



**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMERY
PROJECT REPORT
FOR
THE PROPOSED REHABILITATION OF NYADONG' WATER PAN IN
NORTH SAKWA WARD, BONDO SUB COUNTY, SIAYA COUNTY**



Kenya Climate Smart Agriculture Project

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FACT SHEET

Project Name	Environmental and Social Impact Assessment for the proposed Rehabilitation of Nyadong' Water Pan in North Sakwa Ward, Bondo Sub-County. Siaya County.
Assignment Name	Environmental and Social Impact Assessment (ESIA) Summary Project Report (SPR)
Location	Rabonde Village, North Sakwa Ward, Bondo Sub-County, Siaya County
GPS Coordinates	Latitude-0.093283, long.34.33465. above sea level
Project Description	<p>Rehabilitation and expansion of the water pan</p> <ul style="list-style-type: none">○ Spillway channel○ Silt trap basin○ Community watering point○ Concrete tower platform○ Solar pumping mechanism○ Construction of livestock watering troughs○ Construction of VIP Latrines with bathrooms○ Catchment conservation measures○ Installation of Solar panels
Main source of water	It will be from Rain water harvesting and catchment runoff
Proponent	Nyadong' Community Development Group
Address of the Proponent	Kenya Climate Smart Agriculture Project (KCSAP), Siaya County County Project Coordination Unit P.O Box 3 -40600, Siaya .

CERTIFICATION

For and on behalf of:

Nyadong' Community Development Group Management Committee:

This Environmental Social Impact Assessment (ESIA) Summary Project Report was prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 (revised 2015 & 2019) in order to meet the statutory requirements for the implementation of projects under schedule ii.

I, the undersigned, confirm that the contents of this report are a true representation of the ESIA process for the Proposed Rehabilitation of Nyadong' Water Pan in North Sakwa Ward, Bondo Sub-County. Siaya County.

LEAD ESIA/ EA EXPERT

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Lead Expert Fredrick Aloo

Date. 4th November 2021

Signature



PROJECT PROPONENT:

Name

Position

Signature.....

Date.....

On Behalf Nyadong' Community Development Group Management Committee

PROJECT CLIENT

Name: Willis Atiang

Signature



Designation: County Project Coordinator

Date: 4th November, 2021

On Behalf of Kenya Climate Smart Agriculture Project, Siaya County

ACKNOWLEDGMENT

We, the ESIA study team Mr. Fredrick Aloo (Lead), Mr. Elijah Levo (Lead) and Mr. Blaise Okinyi (Associate) wish to acknowledge and express our profound gratitude to the Siaya County Project Coordinating Unit (especially Willis Atiang the County Project Coordinator and Mr Benard Ayagah) of Kenya Climate Smart Agriculture Project (KCSAP) for commissioning this ESIA SPR.

We appreciate the cooperation and contributions of all the stakeholders who we interacted with during this ESIA report, without their support this study would not have been successful.

We would also like to affirm our appreciation to Dr. Gilbert Muthee from the National Project Coordinating Unit, World Bank ESIA Experts especially Robert and Kimberly, not forgetting Marian from NEMA Head Office for their guidance in the preparation of this SPR. Finally, we wish to appreciate the contributions made by the entire community for providing us with useful information and filling out questionnaires during the field visits and public participation fora.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDs	Acquired Immunodeficiency Syndrome
CBO	Community Based Organization
CIDP	County Integrated Development Plan
CMS	Convention on Migratory Species
CPCU	County Project Coordination Unit
CSR	Corporate Social Responsibility
C-ESMMP	Contractor Environmental and Social Management and Monitoring Plan
EAs	Environmental Assessments
EMCA	Environmental Management and Coordination Act, 1999 Revised, 2015
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMMP	Environmental and Social Management and Monitoring Plan
FGD	Focused Group Discussion
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GPS	Global Positioning System
HIV	Human Immunodeficiency Virus
KCSAP	Kenya Climate Smart Agriculture Project
Km	Kilometers
Km ²	Square Kilometers
Ksh	Kenya Shillings
M	Meters
M	Million
m ³	Cubic Meter
mm	Millimeter
MEA	Multilateral Environmental Agreements
MOALF	Ministry of Agriculture, Livestock and Fisheries
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
OPs	Operational Policies
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
SHG	Self-Help Group
SPR	Summary Project Report
STDs	Sexually Transmitted Diseases
UG	Underground

UNFCCC

United Nations Framework Convention on Climate Change

WRA

Water Resources Authority

EXECUTIVE SUMMARY

The proposed Rehabilitation of Nyadong' Water Pan in North Sakwa Ward, Bondo Sub-County is an initiative of Nyadong' community. The main objective of the project is to increase the supply of water for supplemental irrigation for the Nyadong' community through the rehabilitation of the Water Pan. This contribute to the Kenya Climate Smart Agriculture Project (KCSAP) project development objectives of increasing productivity and building resilience to climate change risk as well as reduction of greenhouse gas emissions. The main component of the project is rehabilitation of the water pan of capacity 43,000 cubic meters, fencing and construction of auxiliary structure including cattle drinking trough, community watering points and sanitary facilities (toilets and bathrooms). The project is supported by the County Government of Siaya and the National Government under the KCSAP project with funding from the World Bank. The project is estimated to cost **Kshs 29,872,168**.

The Environmental and Social Assessment, Summery Project Report was based on the recommendation of the County Director of Environment(CDE), Siaya County following an environmental and social safeguards screening report. This ESIA-SPR was carried out in line with EMCA, 1999 and the Environment Impact Assessment and Audit Regulations, 2003 and the World Bank Environment and social safeguards guidelines OP 4.01. The assessment considered all the relevant legal, policy and institutional framework, key among them; the World Bank Environment and Social Safeguards Policies, the existing environmental regulatory framework EMCA Cap 387 and the Environmental (Impact Assessment and Audit) Regulations of June 2003, Occupational Health and Safety Act (2007), the Water Act (2016), wastes disposal regulation of 2006, environmental standards, and sustainable use of natural resources principles. Other relevant legislations to this ESIA that were considered include the public health, physical planning, land planning Acts and gender promotion, HIV/AIDS prevention and control Act, and sexual offences Act.

The scope of the assessment covered impacts directly or indirectly the construction, operation and the decommissioning phase of the project. The approach and methodology comprised of environmental screening, scoping and data collection through literature review, physical investigation of the site and the surrounding areas, public consultation, photography as well as discussions with the proponent. The impacts identification, analysis and reporting of findings was done to enable the relevant approving authorities make an informed decision.

Public participation exercise took place at Nyadong' village on 29th October, 2021 where 120 participants (75 female and 45 male) participated in the exercise. A total of 15 questionnaires were administered to randomly selected participants

There are a number of positive impacts justifying why the project should be developed in the area alongside likely negative impacts. The positive impacts include improved livelihoods, employment creation, and food security among others. It is anticipated that the project will benefit approximately 1,500 households residing around the pan catchment area. The households keep livestock and undertake crop farming

Among the concerns raised during public consultation were: Solid waste, management, it was proposing that there will be designated waste collection facilities, waste segregation, sensitization of workers and community on waste management practices and ensure recycling of recyclable wastes such as paper, metals, and plastic. To mitigate public and Occupational health and safety the proponent will provide suitable equipment during construction to avoid muscular strains, ensure water is treated and safe for workers and community, the pan area will be fenced to reduce risk both human and livestock drowning. To mitigate contamination of water, the proponent will facilitate training on safe water use, provision of water purifying tablets. All water collection points will be constructed outside the pan area. The proponent will ensure that all COVID 19 prevention measures are enforced e.g. keeping social distance, wearing masks rightly, sanitizing and washing of hands regularly. The social issues and concerns raised were on Gender based violence (GBV), employment by the contractor and design issues such as the number of toilets and maintenance of the project. The project coordination unit and the contractor will in collaboration with the local leadership undertake community awareness on GBV and put in place grievance redress mechanisms (GRM) for tracking and resolving any emerging issues during the Project implementation.

A Comprehensive Environmental Social Management and Monitoring Plan has been developed in this report to assist the proponent in mitigating and managing environmental and social impacts associated with the life cycle of the project. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the ESM&MP. As such, the ESM&MP should be subjected to periodic review for improvement purposes. The cost of implementing the ESMMP is Ksh. 260,000 during construction phase and at least Ksh. 265,000 per year during operation phase and Kshs 120,000 during decommissioning phase of the project.

Based on the assessment, the positive impact outweighs the negative impacts raised. Mitigation measures for the negative impacts have been provided in form of a comprehensive ESMMP. The experts recommend approval by the National Environmental Management Authority (NEMA) subject to full implementation of the ESMMP and annual Environmental Audits. The approved ESMMP should be shared with the selected contractor and the proponent for implementation. The proponent and the CESSCO in consultation with other relevant stakeholders and institution should monitor and report on the implementation of the ESMMP to ensure compliance.

1 INTRODUCTION

1.1 Background information

The proposed Rehabilitation of Nyadong' Water Pan in North Sakwa Ward, Bondo Sub-County at GPS Latitude -0.093283, longitude 34.33465 is a community project spearheaded by the Nyadong' community water pan development committee on behalf of Nyadong' community. According to local sources the pan was first constructed in 1950's and has since been a source of domestic and livestock water for over five decades. Besides, the pan has in the past, before its collapse in 2018, benefitted irrigators in small-holder horticulture in adjacent farms. This water-pan is designed to receive flood flows from a water canal. The canal eventually forms a stream which flows into Lake Victoria. The project is anticipated that upon completion the pan will serve 3,900 people (2,100 Females, 1,700 Males), livestock and adjacent agricultural lands.

Evidently, silt has taken toll of the pan rendering it shallow and risk to livestock and users who have to wade through the muddy surface to access the waters. In the past community have attempted to salvage the pan through manual desilting, however, this has contributed little in resuscitating the pan to its potential. It was also observed that water lilies amongst other aquatic vegetation, have invaded the pan surface adversely affecting water access. Another issue of concern was the absence of a perimeter fence. The pan sits in an open field easily accessible by persons and animals from all sides. Animals particularly contribute to destruction of the pans embankment and water contamination when drinking at the same points where humans draw water. In addition, no latrines or ablution block existed within the vicinity thus potential for contamination of the water reservoir. The main objective of the project is to increase the supply of water for supplemental irrigation and other domestic uses. The specific objective include reduction of surface water run off through harvesting of excess rain water, catchment protection through tree planting and agroforestry practices, food security, reduction of the time and distance taken by community members fetching for water for domestic use and to enhance food security and sustainable land management. The main component of the project includes a water pan of capacity 16,000 cubic meters, catchment protection, construction of auxiliary facilities (community watering points, cattle drinking trough and sanitary facilities) and fencing. The project is estimated to cost **Kshs 29,872,168**.

1.2 Project justification

The southern part of the County (Bondo and Rarieda) have less than one water point per 2.5km². The main project is in Nyadong village and the surrounds have had unreliable water supply and depends on the proposed pan for survival. Since 2018 when the banks of the water pan broke off, the community has been experiencing challenges of unreliable or lack of water for both human, livestock use and crop production. Due to inability to harvest and harness water, the run off from catchment areas in flooding of the surrounding farms during heavy rains. Lack of water nearby means people (including women) trek long distances about 5 to 6 kms in search of water. They also spend long hours at the water collection points where water is available. This has resulted in negative impact on the number of hours dedicated to productive farming activities. If the trend continues, it will eventually lead to poverty and increased cases of vulnerability of community members

1.3 Justification for the ESIA-Summery Project Report

The Kenya government policy on projects, programs or activities such as the proposed rehabilitation and construction of water pan sub-project requires that an Environmental and Social Impact Assessment (ESIA) be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning of the project. The commissioning of this ESIA was informed by the recommendation of the County Director Environment (CDE) Siaya County, based on the screening report. The recommendation was in line with NEMA Public Notice on ESIA and Legal Notice No. 31 which identifies the proposed project as Low risk, thus requiring only SPR. Besides, the ESIA was prepared as per the provisions of World Bank Operational Policy 4.01, and with other relevant laws and regulations of the Government of Kenya.

1.4 Objectives of the ESIA- SPR

The principal objective is to highlight the possible positive and negative environmental and social impacts expected during the construction operation and decommissioning of the proposed project, with the aim of proposing the possible mitigation measures to the negative impacts. This is in line with ensuring that such a development does not negatively impact the environment in terms of social, health, economic and physical (soil, water, plant and animals) state of the area hence ensure sustainable development

1.5 ESIA Approach and methodology

1.5.1 Environmental Screening and scoping

The Consultant first undertook environmental screening and scoping to avoid unnecessary data. The screening process revealed that anticipated social issues would be minimal given that there are similar projects at the project site.

The proposed project was found to be under World Bank Category B classification since the project impacts will be site specific, few if any of them are irreversible; and in most cases adverse effects will be limited (some minor including dust, noise and health and safety impacts during construction and operational phases) and mitigation measures can be designed. Such impacts have been clearly identified both at screening stage and in this SPR report with comprehensive mitigation measures being fully designed and described in ESM&MP.

1.5.2 Desktop study

Desktop study included documents review on the nature of the proposed activities, project documents including designs, policy and legislative framework as well as the environmental setting of the area among others. Key documents reviewed included the following: Kenya policies, strategies and guidelines; National and County Laws and regulations; applicable Multilateral Environmental Agreements (MEAs) and World Bank policies safeguards.

1.5.3 Physical inspection of the site and surrounding

Physical inspection of the proposed site which included field investigation at site and surrounding areas was done on 25rd and 29th October, 2021. The field investigations were

meant for physical inspections of the site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts from the project.

1.5.4 Public Participation

Public participation via the use of public meetings & questionnaires, key stakeholder and informant interviews were carried out during the exercise. A public meeting involving project beneficiaries was held on 26 October, 2021 at Nyandong village observing Covid-19 protocols especially limiting the number of participants where 120 beneficiaries attended the meeting. These were drawn from across the ward area ensuring gender equity from CIGs, VMGs and special groups like women groups as representatives of the beneficiaries to the project. To ensure adequate public participation in the ESIA process, at least 15 questionnaires were administered. The information gathered was subsequently synthesized and incorporated into the ESIA summary project report. This was done in order to incorporate the concerns and views of all persons and individuals in the project neighbourhood.

