

Environmental and Social Impact Assessment Project Report for the Establishment of Proposed Earth Dam in Dhanabale Location, Tana River County.

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DECEMBER, 2020

CERTIFICATION

This is to certify that the Lead Expert hereunder as per the requirements of the National Environment Management and Coordination Act, 1999, carried out this Environmental Impact Assessment.

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20th December,2020

Proponent

I, the undersigned, certify that all kinds of information provided for the purpose of this Environmental Impact Assessment project report, without any prejudice, is true to the best of my Knowledge

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ACRONYMS

⁰ C	Degrees Celsius
AMS	Agricultural Mechanization Stations
AEZ	Agro-Ecological Zones
CMDRR	Community Managed Disaster Risk Reduction
EIA	Environmental Impact assessment
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
GoK	Government of Kenya
KWS	Kenya Wildlife Services
KP	Kenya Power
L.Us	Livestock Units
MM	Millimeters
NEMA	National Environment Management Authority
NDMA	National Drought Management Authority
NPEP	National Poverty Eradication Plan
OSHA	Occupational Safety & Health Act
PCC	Public Complaints Committee
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RPLRP	Regional Pastoral Livelihood Resilience Programme
SDGs	Sustainable Development Goals
TOR	Terms of Reference
WFP	World Food Program
WRMA	Water Resources Management Authority
WSB	Water Service Board
WSSD	World Summit for Social Development

EXECUTIVE SUMMARY

The Kenyan rangelands, especially the ASALs, have very low development indicators. This is characterized by high incidences of poverty and malnutrition requiring frequent relief assistance. The situation has been worsened by increasing human population and consequent shrinkage of the rangeland resource base and rural urban migration in search of alternative livelihoods. Investments in the rangelands rehabilitation and improvement will greatly contribute to the attainment of food and nutritional security as envisaged in the Constitution of Kenya and the Vision 2030.

Adaptation to extreme weather impacts is thus a priority under National Adaptation Programme Action plans (NAPAs). Among other objectives, NAPAs envisages improved livestock productivity through development of water instructors and pastures. Building pastoralist's resilience to climate change risks is the main objective under the Agricultural Sector Transformation and Growth Strategy, which in agriculture operationalizes the climate change Act.

The Kenya Climate Smart Agriculture Project (KCSAP) under the Support of World Bank (WB) intends to increase agricultural productivity and build resilience to climate change risks in the targeted pastoral communities in Kenya, and in the event of an eligible crisis or emergency, to provide immediate and effective response. This includes the containment of pests such as locusts. The Project activities will contribute to these objectives by up-scaling Climate-Smart Agriculture (CSA) Practices and supporting pastoralists to adopt integrated climate-smart Technology, Innovation and Management Practices (TIMPs) and also support investments through a community driven development approach in smallholder agro-pastoral production systems as well as extensive pastoral production systems in selected 24 counties of Kenya. It's against this backdrop that the County government of Tana River one of the recipient counties is seeking to undertake Environmental and Social Impact Assessment for proposed 50,000m³ Dhanabale water pan which fall under the second Schedule of Environment Management Act (EMCA).

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

This ESIA has considered all the relevant legal, policy and institutional framework, key among them; the World Bank Environment and Social Safeguards Policies, the existing environmental regulatory framework EMCA Cap 387 and the Environmental (Impact Assessment and Audit) Regulations of June 2003, Occupational Health and Safety Act (2007), the Water Act (2016), wastes disposal regulation of 2006, environmental standards, and sustainable use of natural resources principles. Other relevant legislations to this 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 ESIA process was achieved through public participation exercise and consultation involving 4 key informant (KI) interviews and Focus Group Discussions (2) as well as desk reviews of critical planning documentation such as Project Development Objective (PDO). The report gives a summary of the findings. The proposal is in line with vision 2030, County Integrated Development Plans (CIDP) and National adaptation Action Plan (NAAPs). Though the analysis from the assessment reveals positive livelihood and environmental impacts, a number of social risks such as gender based violence, environmental impacts such as dust, noise, soil compaction, clearing of vegetation and waste disposal. During the operation and maintenance phase, the negative impacts are on personal health and safety (water borne diseases may occur, mosquito breeding and drowning in the water pan), nitrate pollution from cow dung incase livestock shall be watered in the pan, siltation and loss of aesthetic value. Community members may also consume the untreated water. There also may be water demand conflicts especially during the dry seasons since the water may attract livestock and human populations. Water loss through evaporation may also occur. Mitigation measures against significant negative impacts during excavation will include, observation of safety by all within the site and stabilization of embankment through grassing and landscaping around the water pan, construction of spill way. Others include treating water before consumption. During operation phase

mitigation measures could be fencing off the site, soil conservation on the waterways. By-laws and watering schedules during dry seasons to reduce conflicts. More vegetation should be established through establishing a tree nursery for adapted trees. Cattle troughs be provided to avoid direct access of livestock that could lead to eutrophication of the pan. During decommissioning the water pan should be filled up with excavated soils. 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 main issues and concerns raised during public consultation and meetings relate to employment by the contractor and design issues such as number of water toilets and maintenance of the project. The issues were addressed by various stakeholders including the project engineer who was tasked with the revision of the bill of quantities to incorporate the need for separate toilets for each gender. The PCU and the contractor will in coordination with the local leadership undertake community awareness on GBV and put in place grievance redress mechanisms (GRM) for tracking and resolving any emerging issues during the Project implementation.

