that the local community members area very cooperative whenever they are called upon. He further said that the project contractor should consider giving the locals first priority in terms of casual employment and install signage posts and speed bumps to control traffic during construction and operation of the proposed project.

ii. Elizabeth welcomed the participants and noted that the proposed project was a plus in the area and that the community should be educated on good farm practices.

iii. George Kaparo maintained that the proposed project will help the farmers make huge profits through sales of crops, provide water for livestock and it will create employment for many during construction and operation phase. However, he also noted that the contractor should enhance speed limit for the motorists and the trucks to reduce the risk of accidents within the project site.

iv. Peter Ngatia noted that the proposed project is strategically located and will therefore serve the intended purpose and improve the livelihood of farmers.

v. Charles Muthee, noted that the proposed project will boost agricultural production in the project area.

vi. James Ntimama thanked the project team for involving them in the public participation and consultation meeting in regards to the project; he also pointed that the proposed project will have immense social benefits in the area, enhance development of the area. He further noted that dust and emission to be reduced to the minimum and construction period to be programmed to take the shortest time possible.

vii. Veronicah Ekai; Landscaping should be done after the construction of the proposed project

viii. Douglas Mutai; The proponent to adhere to standards as stipulated in the standard specifications for building and construction, building codes, environmental laws, regulations and policies as well as the relevant statutes in carrying out their operations.

ix. Makories Kinyua; Expressed his gratitude for their involvement in public participation for the proposed project and urged the contractor to adhere to the specified standards and the relevant statutes.

x. George Kaparo; the contractor to ensure proper site signage and warning signs in order to prepare the residents psychologically

Agenda 4: Signatories

The lead expert explained more on the proposed project with clear explanations of the structure of the proposed project to the public participants and appropriate responses in regards to the proposed project were captured. The list of participants was issued to the participants for

providing their personal details such as Name, I D and contact details. All the participants of the public consultative meeting filled their details in the list of attendance and signed against their names. The attendance list for the public participation meeting is hereby attached.

Agenda 5: Adjournment of the Meeting

There being no any other business a vote of thanks was made and a closing prayer done by a community member after which the meeting officially ended at 1:30 pm.

Minutes prepared by Diocesan Kiriaki M **Signature**.....

22/11/2020

Appendix iii: Public Participation Questionnaires

RECEIVED
Date 29/11/2022
Water, Env. & Natural Resources
P.O. Box 376 ...

ENVIRONMENTAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION KEY INFORMANT

PROJECT TITLE: PROPOSED REHABILITATION OF KARIUNGA EARTH DAM IN LAIKIPIA NORTH SUB-COUNTY

State Department of Agriculture – Kenya Climate Smart Agriculture Project (KCSAP) intends to rehabilitate Kariunga Earth dam, build a water storage tank and install pipes for conveying water to the community within Segera Ward in Laikipia North Sub-County for giving livestock and irrigation.

National Environmental Management Authority (NEMA) under Environmental Management and Co-ordination Act. No. 8 of 1999 Section 58 requires that an environmental Impact Assessment involving public participation be undertaken to enable it make an informed decisions in either approving and/or recommending remedial measures prior to carrying out such development project.

As a key stakeholder/government agency, we kindly request for your views/comments vis-à-vis the proposed project.

Please note that your response will be treated with the confidentiality it deserves.

1. Name: Monda Esdron
2. Mobile No. 0704132947
3. Organization/Institution. County Government of Laikipia - Environment
4. Are you aware of the proposed project?... Yes
5. Are there similar projects in the area? ...
6. If yes in Q5 above, how many?...
7. Do you support the implementation of the proposed project?... Yes
8. If yes in Q7 above, do you anticipate positive impacts from the proposed project?.. Yes
9. If yes in Q8 above, what **positive impacts** do you anticipate?
   The project will ~~[illegible]~~ Leem water retention within the reservoir, reducing incidence of flooding downstream, increase water availability for irrigation & livestock use. The water conveyance ~~[illegible]~~ for irrigation will increase food production in the geographically semi-arid area thereof rendering the community self sufficient in livelihood economies
   - micro-climatic will be observed around the dam area related to air-moisture percentage, air temp, air movements

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ENVIRONMENTAL IMPACT ASSESSMENT

PUBLIC PARTICIPATION KEY INFORMANT

10. Do you anticipant any negative impacts from implementation of the proposed project? YES

11. If yes in Q10 above, what **negative impacts** do you anticipant?

1) Water borne diseases due to contamination
2) Breeding of mosquitoes
3) Accidents - drowning of children & dam breakage.