1.6 Data Analysis and Documentation

The Environmental Impacts Assessment report was compiled from the findings in accordance with the EIA guidelines issued by NEMA for Summary Project Report. The Consultant ensured constant briefing of the proponent during the exercise.

The exercise culminated with the production and documentation of this summary project report which will be submitted to NEMA for review and approval.

1.7 Report Structure

The report structure is organized in 9 chapters. Chapter 1 covers the general introduction of the project and its relation to the KCSAP project. In chapter 2, a description of the nature of the project is given covering what the project entails. Chapter 3 describes the location of the project and its surrounding. Public participation and stakeholder engagement description and methods used to reach them is described in chapter 4. A description of potential impacts and mitigation measures foreseen in the project is provided in chapter 5. Chapter 6 gives a table that describes the Environmental and Social Management & Monitoring Plan (ESM&MP) that will be implemented by the project. Chapter 7 sums up the conclusion and recommendations for the whole assessment. References and Annexes are given in chapter 8 and 9 respectively.

2 NATURE OF THE PROJECT

2.1 Introduction

This chapter gives details of the project design. It highlights the project design and materials supported by design and plan drawn to scale and signed by an engineer. Additionally, it provides an overview of project activities during construction, operation and decommissioning phases. Included is a proof of land ownership and a description of any existing environmentally sensitive areas and description of the project area

2.2 Design Concept and Material

The siting, design concept and criteria for were developed in accordance with the general guidelines and standards used in the design of structures/pans in Kenya and are in line with international standards for best practice by the County Government of Siaya, through the Kenya Climate Smart Agriculture Project (KCSAP). An approved project design has been attached to this report (*Appendix iv*).

2.2.1 Components of the water pan

The project entail, Pan area, Spillway channel, Silt trap basin, Community watering point, Concrete tower platform, Solar pumping mechanism, Livestock watering troughs, VIP Latrines with bathrooms, Solar panels, Catchment conservation measures

- (a) **Topography of the pan:** The average slope of the site is 0.5%, towards one direction to the pan area and downstream side of the pan.
- (b) **Soils:** The soil is predominantly black cotton soil. Soil test pits should be dug using augur randomly at the bed to test top and subsoil layers. This soil type should be able to hold water sufficiently. In case lower layers turn porous then the top soil should be used to line the pan bottom
- (c) **Hydrology:** The main source of water in the project area is from the surface runoff. The catchment is vast and covered with shrubs and some trees and was approximated to be 0.8km². There is also road catchment. Few of the adjacent farms are under cultivation.
- (d) **Human Population projection:** The following relationship will be used for population projection.

$$P_n = P_p (1 + r)^n$$

Where P_n = Population at n years
 P_p = Present Population
 r = Population growth rate
 n = Number of years.

The population figures used in calculating the water demand are based on *Kenya Population and Housing Census 2019*. As per 2019 population census, the growth rate for Bondo Sub county was 2.6% per annum. Therefore, the 2.6% rate will be used in projecting the population.

Number of households	= 1516
Average number of persons per household	= 4
Total number of persons	= 6064
School going children (42%)	= 2546

Adults	58%	= 3518
Percentage of Households with Livestock		= 43%
		=652 H/Holds
Average number of cattle +donkeys per household		= 3
Total number of cattle + donkeys		= 1956
Average number of shoats per household		= 4
Total number of shoats		= 2608

The following periods will be considered for designing purposes:

Present period – year 2021

Initial period – year 2025

Future period – year 2035

Ultimate period – year 2045

The period of water demand will be considered based on human, livestock population projection and water demand for both domestic and livestock use as indicated below in Table 2-1, Table 2-2 and Table 2-3 respectively

Table 2-1 Human Population Projection

	2019	Present 2021	Initial 2025	Future 2035	Ultimate 2045
Primary school Pupils	2546	2612	3291	4147	5225
Adults	3518	3609	4548	5730	7220

Table 2-2 Livestock Population Projection

Type	2019	Present 2021	Initial 2025	Future 2035	Ultimate 2045
Cattle and donkeys	1956	2465	3105	3913	4930
goats /sheep	2608	3372	4248	5352	6744

2.2.2 Water demand analysis

Table 2-3 Water Demand m³ /day

Category	Rate	2019	Present 2021	Initial 2025	Future 2035	Ultimate 2045
Primary school	5L/h/day	12.73	13	17	21	26
People	15L/h/day	52.77	54	68	86	108
Cattle	20L/h/day	29.34	30	37	48	60
Shoats	5L/h/day	13.00	13.33	17	21	27
Total						221

With ultimate water demand of 221m³/day this translates to 221m³/day
*30days*5months=33,150m³ for the dry period.

- Evaporation of the area is 5mm/day and the longest dry period experienced has been for 5months information obtained from locals, this totals to a loss of 5mm/day*5months*30days = 750mm using surface area of the pan at full water level is $8000\text{m}^2 * 0.75\text{m} = 6000\text{m}^3$ as evaporation loss
- Dead storage is not very significant in water pans but take 10% of pan capacity i.e. 3315m^3

Total water demand is 42465m^3 . There is need to design for $43,000\text{m}^3$.

2.2.3 Run off Estimation

The catchment for this site has approximate area of 0.9km^2 from Google earth. Surface run-off was calculated using the rational formula method given below: -

$$Q = \frac{K_r i A}{3.6}$$

Where Q = Rate of run-off (m^3/s)
 I = intensity of rainfall (mm/hr)
 A = catchment area (0.9km^2)
 K_r = dimensionless constant

This formula is used hand in hand with Richards' method for estimating flood flows which is suited for Kenyan conditions and is given below

$$\frac{T_c^3}{T_c + 1} = \frac{CL^2}{K_r R s f(A)}$$

Where: T_c =time of concentration in hours

L =the longest path of the catchment in km

C =a coefficient, function (K_r, R)

K_r =run off factor

R =rainfall coefficient $R = ((t+1)/t).F$

F =total rainfall in mm for the selected storm duration

t =selected storm duration in hours (12 hours is adopted)

s =the average slope of the catchment

$F(A)$ =ratio of average (I) to the maximum rainfall intensity (I) over the catchment area,

A = the area of the catchment in km^2

Once T_c has been found, the estimated average rainfall intensity can therefore be obtained using the formulas below-

$$I = \frac{R}{T_c + 1} \quad (\text{mm/hr})$$

$$I = I. f(A) \quad (\text{mm/hr})$$

The runoff factor is calibrated in Table 2-4 below

Table 2-4 Runoff factor

Catchment soil type	Kr
Rocky and impermeable	0.80 to 1.00
Slightly permeable, bare	0.60 to 0.80
Slightly permeable, partly cultivated or covered with vegetation	0.40 to 0.60
Cultivated, absorbent soil	0.30 to 0.40
Sandy bare soil	0.24 to 0.30
Heavy forest	0.10 to 0.24

The following values were used for the calculation; (C = f (Kr. R) and f (A) = I/I obtained from Richards' method graphs and Kenyan Maps for **fifty year** 12-hour Rainfall intensity (mm/hr))

$$F=11 \times 12=132 \text{ mm}$$

$$I = 11 \text{ mm/hr from Kenyan maps}$$

12hrs storm duration

$$R = ((t+1)/t) \times F$$

$$= ((12+1)/12) \times 132$$

$$= 143$$

$$S = 0.5\% \text{ (from topographical map- Lake Basin Development Authority)}$$

$$L = 1.5 \text{ km}$$

$$Kr = 0.5 \text{ (from table 4)}$$

$$Kr. R = 0.5 \times 143$$

$$= 71.5$$

$$C = 0.124 \text{ (Richards method graph in Dam design manual figure 5.14)}$$

$$F(A) = I/I = 0.740 \text{ (from figure 5.15 Richards method graph in Dam design manual)}$$

$$\frac{T_c^3}{T_c + 1} = \frac{CL^2}{K_r R f(A)}$$

$$\frac{T_c^3}{T_c + 1} = \frac{0.124 \times 1.5^2}{0.5 \times 143 \times 0.005 \times 0.5} = 1.56$$

$$T_c^3 = 1.56T_c + 1.56$$

$$T_c = 1.60$$

$$I = \frac{R}{T_c + 1} \text{ mm/hr}$$

$$I = \frac{143}{1.6 + 1} = 55$$

$$i = F(A).I = 0.74 \times 55 = 40.7$$

Now peak runoff is given by;

$$Q = \frac{0.5 \times 40.7 \times 0.9}{3.6} = 5.1 \text{ m}^3/\text{s}$$

2.3.4 Sediment yield

Table 2-5 Indicative sediment yield from *Kenya Belgium Water Development Programme guidelines manual for small dams in Kenya*

Table 2-5 Sediment yield

Erosion rate	Sediment yield (m ³ /km ² /yr)
Low	500
Moderate	1000
Heavy	1500

The catchment area terrain is fairly covered with vegetation thus a low sediment yield of 500m³ per km per year may be taken

Given the catchment area = 0.9 km²

Sediment yield = 0.9km² X 500 (Due to gentle slopes in the area, soils available, and vegetation type)
= 450 m³/year

Assuming 75% of this sediment is trapped

Volume of silt trap (volume of silt trap) = 0.75 X 450m³
= **337.5m³/year**

2.3 Proposed Project Activities

The activities associated with the proposed are planning which covers: designs, topographical surveys to determine the capacity of the pan. This is followed by construction and operation activities. The activities are detailed in the sub sections.

2.3.1 Planning Phase Activities

The main activities considered during this phase are: community mobilization, tendering services as required by procurement regulations, site hand over, hand over of drawing and building plans and site layout.

2.3.2 Construction Phase Activities

Construction activities will include the following; -

- ✓ Excavation of top soil, laying of foundation and building works
- ✓ Procurement of construction materials from approved dealers
- ✓ Storage of the construction materials
- ✓ Transportation of construction materials and disposal of the resulting construction wastes/debris using heavy and light machinery
- ✓ Disposal of debris and excavated materials on sites approved by the local council engineer
- ✓ Electrical and civil works including sewer and water reticulation
- ✓ Landscaping works on completion of the proposed development

✓ Completion of the development and occupation

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

2.3.3 Operation Phase Activities

On project completion the facilities would be utilized for the intended purpose. The project operational activities will include: putting appropriate conservations measures around by planting grass along the embankments and trees species that do not extract a lot of water from the ground the pan management committee will work closely with Kenya Forestry services, Placing water collection points atleast 5meters away from the protected pan, Running a solar powered water drawing pump such that water is drawn outside the pan to avoid contamination. Provision of water treatment tablets to purify water that will be used for domestic purposes and whwre possible installation of fish in the pan to harvest mosquito larvae and provision of mosquito nets

2.3.4 Decommissioning Phase Activities

Decommissioning of the pan will become necessaryif or when the project goals change, when the need arises, climatic conditions or change of government policy as regards the land use. Once this occurs, the affected structures will be demolished. Non-reusable materials will be sold to licensed scrap metal dealers. The closure of the project will involve stopping all activities and demolishing the pan structure and associated infrastructure. The affected land shall be, landscaped and replanted with suitable indigenous grass and trees.

2.4 Project Cost and Implementation Schedule

Based on the technical design's bills of quantity (BOQ) for the project implementation, the project is estimated to cost **Kenya Shillings 29,872,168**

3 LOCATION OF THE PROJECT

3.1 Introduction

The chapter presents the description of the location of the project, land ownership, baseline of the project, supportive environmental infrastructure and conformity to land use plan.

3.2 Proof of Land Ownership

Nyadong water pan is on a public land reserved for community use. The title of the land is Sheet Number 30 of North Sakwa/ Ajigo/ 272. Attached Annex IV the surrounding farms are privately owned and the owners have shown willingness to engage in horticultural production and commercial tree nursery establishment using water from the water pan.

3.3 Project Location

The project is located in Rabonde Village, North Sakwa Ward, Bondo Sub-County, Siaya County. The project site lies within Latitude -0.093283, long.34.33465 1319m a.s.l. The project will also benefit the following villages: Manyatta, Gango, Gobei, Lwala, Bar Chando and Ajigo Market.

A geographical satellite image of the project location showing proposed site of the pan is presented in figure 3-1 below. The area lies to the West of Ajigo Centre and can be accessed using Kisian Bondo Usenge road.

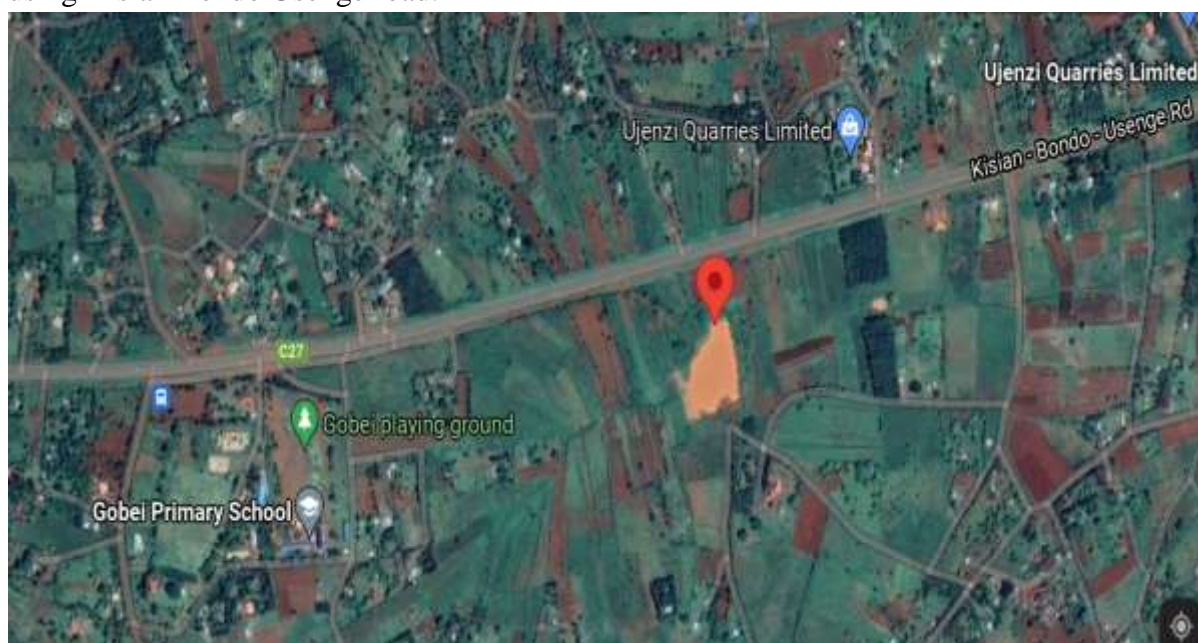


Figure 3-1 Location of project site

3.4 Environmental Management Supportive Infrastructure

The proposed project site requisite environmental supportive infrastructure. There exists an earth access road which is about 150 meters from the main Kisian Bondo Usenge tarmac road that can be used to access the site. Within the area, there is an unreliable pipe water supply system from Siaya water supply Company. The project site is connected to power from the grid.

3.5 Physiographic and Natural Conditions

3.5.1 Physical & Topographic Features

The project area is within a basin surrounded by relatively plain terrain. Sizeable runoffs are often received during rainy season within this project location though vulnerability to soil erosion is moderate, disturbance of the soils during construction phase can increase soil erosion risks.

3.5.2 Geology and Soils

The soils in the project area are predominantly heavy cotton soils that are poorly drained. The soils favour water retention and are thus suitable for water pan. Due to their poor workability during rainy season, the proponent will endeavour to undertake the construction during relatively dry season so as to mitigate on energy losses and emissions.

3.5.3 Climatic Conditions

(a) Temperatures

The climate in Bondo is warm and overcast. Over the course of the year, the temperature typically varies from 62°F to 86°F and is rarely below 60°F or above 92°F. Daily high temperatures are around 86°F, rarely falling below 80°F or exceeding 92°F. The highest daily average high temperature is 86°F on February 17. Daily low temperatures are around 64°F, rarely falling below 61°F or exceeding 68°F (<https://weatherspark.com/m/98120/2/Average-Weather-in-February-in-Bondo-Kenya#Sections-ColorTemperature>)

(b) Precipitation

The chance of wet days in Bondo varies very significantly throughout the year. The wetter season lasts 8.0 months, from March 20 to November 21, with a greater than 50% chance of a given day being a wet day. The chance of a wet day peaks at 79% on May 3. The drier season lasts 4.0 months, from November 21 to March 20. The smallest chance of a wet day is 21% on February 11. Bondo experiences extreme seasonal variation in monthly rainfall. Rain falls throughout the year in Bondo. The most rain falls during the 31 days centered around April 24, with an average total accumulation of 9.2 inches. The least rain falls around February 3, with an average total accumulation of 1.8 inches. (<https://weatherspark.com/y/98120/Average-Weather-in-Bondo-Kenya-Year-Round#Sections-Temperature>)

(c) Humidity

Bondo experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 8.4 months, from October 3 to June 15, during which time the comfort level is muggy, oppressive, or miserable at least 21% of the time. The muggiest day of the year is May 2, with muggy conditions 62% of the time. The least muggy day of the year is July 18,

with muggy conditions 7% of the time (<https://weatherspark.com/y/98120/Average-Weather-in-Bondo-Kenya-Year-Round#Sections-Temperature>)

(d) Climate Change issues

The overflow from the pan in rainy seasons in combination with poor drainage does adversely affect surrounding farms. On the other hand, during the relatively short rains the water pan becomes very dry making it difficult to access clean and safe water for both domestic and livestock use. So far small scale irrigation by use of the pan waters has since stopped. Both flood and drought episodes do adversely affect the surrounding community interfering with their survival, income sources, nutrition and property amongst others.

3.5.4 Land and Land use/Zonation

Traditionally farmers within the project area have practiced mixed farming as mainstay economic activity. Domestic animals are largely kept for substance with few community members increasingly engaging in semi commercially production. The most common livestock include; cattle, chicken, goat and sheep, which are kept for; Milk & Beef, Poultry Meat & Eggs, Chevon and Mutton respectively. According to livestock productivity data 2014, Bondo Sub-County where the project site is located, substantially contributed to livestock production within Siaya County. Figure

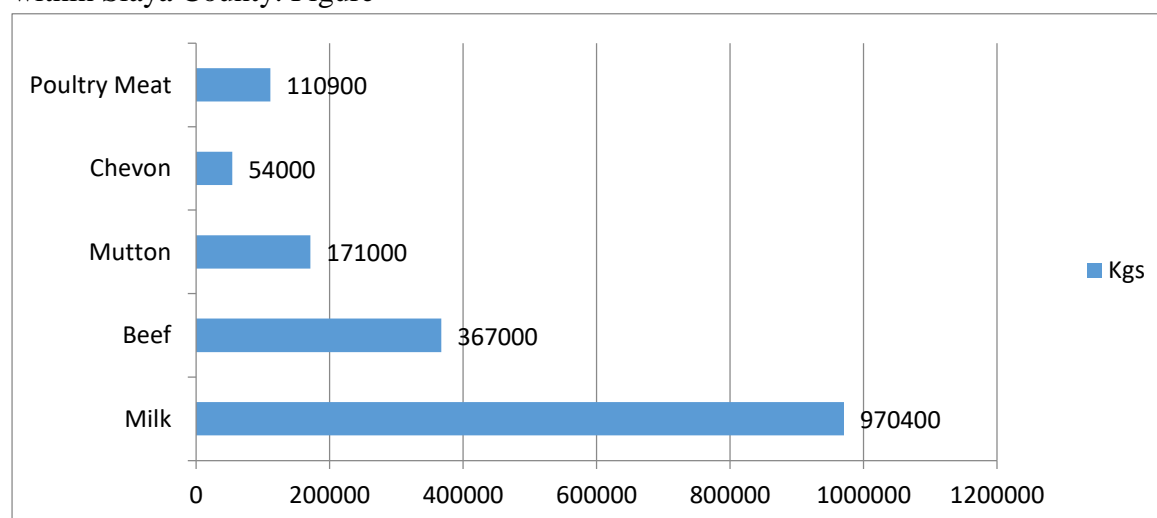


Figure 3-2 Livestock products production (kgs)

3.5.5 Crop Farming

On the other hand, crop farming is as well a common means of production within the project area. This is largely rainfed where farmers do cultivate the following crops; cassava, cow-pea crops, green-grams, maize and sorghum amongst others. On the other hand, Kales and tomatoes are produced through irrigation in small holder units. Farmers use water pumps in flooding their farms during the production process which is evidently an inefficient means of water use. The produce harvested from Rabonde village where the project lies do contribute to crop production in Siaya. Table 2.3 indicate crop production in Siaya in the year 2013 and 2014.

Table 3-1 Production by Type and Quantity, 2013 – 2014

	Crops	Tons	
		2013	2014
1	Maize (tons)	129,818	1,372,914
2	Beans (tons)	20,262	348,283
3	Sorghum (tons)	22,587	128,726
4	Cassava (tons)	87,606	28,700
5	Green Grams (tons)	79	4,105
6	Tomatoes (crates)	6,295	7,118
7	Kales (bags)	1,310	1,965
8	Cowpea leaves (bags)	1,200	4,763

Source, KNBS 2015

Both floods and drought episodes have affected these means of production in the past. Finally, it was also observed that a section of farmers' area steadily embracing horticulture vegetable production as opposed to the traditional system of production.

Small scale trade is also a common means of production within the project area. Different household consumer's goods are sold within the main centre located approximately 500 metres from the project site.

3.5.6 Flora and Fauna

The area is largely settled, some of the most common trees in the area include *Markhamia lutea*, *Albisia corarria* (ober) *Eucalyptus camaldulensis* (kaladari), *Grivelliarobusta* (bole) and *Jacaranda mimosifolia*(jacaranda). The tress are mainly used for timber construction and firewood. Grass and shrubs thrive during the rainy season, and quickly dry up during the dry season. Some of the trees are deciduous as an adaptive mechanism to the dry conditions. The most common fauna found in the project area include birds, insects, rodent and snake's others are majorly domestic animals consisting of cattle, goat, sheep and poultry

3.5.7 Environmentally sensitive areas

There are no ecologically sensitive areas/sites such as wetlands, rivers, forests, or wildlife migratory corridors which might be adversely affected by the project activities.

3.6 Socio-economic Environment

3.6.1 Population

North Sawka Ward where the project lies is densely populated as depicted in Table 3.2. This phenomenon put pressure on need to basic services such as supply of water for both household and domestic use.

Table 3-2 Population Characteristics by Ward and Location of the North Sakwa Ward,

		Total	Male	Female	Household Size	Land Area	Density per Sq. km
Ward	North Sakwa	11128	5278	5830	2664	28.2	395

	Bar Chando	5294	2497	2797	1266	12.3	431
Location	Abom	5834	2781	3053	1398	15.9	367

Source: KNBS, 2019

3.6.2 Infrastructure and Access, Road, Rail Network, Ports and Airports, Airstrips.

The area is connected to electricity. The main water Supplier in the project area is Siaya Bondo water supply (SIBO), a company owned by the county government of Siaya to offer water supply services. The company is charged with the responsibility of supplying safe water for domestic use by residents of the area. In contrast, SIBO face a myriad of challenges and have been ineffective in delivering reliable piped water to resident. A discussion with residents revealed that the water supply is unreliable.

On the other hand, sections of the community rely on Nyadong' Water Pan for both domestic and livestock. The road network is relatively well-developed and consists of all-weather murram road connecting the project site with tarmac road about 100 metres away next to Kisian Bondo Usenge road.

3.6.3 Housing

In Bondo sub-County where the project area is situated, 49% of the households have earthen floor, while 44.8% use concrete/cement floor (KNBS 2019). At the project site and its surrounding, the dominant roofing material is iron sheets. The dominant wall type comprises covered adobe at 29%, bricks at 25% and uncovered at 15%.

3.6.4 Health and Environment

Residence of the area primary access health services from Gobei Health Centre. This is government health facility majorly dealing with outpatients. Common water-borne diseases are treated in this health facility with extreme cases referred to Bondo Sub County Referral facilities. Inadequate water has in the past contributed to an increase in cases of some of the water related diseases at community levels. These cases are reported in the KNBS 2015 report "County Statistical Abstract Siaya County". Conversely, extract from the named report specific Bondo Sub County are presented in figure 3.3.

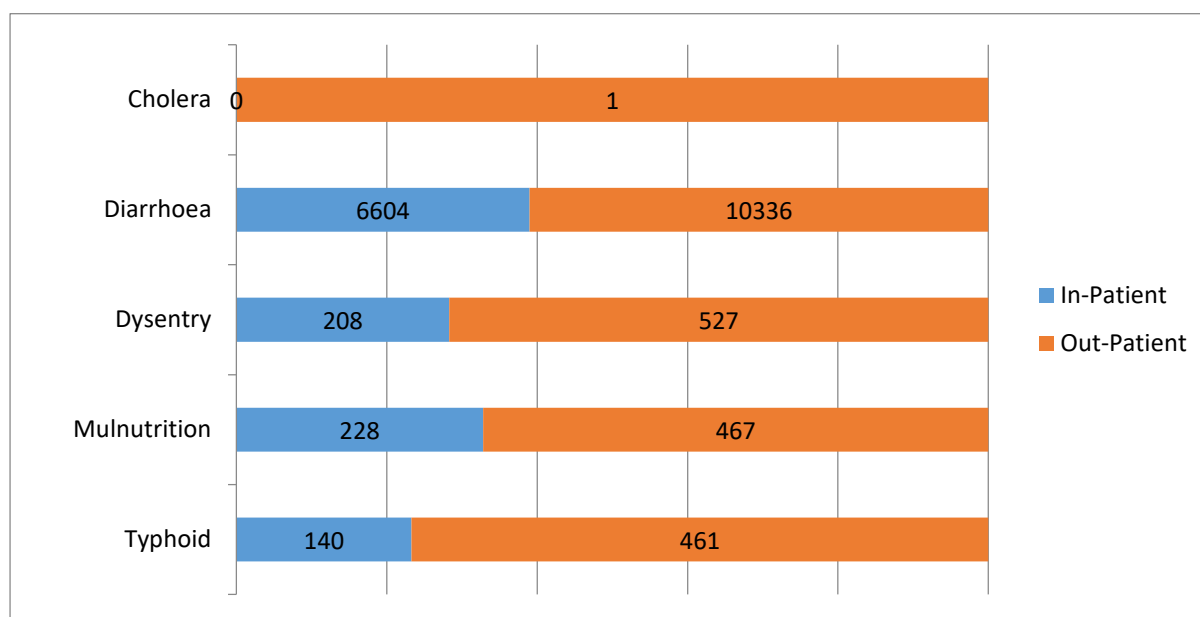


Figure 3-3 Out & In patient Morbidity for Patients below 5 Years of Age, Bondo Sub-County, Siaya
Source KNBS 2015

4 PUBLIC PARTICIPATION AND STAKEHOLDER CONSULTATIONS

4.1 Introduction

The Kenyan government has enshrined the need for human societies' involvement in project development in the Constitution of Kenya 2010. This has been set out in the EMCA, 1999 and Environmental (Impact and Audit) Regulations, 2003 and subsequent amendments (2015 & 2019). The proposed project has incorporated public consultations in order to understand the local impacts, needs and wishes of the community and eventually incorporate them into the final designs and operations of the project.