12. In your own option, how can the negative impacts that you have stated above be mitigated?

1. Reduce contamination of water by providing watering troughs outside the dam.
2. Introduce fish for biological control of mosquitoes.
3) Fence off the dam & control access to prevent accident
4) Dam breakage - Maintain spillway & stabilize the embankments.

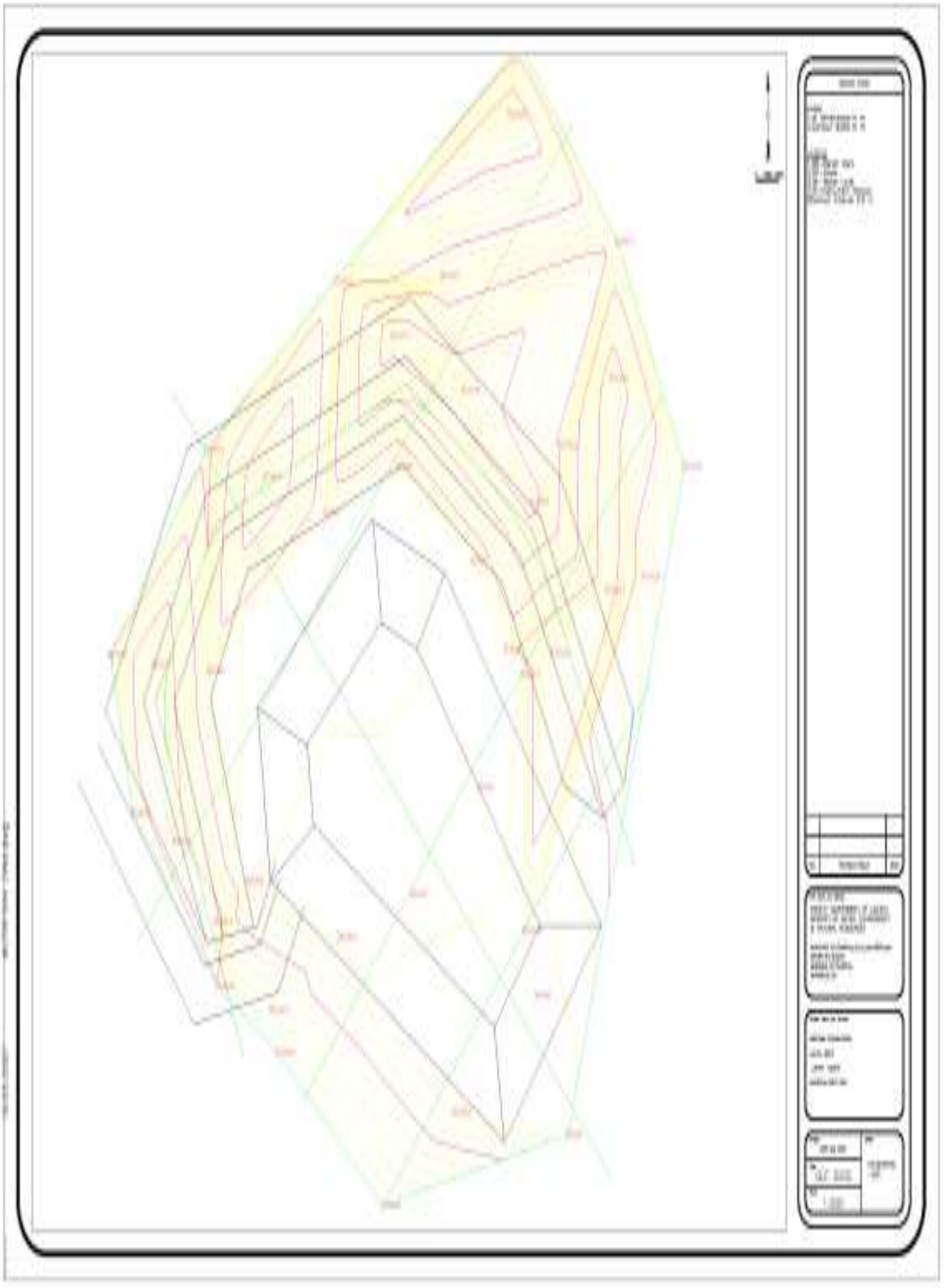
13. Additional remarks/comments

Signature..... Date..09/11/2020

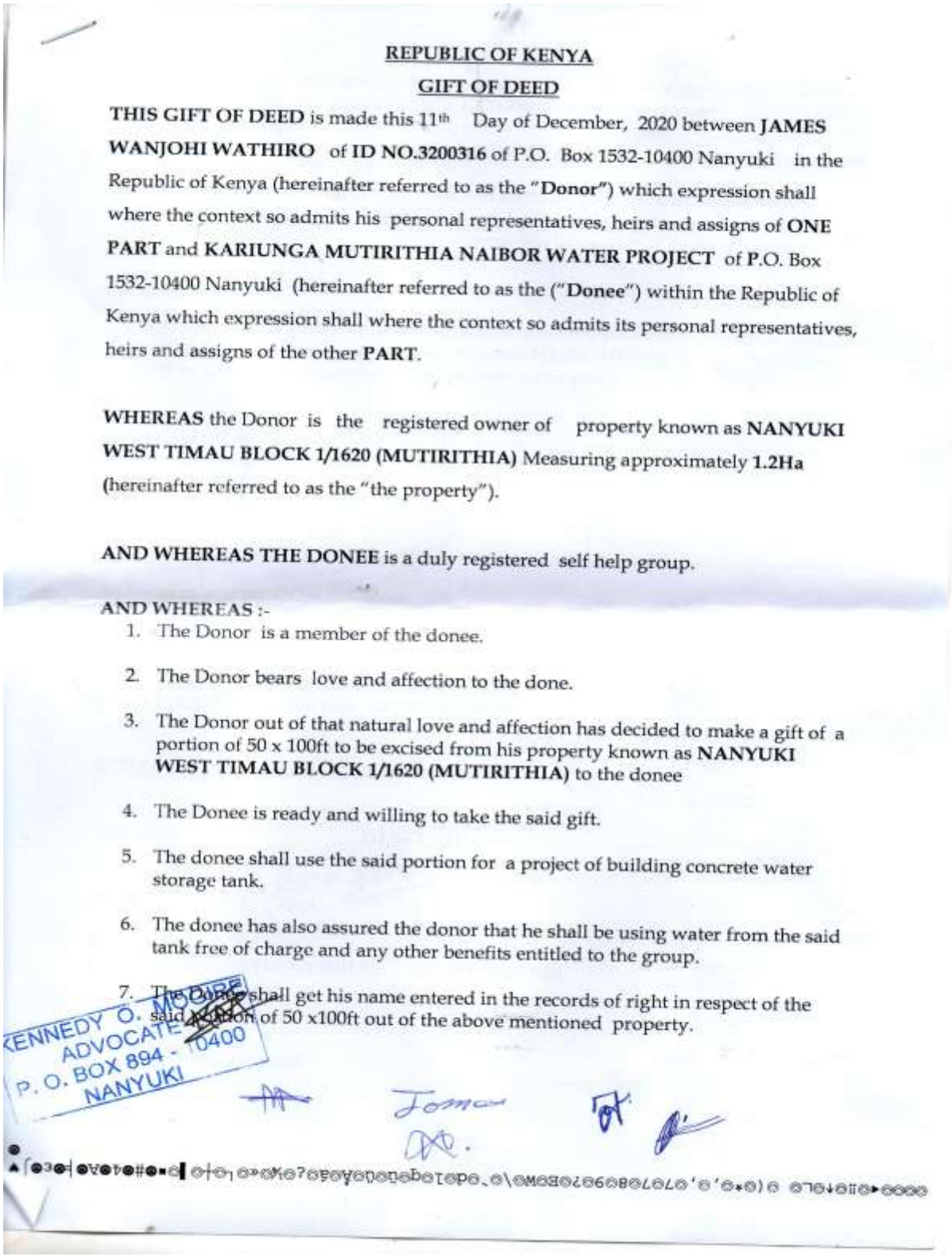
Position.....CDE

Thank you for your co-operation!