4.2 Objectives

The key objectives of the consultation and public participation for proposed rehabilitation of the Nyadong water pan was to:

- (a) Disseminate and inform the public and stakeholders about the project with Special reference to its key components and description
- (b) Create awareness among the public on the need for the ESIA for the proposed project
- (c) Gather comments, suggestions and concerns of the interested and affected parties
- (d) Incorporate the information collected in the ESIA
- (e) Build community consensus and acceptance of the proposed project.

4.3 Methodology

4.3.1 Stakeholder mapping

Public participation for the proposed project was conducted through the public consultative meetings and admission of questionnaires to allow for systematic understanding and interaction of the project beneficiaries, neighbors, local community members/surrounding enterprises and any other would be affected/interested parties. Prior to the public participation and stakeholder consultation, a stakeholder mapping was carried out to identify key stakeholders to be invited for the meetings. Stakeholders that were directly affected by the proposed project and key government institutions (Veterinary officer, Ward Agriculture Officer, Irrigation Engineer, Water officer), Project committee members, as well representatives of Pan Management Committee drawn from the nearby sub-locations (Asembo, Bondo and Rarieda) were invited. Due to the ongoing Covid-19 pandemic, the number of stakeholders invited to attend the public consultations was limited to 30 per session in order to comply with Ministry of Health Guidelines on the Covid-19 pandemic. The total number of participants was 120.

4.3.2 Public consultation questionnaires

ESIA questionnaires were administered, to gather information from the stakeholders and the members of the public. This was done using structured questionnaires to assess the environmental and socio-economic views of the respondents. A total of 15 questionnaires were administered in the project area. Sample filled questionnaires administered in the project area are appended to this report (**Appendix i**)

4.3.3 Public consultation meetings

In seeking the views of the key stakeholders, and any other would be affected/interested parties the consultant organized a consultative meeting targeting the pan sub-project members/beneficiaries, the administration, the proponent key staff at County and sub-county level and other key staff was held on 29th October 2021. The meeting was used to publicize the proposed rehabilitation of water pan sub-project and the anticipated effects and benefits.

The table 4-1 below presents a summary of the participants of the public consultative meetings. The list of participants is appended to this report (*Appendix iii*).

Table 4-1: Summary of public consultative meeting

S/No.	Venue	Number of Participants			Date of Meeting
		Male	Female	Total	
1	Site of the pan	45	75	120	26 th October 2021

Presentation of the project scope was outlined, after which an open discussion forum followed during which all pertinent issues were raised and agreed upon with all stakeholders. During the public participation meeting, stakeholders had a chance to interact with the proponent represented by the ESIA expert and ministry of agriculture officials at county level. The findings are incorporated into this report and captures the issues, suggestions, concerns and recommendations from public meetings on site. The meetings were well attendend and the attendees participated actively during the meetings (Plate 4-1 and 4-2).



Plate 4-1: Public meeting attendants



Plate 4-2: Ongoing public meeting

4.4 Consultation and Disclosure Outputs

The Appendices present the information on the public consultations undertaken under the environmental impact assessment for the proposed water pan sub-project. This information includes selected responses as detailed in the minutes (*Appendix ii*). It was noted that members lauded the project and were eager to see the start of the project. However, there were a few areas that the members sought clarity. A summary of the key concerns raised by the participants is provided in table 4-2 below:

Table 4-2 Stakeholder Consultative meeting key concerns

S/No.	Issues raised by the members	Brief explanation	Response
1.	Employment	During pan construction, preference will be given to the locals with emphasis on the youth During operation phase employment will be generated by sale of water, irrigation and sale of farm produce	The community agreed and promised to provide both skilled and skilled labour
2.	Erosion	Stakeholders residing around the pan catchment sites will be encouraged to plant trees and construct terraces along contours to reduce soil erosion	The community requested for capacity building from the county agriculture office
3.	Mosquitoes/Malaria incidences	The pan will be installed with fish that can eat mosquito larvae The surrounding community members will be provided with mosquito nets	The pan management committee was asked to seek for support from the county government and local institutions to provide mosquito nets
4.	Maintenance and sustainability of the pan	The project management committee will be trained on sustainability and pan management issues a business plan will be put in place	A sustainability strategy to be put in place so that pan maintenance issues can be addressed by a committee which has a funding mechanism
5.	food security and nutrition security especially vegetable produce	The members of the pan will be encouraged to form groups and will be linked to producer organizations so that they can have collective bargaining power when marketing their farm produce	Producer organization that support the various value chains will be linked to the farmers
6.	Availability of clean water	There will be a draw off pipe from the pan where water will be purified and water treatment tablets will be given to the pan users	A water kiosk will be put in place as per the designs, water for livestock, crops and domestic use will be drawn from outside the pan and not directly
7.	Catchment protection	The stakeholders will be encouraged to establish tree nurseries and agro-forestry in their farms along the catchment areas	Communities around the catchment areas to be sensitized and encouraged to grow trees for commercial purposes

4.5 Salient issues

4.5.1 Opinion on Project implementation

It is clear from the questionnaires received back that the proposed water pan sub-project at North sakwa will serve an important role of providing the community with water for livestock and agriculture. All the residents admitted that they were interested in this project more solely for their improved food security and livelihoods in so doing pointed to the benefit that will accrue to them.

4.5.2 Suggestions and comments from public consultations

- Farmer views should be incorporated in the programme. They suggested to have a dedicated committee to be airing farmers concerns.
- Ensure the workers/employees of the proposed project are insured through WIBA for adequate compensation due to injury while at work.
- Jobs opportunities that will arise during the construction of the water pan sub-project and operation phase should be reserved for the residents of the project areas.
- Construction work should strictly observe standards of Occupational Health and Safety including use of appropriate PPE. During operation, need for appropriate PPE such as gloves, gumboots to prevent occupational diseases, injuries and accidents should be emphasized.
- The contractor should have a holding/launching yard for materials and equipment to control environmental pollution.
- The contractor should also strive to use high quality construction materials as detailed in the design
- Educating on HIV aids control and COVID-19 prevention

5 POTENTIAL IMPACTS AND MITIGATION MEASURES

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project. The impacts are presented in-regard to their likelihood of occurrence on the physical, biological, occupational and socio-economic environments.

Table 5-1 Summary of expected impacts, rating and development stage

Impact	Impact rating	Phase
Impacts on public health and safety	Low (negative)	Construction and operation
Soil erosion impacts	Low (negative)	Construction phase
Impacts on air quality	Low (negative)	construction
Waste generation	Low (negative)	Construction and operation
Siltation	Low (negative)	Operation
Socio-economic impacts	High (positive)	Operation
Visual impacts	Low	construction

5.1 Positive Environmental and Social Impacts during construction phase

The anticipated positive impacts include the following: biodiversity conservation, availability of reliable water, improved household incomes, employment creation, enhance market economy, increased revenue generation the county

5.1.1 Positive environmental impacts

5.1.1.1 Erosion Control

Construction of water harvesting structures such as silt traps. Embankment of the pan

5.1.1.2 Biodiversity conservation and enhancement

Landscaping and planting of trees and flowers in the pan compound environments will enhance the aesthetics and community tree planting will enhance biodiversity of the area. The group nursery will provide seedlings to the community and environmental conservation.

5.1.2 Positive social impacts

5.1.2.1 Improved Income levels

The farmers will plant high value horticultural crops under irrigation and sale at the nearest town centre in Bondo Town. Water will be available for livestock and this will enhance milk availability in the households. The cumulative effect would lead to an overall improved food security and livelihood at household level

5.1.2.2 Availability of reliable water for livestock and domestic use

The project will increase reliability water for irrigation throughout the year,

5.1.2.3 Capacity building of farmers

The proposed sub-project has an extensive capacity building component. The success of any farming relies on the proficiency of the farmers' animals on heat and place their requests in good time thus improve in better conception rates and reduce repeat inseminations.

5.1.2.4 Creation of employment opportunities for residents of the project area

The proposed project will provide short term and long-term employment opportunities to the local community. The construction phase will provide short-term opportunities for casual work and semi-skilled labour. During the operational phase, long-term employment opportunities will also be created which will generate income and improve their livelihoods

5.1.2.5 Increased market economy

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

5.1.2.6 Increased revenue generation by the County and National Government

The project will contribute to the county and national government kitty. The contractor will pay Value Added Tax (V.A.T) on purchasing materials for the project. Construction workers will also pay income tax from their earnings while working on the project. The project after completion will allow the county government to collect revenue from sale of farm produce in the local markets and firewood from timber harvested from planted trees

5.1.2.7 Injection of money to the local economy

There will be a short-term increase in economic activity around the project area. The construction labour force will require food and other items that will be bought from the local community. The procurement of laptops to support the database management and mobile phone with geo-tagging capabilities, training venues and materials, procure and construction of central livestock crushes, ear tags and motorbikes will provide opportunities for injection of money to the local economy.

5.2 Negative Environmental and Social Impacts during the Construction Phase and Mitigation Measures

5.2.1 Negative environmental impacts during construction phase

5.2.1.1 Landscape disturbance, erosion and Vegetation loss

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

Mitigation:

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

5.2.1.2 Oil spills/Fuels and Lubricants

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

Mitigation:

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

5.2.1.3 Air quality degradation due to dust and exhaust emissions

Potential air quality degradation will occur as a result of vehicular and equipment emissions/exhaust gases. Additional air quality degradation will occur during painting especially from refurbishment works and construction finishes. Most Paints release VOCs (Volatile Organic Compounds) – chemicals that readily evaporate into the air that could cause indoor air quality problems. Dust generation could also occur during soil stripping for foundation works and vehicular movements on earth roads

Mitigation:

- Evacuate all occupants of the buildings to be refurbished until the refurbishment works are complete.
- Construction workers should be provided with appropriate PPE
- Sprinkle water on uneven project site areas and nearby access roads to site to minimise dust

5.2.1.4 Increased generation of solid wastes

Most of the waste will be generated during the construction waste. This includes papers used in packaging cement and soil this can pose the risk of the site being a breeding for pests, pollution of the physical environment and attraction for scavengers. Temporal storage on site for solid waste such as paper can be done with eventual disposal in compliance with waste regulations. Recycling and reuse strategies can also be achieved.

Mitigation:

- Use of an integrated solid waste management system i.e., the 3 R's: 1. Reduction at source 2. Reuse 3. Recycle where possible.
- Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at site;
- Waste collection bins / receptacles to be provided at the project site
- Contractor to dump unused excavated materials and debris in designated places
- Contractor to re- use excavated soil for the pan wall/embankment

5.2.1.5 Visual impacts and aesthetics

Excavation and refurbishment works will result in changes in the physical appearance of the project site. Volumes of earth will be excavated and stockpiled while construction materials such as sand and ballast will also be stockpiled at the site. Construction waste may also litter the site and the surrounding area and cause visual intrusion. This will be of a low magnitude and will only occur during construction phase.

Mitigation

- Regular site clean-up to prevent littering
- All excavated material should be compacted to minimize soil erosion
- Restrict project activities to the actual project site
- Establishment of a site store for storage of materials, tools and equipment

5.2.2 Negative Social impacts during construction phase

5.2.2.1 Occupational Health and Safety Hazards

During construction the movement of construction materials may result in accidents if good supervision is not provided. Accidental cuts and bruises are common among construction workers as a result of the use of machinery and hand tools, an impact that needs due consideration.

Mitigation:

- Provide appropriate personal protective equipment (PPE).
- Implement a programme of assessment of routine monitoring of worker health.
- Redesign manual processes and rotate work tasks to reduce heavy lifting/repetitive activities, and where possible install mechanical lifting aids.
- Train workers in general safety procedures including first aid and fire safety.
- Use designated routes for machinery and personnel
- Engineer out sharp edges and access to dangerous parts of machinery through a hierarchy of controls (permanently fixed physical barrier, interlocked physical barrier, physical barrier, presence sensing system).
- Ensure that there are provisions for reporting incidents, accidents and dangerous occurrences

5.2.2.2 Labour Influx Effects

During construction the project will attract jobseekers and hawkers with possibility of thieves intruding into the area. This therefore leads to concentration of people in one area drawn from diverse social and cultural backgrounds often resulting to a number of issues as listed below;

- Strain on various resources especially water resources

- Grievances from local community members over job opportunities
- Sexual Exploitation and Abuse
- Unwanted Pregnancies

To mitigate against possible social ills associated with labour influx during construction phase and conflicts thereof, the contractor will adhere to the following mitigation plan;

Mitigation measures to Labour Influxes

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

5.2.2.3 Increased Spread of STD, HIV & AIDS

There is likely increase in incidences of health impacts such as sexually transmitted diseases including HIV & AIDS especially during construction of the project. Possible illicit behaviours such as prostitution may increase in the centre leading to spread of STD, HIV/AIDS due to influx of workers and perceived 'quick money' from the sub-project albeit on a smaller scale.

Mitigation

The following should be implemented to mitigate spread of STD, HIV & AIDS:

- Contractor to develop appropriate awareness content and implement awareness sessions for workers on HIV/AIDS and other STDs. This can be done through the use of educative posters and tool box meetings.
- Ensure an adequate and accessible provision of condoms to workers both male and female.
- Contractors to develop a code of conduct and ensure it's signed by all workers with physical presence on site as well as within the project area.

5.2.2.4 Increased Spread of COVID-19

The construction activities will introduce new workers to the site increasing the risk of contracting and spreading COVID-19 from workers who could be infected with the virus. Due

to the current spread of COVID-19 which has become a pandemic, if not well mitigated this impact may be high.

Mitigation

The project contractor to establish prevention and mitigation measures against COVID-19 and arrangements for dealing with suspected and confirmed COVID-19 cases. The measures should include but not limited to;

- Raise awareness on the need to take COVID-19 vaccine,
- Ensuring social distancing of not less 1.5 meters between employees in all directions
- Hygiene promotion through use of suitable hand sanitizers or handwashing with soap and water
- Strict and proper use of face masks throughout all working hours and public places.
- Implement Ministry of Health guidelines for staff safety and health, including daily temperature checks for everyone in the workplace
- Increase frequency of disinfecting commonly touched surfaces/objects

5.2.2.5 Gender Based Violence(GBV) and Sexual Harassment

This impact is triggered during project construction phase when the contractor fails to comply with the gender inclusivity requirements in hiring of workers and entire project management as per required by Gender Policy 2011 and 2/3 gender rule.