Appendix iv: Earth Dam Design plan



Appendix v: Land Ownership Document



REPUBLIC OF KENYA

GIFT OF DEED

THIS GIFT OF DEED is made this 11th Day of December, 2020 between **JAMES WANJOHI WATHIRO** of **ID NO.3200316** of P.O. Box 1532-10400 Nanyuki in the Republic of Kenya (hereinafter referred to as the "**Donor**") which expression shall where the context so admits his personal representatives, heirs and assigns of **ONE PART** and **KARIUNGA MUTIRITHIA NAIBOR WATER PROJECT** of P.O. Box 1532-10400 Nanyuki (hereinafter referred to as the ("**Donee**") within the Republic of Kenya which expression shall where the context so admits its personal representatives, heirs and assigns of the other **PART**.

WHEREAS the Donor is the registered owner of property known as **NANYUKI WEST TIMAU BLOCK 1/1620 (MUTIRITHIA)** Measuring approximately **1.2Ha** (hereinafter referred to as the "the property").

AND WHEREAS THE DONEE is a duly registered self help group.

AND WHEREAS :-

1. The Donor is a member of the donee.
2. The Donor bears love and affection to the done.
3. The Donor out of that natural love and affection has decided to make a gift of a portion of 50 x 100ft to be excised from his property known as **NANYUKI WEST TIMAU BLOCK 1/1620 (MUTIRITHIA)** to the donee
4. The Donee is ready and willing to take the said gift.
5. The donee shall use the said portion for a project of building concrete water storage tank.
6. The donee has also assured the donor that he shall be using water from the said tank free of charge and any other benefits entitled to the group.
7. The Donee shall get his name entered in the records of right in respect of the said portion of 50 x100ft out of the above mentioned property.

KENNEDY O. MOGIRE
ADVOCATE
P. O. BOX 894 - 10400
NANYUKI

8. Donor does declare and confirm that he shall not have any right , title or interest in or over the said portion of 50 x 100ft out of his property or any party thereof.

9. The donor hereby assures the donee that the property is free from encumbrances

10. The Donor also assures the donee that all taxes, charges and assessments payable in respect of the said property has been duly paid up to date by the donor and those accruing and becoming due in respect of the said property

11. The land is freehold

12. The done as a sign of appreciation has assured the donor that they shall pay him Kenya shillings one hundred thousand (**kshs. 100,000/=**) after the project they are carrying out on the said portion is complete.

IN WITNESS whereof the parties hereto have set their respective hands the date and year first herein above written.

SIGNED BY THE DONOR
JAMES WANJOHI WATTHIRO ..... Jomes

KENNEDY O. MOGIRE ADVOCATE P. O. BOX 894 - 10400 NANYUKI

In the presence of

SIGNED BY THE OFFICIALS OF THE DONEE

JOHN WAMAI WAMBUGU ID NO. 10245428 .....
CHAIRMAN

NTIMAMA JAMES KIKANAE ID NO. 30349738 .....
TREASURER

VERONICA EKAI ID NO. 36110979 .....
SECRETARY

KENNEDY O. MOGIRE ADVOCATE P. O. BOX 894 - 10400 NANYUKI

In the presence of

WITNESS:-
DUNCAN MWENDA NDERITU ID NO. 28252864 .....

DRAWN BY:
MOGIRE & CO. ADVOCATES
MATHAI HOUSE 1ST FLOOR
P.O. BOX 894-10400
NANYUKI ...OFFICE LINE 0725423643

Appendix vi: NEMA Practicing License for the Lead expert

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/11577

Application Reference No: NEMA/EIA/EL/15668

M/S **Fredrick Karani**
(individual or firm) of address

P.O. Box 30902-00100, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **7442**

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

Issued Date: **1/9/2020** Expiry Date: **12/31/2020**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2008 Certified