Mitigation

- Ensure clear human resources policy against sexual harassment that is aligned with national law
- Integrate provisions related to sexual harassment in the employee COC
- Ensure appointed human resources personnel to manage reports of sexual harassment according to policy
- The Contractor shall require his employees, sub-contractors, sub-consultants, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse
- The contractor will implement provisions that ensure that gender -based violence at the community level is not triggered by the Project, including:
- Effective and on-going community engagement and consultation, particularly with women and girls;
- Review of specific project components that are known to heighten GBV risk at the community level, e.g., compensation schemes; employment schemes for women; etc.

5.2.2.6 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

- Given that the project will be smaller in nature, it is anticipated that the mitigation will be through management and coordination to include 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.

5.2.2.7 Child Abuse

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

Mitigation

- The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including on SEA...
- All staff must sign, committing themselves towards protecting children, a contract which clearly defines what is and is not acceptable behaviour
- Children under the age of 18 years should not be hired on site as provided by Child Rights Act (Amendment Bill) 2014.
- Wherever possible, ensure that another adult is present when working in the proximity of children.
- Refrain from hiring children for domestic or other labour, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.

5.3 Negative Environmental and Social Impacts during Operational Phase and Mitigation Measures

5.3.1 Negative environmental impacts during operational phase

5.3.1.1 Increased pressure on infrastructure

The proposed project will lead to increased pressure on water source due to increased number of people who will be using these facilities which will directly translate into increase in volume of the relevant parameter

Mitigation measures

- Put appropriate conservation measures around by planting grass along the embankments and trees species that do not extract a lot of water from the ground the proponent will undertake this measures in collaboration with forestry department in the county.
- Water collection points to be at least 5meters away from the protected pan

5.3.1.2 Water quality nitrate pollution by livestock dung and use of fertilizers upstream

Livestock if they access the water from the reservoir may deposit dung and lead to nitrate pollution. Workers may also wash in the pan water and children may start swimming in the pan. Use of fertilizers upstream in catchment areas may also contaminate the water. All these affect the water quality and compromise health of water users. Livestock may also contaminate the water or objects may be thrown into the pond

Mitigation measures

- Livestock should not be allowed to drink water directly from the reservoir at any time.
- By laws should take care of water quality issues associated with livestock and children
- Train on safe use of organic fertilizers that are biodegradable

5.3.1.3 Siltation

This may be caused by soil eroded from the catchment area that is usually bare during dry season. The runoff may transport the dung and debris from the catchment into the reservoir. Poor workmanship or failure to maintain the sedimentation ponds may lead to excessive siltation in the pan.

Mitigation measures

A silt trap will be constructed to reduce the amount of soil that is transported into the pan. Reduced silt levels will prolong the lifespan of the pan. Construction of silt trap will involve clearing of vegetation over a surface area and excavating a depth of 2m. This will create a volume of spoils that would require to be disposed off appropriately. The silt volume expected per year is 1,400m³ and hence adopts a standard silt trap of capacity 20m by 30m by 2m depth.

- Soil conservation should be addressed seriously and silt-trapping facilities maintained.
- By-laws to ensure operation and maintenance.
- Training project group members on maintenance of the facility.
- Use of the recommended materials and skilled labor for technical work.

5.3.1.4 Increased incidences of malaria

Due to mass water body which is stagnant there are high chances of mosquitoes breeding in the water pan hence increased incidences of malaria

Proposed Mitigation

- ☐ Provision of mosquito nets to the people residing around the pan area
- ☐ clearing of bushes around the pan

5.3.2 Negative social impacts during operational phase

5.3.2.1 Leadership issues in management

During operation, the management of the group will be exposed to the group increased income levels. As such, there will be tendency to mismanage funds meant for group advancement/development due to personal interests. This may limit the group growth and risk membership loss.

Mitigation:

- Capacity building to the management committee should be undertaken periodically by KCSAP
- The management of funds should be handled by duly elected finance committee with appropriate gender representation.
- There should be periodic update to the members on the incomes received and the expenditure to enhance transparency and confidence in the committee.

5.3.2.2 Occupational Health and Safety Issues

Health issues are a major concern globally; therefore, hazards associated with diseases must be dealt with. Safety may be compromised when children play around the reservoir. The operation of the facility is likely to result in the following.

- ✓ Increased movement of human leading to congestion on the available paths and walkways which will cause soil erosion in the long run.

- ✓ Accidental falls into the pan.
- ✓ Consumption of water before treatment
- ✓ Breeding of mosquito from the stagnant water.

Mitigation measures

- Construct the facilities as per the recommended plans that include fencing, toilets and water pumping site access steps to the reservoir and paths among others.
- Develop By-laws that are acceptable to all.
- Train the group members on water use efficiency with conservation aspects being integrated.
- Restrict livestock and human movement inside the reservoir by fencing the site.
- Allocate designated water collection points outside the pan

5.3.2.3 Introduction of vector borne diseases

Some of the most common vector borne diseases includes bilharzias, typhoid and dysentery.

Mitigation Measures

- Promote primary health care practices, with the assistance of the Ministry of Health;
- Monitor the presence of disease vectors
- Contribute to strengthening of local health facilities through public enlightenment
- Contribute to public health programmes to eradicate/protect against malaria, schistosomiasis
- Enhance community animal spraying and immunization programmes

5.3.2.4 Water Demand Conflicts

During the dry seasons water volume reduces and members may seek more water for livestock purposes which could lead to conflicts among users of the water pan. Also livestock keepers may want to water their cattle here

5.3.2.5 Mitigation measures

- Schedule should be set for reduced water use during the dry season
- By laws should be followed and enforced.
- Penalties and fines should be introduced

5.3.2.6 Spread of COVID-19

The potential for the spread of any infectious disease like COVID-19 is high. The project operational activities will involve among others artificial insemination clinic and promotion campaigns among the dairy farmers on AI. There is also the risk that the project may experience large numbers of community becoming ill and will need to consider how they will receive treatment, and whether this will impact on local healthcare services

Mitigation

The project management committee will develop SOPs for managing the spread of Covid-19 during project operations. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions; -

- Ensure all County staff are vaccinated against COVID-19 and sensitize farmers to take up the vaccine
- Avoid concentrating of more than 15 persons or workers at one location. Where more than one person is gathered, maintain social distancing of at least 2 meters
- 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 AI clinic venues and meetings and ensure they are used;
- Ensure routine sanitization of shared social facilities and other communal places routinely

5.3.2.7 Gender Based violence and Sexual Harassment

While such cases are difficult to assess, there is likelihood of rape cases during project operations. This impact is triggered during project operation phase when the project management unit fails to comply with the Gender Inclusivity requirements in entire project management team as required by Gender Policy 2011 and 2/3 gender rule.

Mitigation

- Integrate provisions related to sexual harassment in the employee COC in project management committee
- The Project management committee in collaboration with county department of social services will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: effective and on-going community engagement and consultation, particularly with women and girls; review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women
- The project management committee in collaboration with county department of social services shall develop specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc
- The project management committee will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project management unit.

5.3.2.8 Sexual Exploitation and Abuse (SEA)

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

Mitigation

The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). The SEA action plan will include how the project will ensure necessary steps are in place for:

- 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;

5.4 Negative Environmental and Social Impacts during Decommissioning Phase and Mitigation Measures

5.4.1 Negative environmental impacts during decommissioning phase

5.4.1.1 Oil spills/Fuels and Lubricants

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

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

5.4.1.2 Increased generation of solid wastes

Decommissioning activities will generate various solid wastes ranging from debris, wrappings, concrete, human wastes to food wastes etc. Poor handling and disposal of such waste will lead to environmental pollution.

Mitigation:

- Careful dismantling to ensure materials remain as re-usable as possible
- Selling or donating the re-usable or recyclable materials to avoid waste
- Cleaning and proper site rehabilitation by adhering to a NEMA approved Decommissioning plan

5.4.1.3 Loss of livelihood

During project operation there will be income generated from undertaking artificial insemination, sell of improved breeds and milk production. The income is expected to reduce following termination of the AI project.

Mitigation

- The impact is low as it is anticipated and can be mitigated by training farmers on other forms of business and other strategies for continuous improvement of local breeds.

6 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESM&MP)

6.1 Introduction

The project proponent acknowledges that the proposed project activities will have some impacts on the biophysical environment, health and safety, and socio-economic well-being of the crop and livestock farmers and nearby occupants. Thus, the main focus will be on reducing the negative impacts and maximizing the positive impacts associated with the project activities through a programme of continuous improvement. An environmental and social management and monitoring plan has been developed to assist the proponent in mitigating and managing environmental and social impacts associated with the life cycle of the project. It is noteworthy that key factors and processes may change through the life of the project and considerable provisions have been made for dynamism and flexibility of the ESM&MP. As such, the ESM&MP should be subjected to periodic review for improvement purposes.

Tables 6-1 form the core of this ESM&MP for the construction, operational and decommissioning phases of the proposed rehabilitation and expansion of the water pan sub-project. In general, the tables outline the potential environmental, socio-economic, health and safety risks associated with the project and details all the necessary mitigation measures, their financial costs, as well as the persons responsible for their implementation and monitoring. The ESM&MP should be used as checklist in the initial environmental audit of the project.

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

Table 6-1: Environmental and Social Management and Monitoring Plan (ESM&MP)

Potential Impact	Proposed Mitigation Measures	Responsibility	Timeline	Performance Monitoring Indicator	Means of Verifiable	Cost (Ksh)
Construction phase						
Increased exposure to soil erosion	<ul style="list-style-type: none"> • Install gabions upslope to prevent collapse/caving in and stabilise the slope • Ensure the pan site is oriented with the existing contours to minimise soil disturbance and exposure to erosion • Plant trees 	Contractor/ PMU	Continuous during Construction	<ul style="list-style-type: none"> • Length of gabions installed • pan% slope at the project site • Soil loss rate 	Reports Observation Field visits	Contractor cost 20,000
Increased noise and vibration generation	<ul style="list-style-type: none"> • Ensure PPE such as ear muffs are provided to the workers where necessary • Construction works should be done during the day when people are away and also the outside environment is also noisy. • Ensure that the machines are serviced promptly as required 	Contractor/ PMU	Continuous during Construction	<ul style="list-style-type: none"> • No of PPE provided to workers • No. of cases reported relating to noise pollution 	<ul style="list-style-type: none"> • Noise Levels • Duration/time of the day • Reports 	Contractor cost
Air Quality Degradation due to dust and exhaust emissions	<ul style="list-style-type: none"> • Warn and update all occupants around the site of the pan until the civil works are complete. • Construction workers should be provided with appropriate PPE • Sprinkle water on uneven project site areas and nearby access roads to site to minimise dust 	Contractor	Continuous during Construction	<ul style="list-style-type: none"> • No of Workers/vehicle operators sensitized on reduced emission • No. of PPE supplied 	<ul style="list-style-type: none"> • Frequency of water sprinkling • PPE provided to workers 	Contractor Cost
Oil spills/Fuels and Lubricants	<ul style="list-style-type: none"> ✓ Vehicle maintenance should be done on purpose built ✓ Impervious concrete platforms with oil and grease traps. • Standard operating practices for re-fuelling mobile equipment such as a minimum 15m from any water channel should be practiced 	Contractor	Construction phase	<ul style="list-style-type: none"> • No of Oil and grease traps established 	<ul style="list-style-type: none"> • Records Register on vehicle maintenance 	Contractor cost

Increased generation of solid wastes	<ul style="list-style-type: none"> • Use of an integrated solid waste management system i.e., the 3 R's: 1. Reduction at source 2. Reuse 3. Recycle where possible. • Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at site; • Waste collection bins / receptacles to be provided at the project site 	Contractor/PM U	Continuous during Construction	<ul style="list-style-type: none"> • No. of waste bins/receptacle • Quantity of Waste • No of designated waste collection points 	<ul style="list-style-type: none"> • Type of waste • Designed waste collection points established • Waste collection company engaged 	30,000
Visual Impacts and aesthetics	<ul style="list-style-type: none"> • Regular site clean-up to prevent littering • All excavated material should be compacted to minimize soil erosion • Restrict project activities to the actual project site • Establishment of a site store for storage of materials, tools and equipment 	Contractor/PM U	Throughout the construction phase	<ul style="list-style-type: none"> • Volume of waste cleaned up • Area compacted • Number and size of materials stores erected • Area of site rehabilitated 	<ul style="list-style-type: none"> • Cleaning up of waste • Compacting loose soils • Establishment of a materials store • Site rehabilitation 	30,000
Occupational Health and safety Hazards	<ul style="list-style-type: none"> • Provide appropriate personal protective equipment (PPE). • Implement a programme of assessment of routine monitoring of worker health. • Redesign manual processes and rotate work tasks to reduce heavy lifting/repetitive activities, and where possible install mechanical lifting aids. • Train workers in general safety procedures including first aid and fire safety. • Use designated routes for machinery and personnel • Engineer out sharp edges and access to dangerous parts of machinery through a hierarchy of controls (permanently fixed physical barrier, interlocked physical barrier, physical barrier, presence sensing system). 	Contractor/PM U	Continuous during construction	<ul style="list-style-type: none"> • No. of HSE trainings • No. PPE provided • First Aid Kits availability • Availability of sanitation facility • Potable water • No. of Accidents/incidents 	<ul style="list-style-type: none"> • PPE provided • Recorded accidents occurrences and near misses • OSH sensitization conducted 	50,000

	<ul style="list-style-type: none"> • Ensure that there are provisions for reporting incidents, accidents and dangerous occurrences 					
	Social Impacts					
Increased Spread of STD, HIV & AIDS,	<ul style="list-style-type: none"> • Contractor to develop appropriate awareness content and implement awareness sessions for workers on HIV/AIDs and other STDs i.e. use of educative posters and tool box meetings. • Ensure an adequate and accessible provision of condoms to workers both male and female. • Contractors to develop a code of conduct and ensure its signed by all workers with physical presence on site as well as within the project area. 	Contractor	Throughout construction Period	<ul style="list-style-type: none"> • No of Cartons of condoms distributed and to the relevant persons • No. of HIV trainings and awareness campaign • Code of Conduct 	<ul style="list-style-type: none"> • Presence of Condoms • Reports 	20,000
Increased Spread of COVID-19	<ul style="list-style-type: none"> • Raise awareness on the need to take COVID-19 vaccine, • Ensuring social distancing of not less 1.5 meters between employees in all directions, • Hygiene promotion through suitable hand sanitizing facility or handwashing soap and water • Strict and proper use of face masks throughout all working hours and public places. • Implement Ministry of Health guidelines for staff safety and health, including daily temperature checks for everyone in the workplace • Increase frequency of cleaning commonly touched surfaces / objects 	Contractor	Throughout construction Period	<ul style="list-style-type: none"> • Number of Handwashing facilities/sanitize rs • No. of appropriate PPE (Face Masks) distributed • No. of trainings • Vaccinations undertaken • No. of Covid-19 incidences reported • Number of persons working at the site 	<ul style="list-style-type: none"> • Incidences reported • Field visits • Observance of social distance 	70,000

Gender based violence and sexual harassment	<ul style="list-style-type: none"> Integrate provisions related to sexual harassment in the employee COC The Contractor to ensure compliance with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse Community and construction workers awareness on GBV Separate toilets for each gender Establishment of appropriate grievance redress mechanisms 	Contractor	Throughout construction Period	<ul style="list-style-type: none"> No. of cases of GBV reported Number of sensitization workshops 	<ul style="list-style-type: none"> Human resource policy in place Code of Conducts signed Separate sanitary convenience Reports Observation 	20,000
Child abuse	<ul style="list-style-type: none"> Contractor develop and implement a Children Protection Strategy All staff signing and committing themselves towards protecting children, a contract which clearly defines what is and is not acceptable behaviour Children under the age of 18 years should not be hired on site as provided by Child Rights Act (Amendment Bill) 2014. Wherever possible, ensure that another adult is present when working in the proximity of children. 	Contractor	During construction	<ul style="list-style-type: none"> Number of school going children who have dropped out of school Number of workers to have ratified to child protection strategy No. of children/persons below the age of 18 yrs employed 	<ul style="list-style-type: none"> Child Protection Strategy Workers signing and committing to child protection strategy Age of employees 	20,000
Sub-Total						260,000
Operation phase Environmental impacts						
Siltation	<ul style="list-style-type: none"> Clearing of vegetation over a surface area and excavating a depth of 2m Silt-trapping facilities maintained. Establishment of tree nursery Establishment of agroforestry within surround farms upstream 	Proponent nyadong' community development group	Throughout operation	<ul style="list-style-type: none"> One check dam or silt trap Number of established agroforestry farms upstream 	Operational silt trap Agroforestry farms established Reports Field visits/observation	50,000

Solid Waste generation from pan operation	<ul style="list-style-type: none"> • Use of an integrated solid waste management system i.e., the 3 R's: 1. Reduction at source 2. Reuse 3. Recycle where possible. • Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at site; • Waste collection bins / receptacles to be provided at the project site 	Proponent nyadong' community development group	Throughout operation	<ul style="list-style-type: none"> • No of Designed waste collection points established • -No of Waste collection companies engaged 	<ul style="list-style-type: none"> • Waste storage points • Field observation • Site visits • Reports 	30,000
Increased pressure on infrastructure	<ul style="list-style-type: none"> • Plant grass along the embankments. Plant trees that do not extract a lot of water from the ground. Plant trees along the catchment areas • Water collection points to be at least 5meters away from the protected pan 	Proponent nyadong' community development group	Throughout operation	<ul style="list-style-type: none"> • Acreage of grass coverage • Number of trees planted 	<ul style="list-style-type: none"> • Trees and grass planted • Livestock and domestic watering points operational • Reports • Field observation 	30,000
Water quality nitrate pollution by livestock dung and use of fertilizers upstream	<ul style="list-style-type: none"> • Livestock should not be allowed to drink water directly from the reservoir at any time. • By laws should take care of water quality issues associated with livestock and children • Train on safe use of organic fertilizers that are biodegradable 	Proponent nyadong' community development group.	Throughout operation	<ul style="list-style-type: none"> • Length of pan perimeter fencing • Bylaws developed • No of livestock water troughs • Number of farmers trained on use of organic fertilizers 	<ul style="list-style-type: none"> • Reports • Field observation • Farmers practising organic farming • By laws in place and being adhered 	20,000
Oil spills	<ul style="list-style-type: none"> • Standard operating practices for application of oils lubricants on mobile equipment to be a minimum 15m from any water course/ channel should be practiced 	Proponent nyadong' community development group	Throughout operation	<ul style="list-style-type: none"> • Amount of Oil and grease traps used 	<ul style="list-style-type: none"> • Records Register on machinery maintenance 	5,000

Operation phase Social impacts						
Leadership issues in management	<ul style="list-style-type: none"> Periodical capacity building to the PMU Elected finance committee with appropriate gender representation to handle funds. Periodic update to the members financial status- transparency 	Proponent nyadong' community development group.	Throughout operation	<ul style="list-style-type: none"> Number of trainings conducted Number of meetings held No of reported grievances Periodic financial status updating 	<ul style="list-style-type: none"> Training of PMCs GRM mechanisms Periodic financial status update 	10,000
Conflicts on water use	<ul style="list-style-type: none"> ✓ Ensure the grievance redress mechanism is available to the affected community members and stakeholders at no cost Educate all project stakeholders on the availability and use of the grievance redress mechanism in a manner that is understandable to all, 	Proponent nyadong' community development group.	Continuous	<ul style="list-style-type: none"> Number of reported cases on grievances Number of sensitization awareness creation workshops on GRM Number of community members trained on GRM 	<ul style="list-style-type: none"> Existing records 	20,000
Occupational Health and safety Hazards	<ul style="list-style-type: none"> Ensure that all the PMU undergo training on health safety issues Support to provision of PPEs for the pan users Put signage signs around dangerous spots or very deep areas in the pan 	Proponent nyadong' community development group	Throughout operation	<ul style="list-style-type: none"> No. of accidents reported Number and types of PPE procured No. of sensitization meetings No of Signage 	<ul style="list-style-type: none"> Reports Field observation Health safety register Warning Signs install 	50,000
Spread of Covid 19	<ul style="list-style-type: none"> Sensitize dairy farmers and county staff to take up COVID-19 vaccine 	Proponent nyadong' community	Throughout operation Period	<ul style="list-style-type: none"> Presence of Handwashing 	<ul style="list-style-type: none"> Incidences reported Reusable phase masks distributed 	30,000

	<ul style="list-style-type: none"> Avoid concentrating of more than 15 persons or workers at one location. Where more than one person is gathered, maintain social distancing of at least 2 meters The project shall put in place means to support rapid testing of suspected workers for covid-19; Install appropriate handwashing at designated locations; Ensure routine sanitization of shared social facilities and other communal places routinely 	development group		facilities/sanitize rs <ul style="list-style-type: none"> No. of appropriate PPE (Face Masks) distributed No. of trainings/sensitization Number of staff/farmers vaccinated No. of Covid-19 incidences reported at offices 	<ul style="list-style-type: none"> Hand washing facilities Observance of social distance 	
GBV and Sexual harassment	<ul style="list-style-type: none"> Integrate provisions related to sexual harassment in the employee COC in project management committee PMC in collaboration with county department of social services ensure that gender-based violence at the community level is not triggered by the Project The project management committee will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project management unit. 	Proponent nyadong' community development group	Throughout operation period	<ul style="list-style-type: none"> Number of recorded cases Number of sensitization workshops Human resource policy No. of cases of GBV reported 	Reports General observation	10,000
Sexual exploitation and Abuse (SEA)	<ul style="list-style-type: none"> 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 	Proponent nyadong' community development group	Throughout operation phase	<ul style="list-style-type: none"> Number of recorded cases Number of sensitization workshops 	<ul style="list-style-type: none"> Reports General observation 	10,000

	disciplinary procedures at the project level, including confidential data management; <ul style="list-style-type: none"> 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; 			<ul style="list-style-type: none"> Number of cases reported 		
Sub-Total						265,000
Decommissioning phase						
Air Quality Degradation due to dust and exhaust emissions	<ul style="list-style-type: none"> Workers engaged in decommissioning should be provided with appropriate PPE Sprinkle water on uneven/bare areas at project site areas and nearby access roads to minimise dust 	Contractor	Continuous during decommissioning	<ul style="list-style-type: none"> No. of workers sensitized PPE provided Frequency of watering 	<ul style="list-style-type: none"> Workers/vehicle operators sensitized on reduced emission PPE provided to workers Sprinkling of water 	30,000
Increased generation of solid wastes	<ul style="list-style-type: none"> Careful dismantling to ensure materials remain as re-usable as possible Selling or donating the re-usable or recyclable materials to avoid waste Cleaning and proper site rehabilitation by adhering to a NEMA approved Decommissioning plan 	Contractor	Continuous during decommissioning	<ul style="list-style-type: none"> Recycling solid waste Rehabilitated site Designed waste collection points established Waste collection company engaged 	<ul style="list-style-type: none"> Quantity of waste Area rehabilitated No. of solid waste bins/receptacles Type of Waste 	30,000
Occupational Health and Safety Hazards	<ul style="list-style-type: none"> Provide appropriate personal protective equipment (PPE). Train workers in general safety procedures including first aid and fire safety. 	Contractor	Continuous during decommissioning	<ul style="list-style-type: none"> Training of workers on safety Provision of PPEs 	<ul style="list-style-type: none"> No. of HSE trainings Number of PPEs provided 	30,000

	<ul style="list-style-type: none"> • Use designated routes for machinery and personnel • Ensure that there are provisions for reporting incidents, accidents and dangerous occurrences 			<ul style="list-style-type: none"> • Install first aid kits • Reporting of incidents • Set up sanitation facilities • Designated routes for machinery and personnel 	<ul style="list-style-type: none"> • First Aid Kits availability • No. of Accidents/incidents • Existence of routes for machines and personnel 	
Spread of COVID-19 amongst workers	<ul style="list-style-type: none"> • Provision and use of appropriate Personal Protective Equipment (PPE) • Maintain social distancing at least 2 meters • Install handwashing facilities with adequate running water and soap, or sanitizing facilities 	Contractor	Continuous during decommissioning	<ul style="list-style-type: none"> • Availability of SOP(s), Training material, PPE, sanitising facilities etc; 	<ul style="list-style-type: none"> • No. of PPEs provided/procured • No. of handwashing facilities installed • Number of COVID-19 cases reported 	30,000
Sub-Total						120,000
Total Cost of ESM&MP(Kshs)						645,000

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The rehabilitation and expansion of Nyadong water pan sub-project has minimal impacts to the environment, social and economic being of the project site during the various phases of project. Adequate mitigation measures have been suggested in the comprehensive Environmental Management Plan and mitigation measures proposed to ensure that the impacts pose no threat to the environment and communities. The project design has taken into consideration the key element during the construction phase. Overall, negative environmental impacts due to the project are deemed to be largely outweighed by the improved quality of life of the population through its implementation.

7.2 Recommendations

Based on the findings of the assessment of the environmental and social impacts for the Proposed Project, it is the view of the experts that the project be allowed to proceed subject to the implementation of the proposed mitigation measures in compliance with all the relevant legislation and planning requirements of Kenya. The experts recommend the project for approval by the National Environmental Management Authority(NEMA). The experts further recommend annual environmental audit after one year of the project implementation. On approval the ESMMP should be shared with the selected contractor for implementation of the contractors specific ESMMP. In addressing the environmental issues, the contractor and the proponent must follow the mitigation guidelines provided under the ESMMP. This will ensure the environmental and safety of farmers and the neighbouring communities. During construction phase the contractor is required to undertake Environmental Monitoring to ensure that the construction is done in compliance with the provisions of the ESIA-SPR approval. The proponent and the CESSCO in consultation with the other relevant stakeholders and institutions shall monitor and report on the implementation of the ESMMP to ensure compliance.

REFERENCES

- Government of Kenya (2010). The constitution of Kenya, government printer, Nairobi, Kenya
- Government of Kenya (2000): Kenya gazette supplement Acts, Environmental Management and Coordination Act Number 8 of 1999 and 2015 Amendments (Cap 387). Government printer, Nairobi, Kenya.
- Government of Kenya (2003): Kenya gazette supplement number 56. Environmental Impact Assessment and Audit Regulations, Government Printers, Nairobi, Kenya.
- Government of Kenya (2007): The Occupational Safety and Health Act, Government Printers, Nairobi, Kenya.
- Government of Kenya (2012): The Land Act, Government Printer, Nairobi, Kenya.
- Government of Kenya (2012): The Land Registration Act, Government Printer, Nairobi
- Government of Kenya (2012): The National Land Commission Act, Government Printer, Nairobi, Kenya.
- Government of Kenya. (2019). Energy Act, 2019, government printer, Nairobi, Kenya.
- Government of Kenya. (2012). The Prevention, Protection and Assistance to Internally Displaced Persons (IDPs) and Affected Communities Act, 2012, government printer, Nairobi, Kenya
- Government of Kenya. (2012). The County Government act, 2012, government printer, Nairobi, Kenya
- Government of Kenya. (2012). The National Land policy, 2012, government printer, Nairobi, Kenya
- Government of Kenya. (2006). Museums and Heritage Act, No. 6 of 2006, government printer, Nairobi, Kenya.
- Government of Kenya. (2007). Kenya Roads Act No. 2 of 2007, government printer, Nairobi, Kenya.
- Government of Kenya. (2012). Public Health Act (Cap 242), government printer, Nairobi, Kenya.
- Government of Kenya. (2008). Vision 2030, government printer, Nairobi, Kenya.
- Government of Kenya. (2012). National Environmental Policy, government printer, Nairobi, Kenya.
- Government of Kenya. (2014). National Energy Policy, government printer, Nairobi, Kenya
- Government of Kenya. (2011). Gender Policy, government printer, Nairobi, Kenya.
- International Finance Corporation/World Bank Group (2007): General Environmental, Health, and Safety (EHS) Guidelines.
- Kenya gazette supplement Acts Land Planning Act (Cap. 303) government printer, Nairobi
- Kenya gazette supplement Acts Physical Planning and Land Use Act, 2019 government printer, Nairobi
- Kenya gazette supplement Acts Water Act, 2016 government printer, Nairobi

Kenya County Climate Risk Profile Series 2018, Climate Risk Profile for Siaya County.

Siaya County Government. (2015). County Integrated Development Plan (CIDP) for 2018-2022

World Bank (1998). Environmental Assessment Sourcebook volume II: Sectoral Guidelines. World Bank, Washington.

World Bank. (2013). Operational Policy 4.01 - Environmental Assessment available at <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1565&ver=current>

World Bank. (2013). Operational Policy 4.04 - Natural Habitats available at <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1581&ver=current>

World Bank. (2013). Operational Policy- 4.12 - Involuntary Resettlement available at <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1584&ver=current>

World Bank. (2013). Operational Policy – 4.11-Physical Cultural Resources available at <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1583&ver=current>

APPENDICES

Appendix 1: Copies of filled questionnaires

PROJECT: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR PROPOSED REHABILITATION AND EXPANSION OF NYADONG' WATER PAN IN North SAKWA WARD, BONDO SUB COUNTY IN SIAYA COUNTY

The Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MOAL, F&C), the state department of Crops through World Bank Funded Kenya Climate Smart Agriculture Project (KCSAP), intend to support the proponent Nyadong' Community Development Group to rehabilitate and expand Nyandong' water pan. The project is meant to, provide water for tree nurseries, domestic and livestock use to the community. The project will involve excavation, embankment, draw off pipes and fencing. In a bid to ensure safe and sustainable environment, the National Environmental Management Authority (NEMA) under EMCA (Amendment) of 2015 Section 58 requires that an Environmental Impact Assessment is done and public participation be undertaken to establish the views and concerns of the interested and/or affected stakeholders. Thus as a member of the local community/group/institution within/around the proposed project area we kindly request for your comments on the expected socio-economic and environmental impacts of the proposed project.
Your response will be treated with utmost confidentiality

Section A
Response details

Name	Institution/Organization	Telephone
<u>Rose Atieno Ayoo</u>	<u>Community Member</u>	<u>0750296528</u>

1. Gender
Male ☐ Female ☒

2. Age of the Respondent.....40 yrs.....

3. For how long have you resided or worked in this area.....20.....(years)

Section B
Human Natural Environmental Concerns

1 Are you aware of the proposed rehabilitation and expansion
Yes ☒ No ☐

2 Do you think the proposed rehabilitation and expansion of the pan and its activities pose any danger to the environment
Yes ☒ No ☒

1

If yes explain

3 Do you have any rejection/reservation on proposed rehabilitation and expansion of the pan
Yes ☐ No ☒

If yes explain

4 What do you think are the positive and negative socio economic and environmental impacts on the proposed project

Positive	Negative
Clean water	Erosion
Fish	but all well benefit
Vegetable also	- Mosquitoes
cheap price	- malanica
Tree nursery	- Darkoza
Employment	- draw many
Food security	

5 Suggest mitigation measure for any negative impact that may result from implementing the project 1. Water treatment tablets 2. Plant trees and grass on the embankment
2. fence off the pan site

6 a) Do you anticipate any conflict or complain against water pan project with respect to:

• Land Yes ☐ No ☒
If yes indicate.....

• Water Yes ☐ No ☒
If yes indicate.....

• Public health and safety? Yes ☐ No ☒
If yes indicate

• Loss of livelihood? Yes ☐ No ☒
If yes indicate

• Cultural/heritage? Yes ☐ No ☒
If yes indicate N/A
Others

(b) If any in 6(a) above what are the mechanism to put in place to resolve the conflicts/complaints amicably

i. N/A
ii.
iii.

7 On the whole, would you have any objections to the project being implemented?..... **NO**

8 In which category do you fall? (tick where applicable: you can tick more than one box)

Neighbour resident ☐ Project official ☐ Stakeholder ☐
Stakeholder ☐ Community leader/Member ☒
Other Specify ☐

PERSONAL INFORMATION

Signature..... *[Signature]*

Thank you for your cooperation

[Please provide these details for the purpose of authentication in this EIA study only]

SHOT ON POCO X3 NEO

Appendix 2: Minutes of public consultation meeting



MINUTES OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) PUBLIC MEETING FOR THE PROPOSED REHABILITATION AND EXPANSION NYADONG' WATER PAN SUB-PROJECT IN NORTH WARD, BONDO SUB- COUNTY IN SIAYA COUNTY HELD ON 29thOCTOBER 2021 AT NYADONG' VILLAGE IN GOBEI CENTRE , AT 09:45 AM.

MEMBERS PRESENT

Attached as an Appendix – List of Participants

AGENDA

1. Introductions and opening remarks
2. Purpose of the meeting
3. Rehabilitation and Expansion of Nyadong' water pan sub-project Brief
4. Concerns, Questions and Responses
5. A.O.B. & adjournment

PRELIMINARY

The meeting started with a word of prayer from Bishop Daniel Ongonga at 10:00hrs. The meeting was held at the proposed site in Nyadong' village on 29 October 2021. The meeting was hosted and chaired by Mr Jared Otieno Luanda the Chairman of Nyadong' Community Development Group the proponent. . A total of 120 members attended the ESIA public meeting. The meeting started at 10:15 hrs.

MIN. 1 - 10/29/2021: INTRODUCTION & OPENING REMARKS

The project coordinator Siaya County Mr Ating Willis welcomed the attendants for a round of introductions starting by highlighting the need to put in place measures for covid-19 prevention by adhering to Ministry of Health guidelines that included wearing of appropriate masks, washing hands regularly or using alcohol based sanitizer and social distancing. The Kenya Climate Smart Agriculture Project (KCSAP) County Environment and Social Safeguard Officer (CESSCO) Benard Ayagah introduced himself. This was followed by introductions from the ESIA consultants and the pan management committee officials

MIN. 2 – 10/29/2021: PROJECT BRIEF

The ESIA lead Consultant welcomed KCSAP CESSCO to give a brief about the proposed project. Mr. Benard from KCSAP Siaya County explained that the proposed project was a rehabilitation and expansion of Nyadong' water pan comprising of; clearing of vegetation , fencing, excavation, Construction of auxiliary structures (water tank, livestock trough, silt

traps, check dams, spillway, water kiosk), There will be Horticulture Production (water tank, shade nets, horticulture seed, agrochemical. Along the catchment areas there will be check dams, agroforestry, cross slope barriers. Fish will be stocked in pan and a tree nursery will be established where seedlings can be grown and sold out. A water tank will be installed and water will be pumped by means of solar energy and water will be piped through gravity to the farms. (shade, tank, pipes, seeds, tools and equipment). He emphasized that the project will be owned by the community and the need for the active involvement of members.

MIN. 3 - 10/29/2021: PURPOSE OF THE MEETING

The consultant explained to the participants that consultation and public participation process is a requirement by the Kenyan Constitution and a mandatory procedure stipulated in the Environmental Management and Coordination Act (EMCA) CAP 387 Section 58. According to section 59, and the second schedule of EMCA (Amendments 2019) new projects like the proposed Nyadong' water pan must undergo Environmental and Social Impact Assessment that includes conducting public meetings for the stakeholders, project affected persons, local community/ surrounding enterprises or interested and affected parties. The resulting summary project report must be submitted to the National Environment Management Authority (NEMA) for public and technical review, approval and subsequent issuance of relevant license to enable commencement of project implementation. The consultant also underscored the fact that the project will be funded by World Bank and the need to meet the operational safeguards which require that the project submits a summary project report prior to facilitation.

The main objective of the consultation meeting was to

1. Gather comments, suggestions and concerns of the interested and affected parties in the proposed project, and incorporate them in the summary project report (SPR).
2. Disseminate and inform the public and stakeholders about the project with Special reference to its key components and description
3. Create awareness among the public on the need for the ESIA for the proposed project

The ESIA team Leader then welcomed the attendants to raise their comments, concerns and suggestions anticipated from the proposed Nyadong water pan sub-project.

MIN. 4 –10/29/2021: POSITIVE IMPACTS ANTICIPATED BY MEMBERS FROM THE MEETING

The community welcomed the project. They particularly noted that they had benefited from the pan when it was in operation, but unfortunately it is of a small capacity and therefore it does not hold water till the next rain season. . Additionally they indicated that the project will provide farmers with more horticultural crops. Some of the positive impacts raised by members are listed below:

1. **Paul Onyango Owuor** : welcomed the project highlighting that they anticipated to benefit from improved income from production of irrigated onions, high value horticultural crops like indigenous vegetables, onions, water melons, onions and tomatoes . The members also anticipated lower cost of farm inputs making it affordable to farmers
2. **Wilkister Adhiambo Oluoch** . Appreciated that they will be having a designated place for collecting water and washing clothes outside the pan, previously, they used to draw water directly from the pan and wash clothes at banks of the pan. Now the pan will be fenced off and this is great achievement. **James Abungu Odero reiterated** that even livestock will no longer drink water directly from the pan there will be a designated place for water troughs .

3. **Cyprose Atieno Odhiambo:** Noted that with expansion of the pan and agroforestry establishment. There will be a micro-climate which will enhance rainfall and through irrigation and livestock watering household food security will be improved
4. **Stephen Ouma:** Was hopeful that the project will increase household incomes. He however, cautioned on the need for cooperation and ownership. He emphasized that that in the past, the community members used to collect and water livestock about 6kms away and therefore currently if the project is successful, We must address the issue of sustainability critically
5. **John Onguru:** Reported that the water pan project will create employment to the youth through irrigated farming and fish production. He further noted that once trees have been planted there will be Timber and firewood for construction and cooking catchment areas will be protected and siltation of the pan will be reduces, erosion upstream will be contained.

6.

MIN 5 - 10/29/2021: CONCERNS, QUESTION & ANSWER SESSION AND RESPONSES

The Consultant assisted by the group chairman chaired the session to allow greater participation. The community were allowed to raise questions and concerns on the project and its possible impacts. The consultant, and KCSAP representative were available to answer and provide relevant explanations to the satisfaction of participants where possible. The feedback is summarized in the Table below.

Table 1.1 Concerns by ESIA meeting attendants and Responses by Consultants and KCSAP

SN.	Issues raised by the members	Brief explanation	Response
1.	Employment	During pan construction, preference will be given to the locals with emphasis on the youth During operation phase employment will be generated by sale of water, irrigation aand sale of farm produce	The community agreed and promised to provide both skilled and skilled labour
2.	Erosion	Stakeholders residing around the pan catchment sites will be encouraged to plant trees and construct terraces along contours to reduce soil erosion	The community requested for capacity building from the project management
3.	Mosquitoes/Malaria incidences	The pan will be installed with fish that can eat mosquito larvae The surrounding community members will be provided with mosquito nets	The pan management committee was asked to seek for support from the county government and local supporting institutions to provide mosquito nets
4.	Maintenance and sustainability of the pan	The project management committee will be trained on sustainability and pan management issues and a business plan will be put in place	A sustainability strategy to be put in place so that pan maintenance issues can be addressed by a committee which has a funding mechanism

5.	food security and nutrition security especially vegetable produce	The members of the pan will be encouraged to form groups and will be linked to producer organizations so that they can have collective bargaining power when marketing their farm produce	Producer organization that support the various value chains will be linked to the farmers
6.	Theft of pan equipments i.e. solar panels	There was a concern that there will be theft and vandalism of equipments	The Nyadong' pan management committee must put in place measures to maintain and protect pan facilities in collaboration with community

MIN 6 - 10/29/2021: SUGGESTIONS FROM MEMBERS IN ATTENDANCE

- The community recommend that capacity building be done to them and farmers be supported with farm inputs for irrigation
- The community members suggested that they be trained by forestry department on running or operating tree nurseries and where possible assist them in locating market for selling tree seedlings that have been established in the nurseries
- Training of trainers who will reach to more farmers. Suggestions were made to have representatives who can channel farmer views to agriculture office.
- The farmers suggested that they be linked to producer organizations so that can be able to market their produce collectively to evade middle men or speculative buyers

MIN 7 – 10/29/2021: A.O.B AND ADJOURNMENT


There being no other business, the meeting ended with a word of prayer from Josephine Adhiambo Oluoch at 11:20hrs.

Signed by: Mr. Elijah Lwevo













Environmental and Social Consultant
Date 29 /10/2021

Appendix 3: Public participation attendance list


Kenya Climate Smart Agriculture Project (KCSAP)
 Office of the CPCU - Siaya

ACTIVITY: Public participation for Nyadong' Water Pan DATE: 29/10/2021
 REGISTRATION FORM

NO	NAME	ORGANIZATION	DESIG	MOBILE	CONTACT	EMAIL	SIGN
1.	Benson Omondi Othman	Nyadong	member				
2.	Alicia Ogo	Nyadong	Member	0704608598			
3.	Polina Onyaga	Nyadong	Member	071352538			
4.	Mary Aueni	Nyadong	member	0703705870			
5.	Jörn Simach		member	072436404			
6.	Rosa Ogo	Nyadong		0727802020			
7.	Alice Oadico	Nyadong	member	0712762291			
8.	Lysia Ogo	Nyadong	member	0148133565			
9.	Isabelle Aueni	Nyadong	member	0716354352			
10.	Kelvin Ombi	Nyadong	member	0706641192			

P.O. Box 3 - 40000, SIAYA Mob: +254 722 943269

Kenya Climate Smart Agriculture Project (KCSAP)

Office of the CPCU - Siaya

REGISTRATION FORM

ACTIVITY: Public Participation in NFAHSA Workshop

DATE: 29/10/2021

NO	NAME	ORGANIZATION	DESIG	CONTACT		SIGN
				MOBILE	EMAIL	
1.	Dina HIRIEMBO GITHIUKU	NFAHSA	Member	0728776279	hiriembo.githiuk@gmail.com	
2.	Edgard LUSUO	NFAHSA	ADLP			
3.	Henry Odhiambo	MOALD	Eng	0789324008	Henry.Odhiambo@gmail.com	
4.	FREDRICK ATUO	WMAHSA	ADLP	0725324117	fredrickatuo@gmail.com	
5.	Boris Odingi	WMAHSA	ADLP	0721687978	borisodhiambo@gmail.com	
6.	George Mwangi	Kenya Export	P.O.C	0728793544	ndunguho@gmail.com	
7.	Steven Okina	MOALD	Eng	0734779003	okinaokina@gmail.com	
8.	SAULIR KICOT	WMAHSA	ADLP	0700058323	saulir.kicot@gmail.com	
9.	Peter Giga	MOALD	ADLP	0721549251	Petergiga@gmail.com	
10.	Michael Ombao	MOALD	ADLP	0727087144	Michaelombao@gmail.com	

P.O. Box 3 - 40600, SIAYA

Mob: +254 722 943269

P.O. Box 3 - 40600, SIAYA

Mob: +254 722 943269



Kenya Climate Smart Agriculture Project (KCSAP)

Office of the PCPU - Siaya

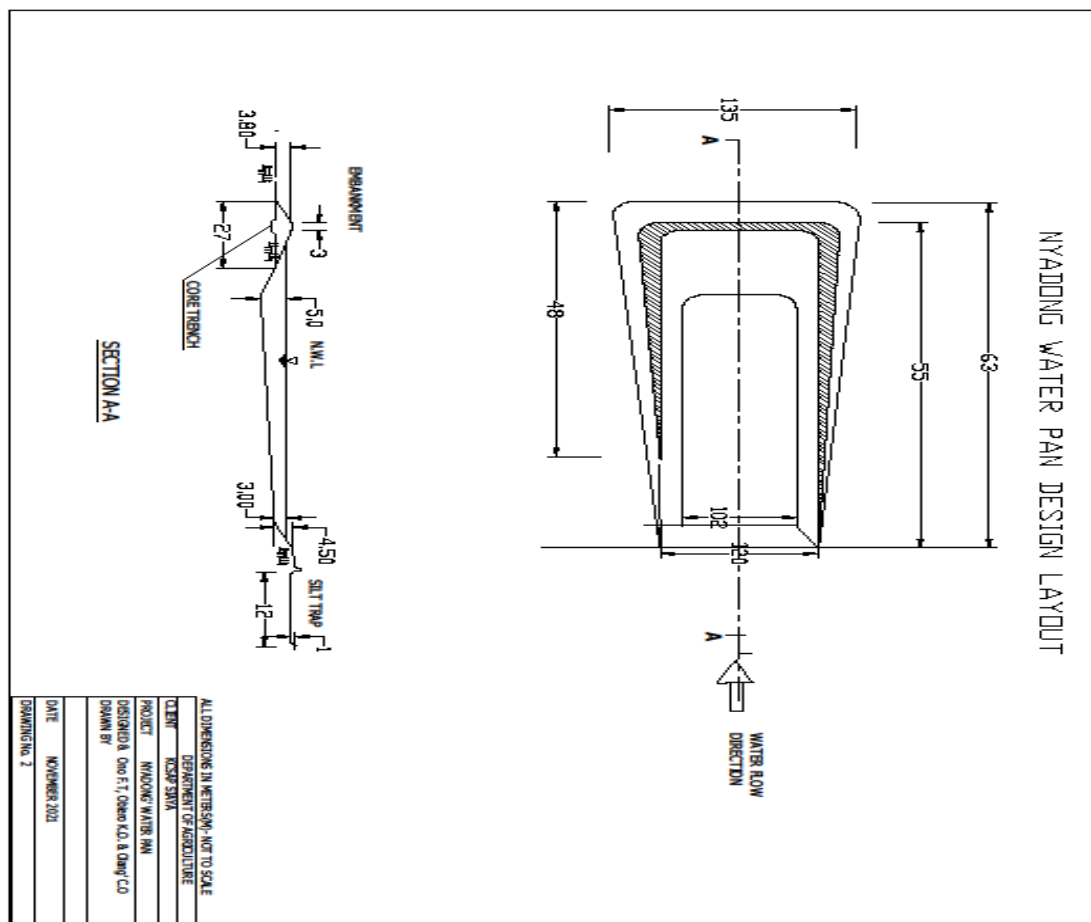


REGISTRATION FORM

ACTIVITY: ESIA FOR FIVE WATER PANS - NYADONG' PUBLIC AMELIORATION DATE: 28/10/2021

NO	NAME	ORGANIZATION	DESIG	MOBILE	CONTACT		SIGN
					EMAIL		
1.	Yusef Ali	Member		07866005604			
2.	James Ochieng'	Member		07150366201			
3.	James Ochieng'	Member		07864110446			
4.	James Ochieng'	Member		0710982991			
5.	James Ochieng'	Member		0744849823			
6.	James Ochieng'	Member		0713082317			
7.	James Ochieng'	Member		07510867986			
8.	James Ochieng'	Member		07866005604			
9.	James Ochieng'	Member		0710982991			
10.	James Ochieng'	Member		0710982991			

Appendix 4: Project design/layout



Appendix 6: Land Ownership Documents

SHEET NO 30

THE LAND REGISTRATION ACT
THE LAND REGISTRATION (GENERAL) REGULATIONS, 2017
CERTIFICATE OF OFFICIAL SEARCH

TITLE NO. NORTH SAKWA AJIHO/272

SEARCH NO. _____

On the 21st day of Sept 2020 the following

Were subsisting entries on the register of the above mentioned title:

Part A – Property Section (easements, etc.) – RESERVED FOR NYANDONGE WATER POINT

Nature of title ABSOLUTE

Approximate area (2.6) Ha TWO DECIMAL SIX.

Part B – Proprietorship Section

Name and address of proprietor 1. 9/10/78. SIAYA COUNTY COUNCIL

Intubitions, cautions and restrictions _____

Part C – Encumbrances Section (leases, charges, etc.) _____

The following applications are pending

(a) _____

(b) _____

(c) _____

(d) _____

The following certified copies are attached as requested:

(a) _____

(b) _____

(c) _____

(d) _____

Date 21st day Sept 2020

Signed by Registrar _____


Name: _____



Signature: _____

Seal _____

9. O. Onyanta '2021

Appendix 7: Duly Filled Screening Checklist

 **WORLD BANK GROUP**
Agriculture

Third phase Sub Project Screening Checklist 2021

Section A: Background information

Name of County... Siaya.....
Name of CPCU/NEMA... Siaya.....
Sub-project Ward... North Sakwa.....
Name of CBO/Institution... Nyadong' Waterpan Rehabilitation.....
Contact Person... J. K. K. K...... Cell phone... 0711-688-682.....
Sub-project name... Nyadong' Waterpan Rehabilitation.....
Estimated cost (Ksh.)... 12,352,182.....
Approximate size of land area available for the Sub-project... 2.6 Ha.....
Objectives of the Sub project.....
1. To rehabilitate the waterpan and its catchment area.
2. To improve the water supply to the community.
Activities/enterprises undertaken... Rehabilitation of the waterpan and its catchment area.
How was the Sub-project chosen?... Community.....
Expected Sub project duration... Continuous.....

Section B: Environmental Issues

Will the Sub-project:	Yes	No
Create a risk of increased soil erosion?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create a risk of increased deforestation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create a risk of increasing any other soil degradation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Affect soil salinity and alkalinity?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Divert the water resource from its natural course/location?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cause pollution of aquatic ecosystems by sedimentation and agro-chemicals, oil spillage, effluents, etc.?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Introduce exotic plants or animals?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Involve drainage of wetlands or other permanently flooded areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cause poor water drainage and increase the risk of water-related diseases such as malaria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Reduce the quantity of water for the downstream users?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Result in the lowering of groundwater level or depletion of groundwater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reduce various types of livestock production?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Affect any watershed?		✓
Focus on Biomass/Bio-fuel energy generation?		✓

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

Section C: Socio-economic Issues

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

Section D: Natural Habitats

	YES	NO
Will the sub-project:		
Be located within or near environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species?		✓
Adversely affect environmentally sensitive areas or critical habitats – wetlands, woodlots, natural forests, rivers, etc.)?		✓
Affect the indigenous biodiversity (Flora and fauna)?		✓
Cause any loss or degradation of any natural habitats, either directly (through project works) or indirectly?		✓
Affect the aesthetic quality of the landscape?		✓
Reduce people's access to the pasture, water, public services or other resources that they depend on?		✓
Increase human-wildlife conflicts?		✓
Agrochemical use		
Will the sub-project:		
Involve the use of pesticides or other agricultural chemicals, or increase existing use?		✓
Cause contamination of watercourses by chemicals and pesticides?		✓
Cause contamination of soil by agrochemicals and pesticides?		✓
Experience effluent and/or emissions discharge?		✓
Export produce? Involve annual inspections of the producers and unannounced inspections?		✓
Require scheduled chemical applications?		✓
Require chemical application even to areas distant away from the focus?		✓

Adversely affect small communal cultural property such as funeral and burial sites, or sacred groves?		
Result in involuntary restriction of access by people to legally designated parks and protected areas?		
Be on monoculture cropping?		

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

Section II: Proposed action

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

(iii) Recommended Course of Action

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

☐ CPCUs and County Director of Environment (CDE) will provide detailed guidance on mitigation measures as outlined in the ESMF; and

☐ Specific advice is required from CDE and CPCUs regarding sub-project specific EIA(s) and also in the following area(s)

☐ All sub-project applications/proposals MUST include a completed ESMF checklist. The KCSAP-CPCU and CDE will review the sub-project applications/proposals and the CDEs will sign off;

☐ The proposals will then be submitted to NPCU for clearance for implementation by communities in the proposed subprojects.

Expert Advice

☐ The National Government through the Department of Monuments and Sites of the National Museums of Kenya can assist in identifying and, mapping of monuments and archaeological sites; and

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

Completed by:

Name: Tared Otieno

Position / Community: Nyadong' - Afiga

Date: _____

Field Appraisal Officer (CDE): William Oboyo

Signature: _____

Date: 3/5/21

Appendix 8: ESIA Practising Licence

FORM 7 (x.15/2)


nema
natung'ya yote | shulimote | nejiba nyote

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/13629
Application Reference No: NEMA/EIA/EL/18097

M/S **FREDRICK ONYANGO ALOO**
(individual or firm) of address
P.O. Box 34188-00100, Nairobi

is licensed to practice in the
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
registration number **9049**
in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: 1/5/2021 Expiry Date: 12/31/2021


Signature.....
(Seal)
Director General
The National Environment Management
Authority

P.T.O.


Appendix 9: Photos of Public Participation



Appendix 10: Letter from NLC County Coordinator to Confirm that the Public Land is set aside for the Purpose



**COUNTY PROJECT COORDINATOR
SIAYA**
06 JAN 2022
RECEIVED
**KENYA CLIMATE SMART
AGRICULTURE PROJECT**

OFFICE OF THE COUNTY COORDINATOR
Ardhi House, 1st Floor
P.O. Box 803- 4060
Siaya

Tel: 0726881557
Ref: NLC /CC/SYA/GEN/VOL.I (54)

6th January, 2022

The County Project Coordinator,
Kenya Climate Smart Agriculture Project
Siaya County.

RE: CONFIRMATION OF PARCELS OF LAND AS PUBLIC LAND

Reference is made to your letter Ref: KCSAP/SYA/SUB-PJJ/VOL1 (140) dated 5th January, 2022.


This serves to confirm that the parcels of land listed below are public land.

S/ NO	Parcel Number	Reservation	Proprietor
1.	Siaya /Kobong/3077	Panyago Dam	Siaya County Council
2.	South Sakwa/Migwena /633	Ongiyo Dam	Siaya County Council
3.	Uyoma/Katwenga/595	Tinga Dam	Siaya County Council
4.	North Sakwa/Ajigo/272	Nyadong Water Point	Siaya County Council
5.	Uyoma/ Katwenga/373	Achar Pond	Siaya County Council

Kind regards,

Robert Wangalwa
County Coordinator

Nyadong water Pan NEMA License


nema
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Office of the County Director of Environment, Siaya County
P.O. Box 127-40600, Siaya Tel +254-726 537061
Siaya@nema.go.ke

APPROVAL NO: NEMA/BPA/B663
APPLICATION ID: NEMA/SPR/B/3/9041

1/3/2022


NEMA/SPR/SYA/5/2/289

Nyadong' Community Development Group
P.O. BOX 3 Siaya

RE: SUMMARY PROJECT REPORT APPROVAL FOR THE PROPOSED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (SUMMARY PROJECT REPORT) FOR THE PROPOSED REHABILITATION OF NYADONG' WATER PAN IN NORTH SAKWA WARD, BONDO SUB-COUNTY, SIAYA COUNTY. PLOT L.R NO.: THE TITLE OF THE LAND IS SHEET NUMBER 30 OF NORTH SAKWA/ AJIGO/ 272, BONDO, SIAYA COUNTY

Reference is made to your Summary Project Report submitted to the Authority on 2021-12-18 on the above subject.

The National Environment Management Authority (NEMA) has reviewed the Summary Project Report of the above mentioned proposed project and in light of the provisions of the Environmental Management and Coordination Act, EMCA 1990 and pursuant to Section 3(b) of the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019 the Authority has approved the proposed project with the following mandatory conditions.


NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
COUNTY DIRECTOR OF ENVIRONMENT
WILLIAM OPIYO ODEYO
P.O. BOX 127-40600 SIAYA COUNTY

FOR: DIRECTOR GENERAL