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

Based on the assessment, the project is, therefore recommended for approval by the National Environment Management Authority (NEMA). The conditional license will be tracked through annual environmental and social audits after operating for one year. Implementing the ESMP will cost Kes 1.8 million and shall be part of the project contract. The Proponent should share the ESMP with the Contractor and the latter will be required to develop and implement a Contractor-Specific ESMP (C-ESMP). The CPCU will follow up and monitor implementation of the ESMP. The CPCU/ CESSCO, contractor, the supervising water engineer, the proponent and the Tana River county environmental committee will be required to ensure that the mitigation measures proposed for the construction, operation and decommissioning phases in the ESMP are followed. The total cost of the proposed water pan is estimated at Kshs 38,885,000

CHAPTER ONE

1.0. INTRODUCTION

1.1. Project Background

The overall national development objectives of the Government of Kenya are accelerated economic growth and rising productivity of all sectors, equitable distribution of national income, alleviation of poverty through provision of basic needs, enhanced agricultural production, industrialization, accelerated employment creation and improved rural-urban balance. These objectives are facilitated through a myriad of interventions that are funded through local and international resource mobilization. The extent to which these objectives can be realized on a sustainable basis and in an environmentally sound manner is dependent on the degree and economic efficiency with which critical factors of production are made available and combined with each other to produce the desired results.

Access to clean and adequate safe drinking water and basic sanitation as stipulated in Article 43 of the Constitution of Kenya is a basic human right as well as critical objective of Sustainable Development Goal (SGD), No.6. Thus, this calls for significant capital investments in the sector to guarantee service provision. Tana River County has relatively low and inadequate water supply. In the proposed project area there is no piped water, the existing sources of water are water pans and a borehole. The only reliable water sources are sub surface water which are mostly contaminated and aggravates the cases of water borne diseases i.e. typhoid.

The proposed project site is located in Wayuboro location in Kokicha village. The proposed site is near a “larga” –dry river bed (an area which holds water when it rains). The land on which the Water pan will be established is community land. Wayu location has four primary schools- Wayuboro Primary school, Waiyo primary, Koticha primary and Baltumulitu primary. It also has seven ECDs namely, Koticha ECD, Koticha Odho 1, Koticha, Waiboro ECD, Matagala ECD, Baltumulitu ECD and Baltuabarufa ECD. The community is mainly pastoralist

The proposed water pan (sub-project) has more positive impacts on the community than negative impacts: provision of water for domestic uses and livestock, and creation of employment opportunities. It represents a key adaptation intervention to climate change that can cushion livelihoods from erratic weather patterns. Since the proposed project falls under the category of the second schedule of EMCA, its implementation calls for consideration of likely adverse social, cultural and economic impacts. The Environmental and Social Impact Assessment (ESIA) report predicts the likely impacts, their significance, and proposes mitigation measures for identified impacts. The Environmental and social Impact Assessment (ESIA) study for the project was conducted in December, 2020. The assessment considered all the impacts of the proposed project from construction, operation and decommissioning.

The report gives findings of the Environmental and Social Impact Assessment Study (ESIAs) undertaken as an integral part of design process. It highlights salient social and environmental issues associated with the design, construction and operational aspects of the proposed Wayu Water Pan Project.

1.2. Purpose and Nature of the Project

The purpose for which the project is initiated is to increase access to water for livestock productivity and climate change mitigation and adaptation. The overall objective of the project is to build resilience to climate related risks, poverty alleviation and environmental sustainability. The specific aims of the Environmental and Social impact assessment were to:

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

1.3. Terms of Reference

The key instructions to the ESIA expert/ consultant were as follows:

- ✓ Describe the proposed project activities with a focus on potential adverse impacts of inputs during construction, waste generation and disposal
- ✓ Elicit community and stakeholder views for effective decision making in line with World Bank ESS guidelines, EMCA and County government Act
- ✓ Review Kenya's environmental governance/legislation, World Bank group ESS policies and other standards related to the operation of the project and concise description of the same
- ✓ Establish Environmental baseline while identifying areas likely to be impacted by the project as per the laid down legislation and guidelines on the Environment
- ✓ Produce an ESIA report that identify key environmental and social aspects impacted on by the proposed project while recommending appropriate mitigation measures in accordance with Environmental Impact and Audit regulations, 2003 policies and relevant legal framework and World bank operation procedures, policies and safeguards OPs.
- ✓ Develop an Environmental & Social Management Plan (ESMP) outlining measures for minimizing, eliminating or mitigating the adverse impacts on the environment and ensuring the health and safety of the workers and community
- ✓ Recommend mitigation and action plans as reference for performance on Environmental management for internal and external stakeholders

1.4. Methodology

1.4.1 Environmental Screening Criteria

Screening exercise was undertaken to identify pertinent issues for coverage in line with the TOR to complement the world bank EMSF screening checklist findings. The pertinent issues are as outlined. The three important aspects of the ESIA process included: Collecting information, evaluating the information and presenting relevant social & environmental information for use in project planning, implementation, decommissioning, Monitoring and evaluation. The data collection achieved through administration of 35 questionnaires (Sample provided in Appendix V with a response of 90%), 4 gender (Youth, Women, Men and community leadership) segregated Focus Group Discussions and one community public baraza (Annex 1), attendance of 20 persons due to the current Covid 19 regulations)

Expert Consultations and scenario building were led by Fredrick Aloo, (Lead Expert and Tom Masanga Social Safeguards Specialist), Eng Omar Buya (Civil works), Nzioka Wambua (Livestock Specialist) and Michael Oyuga (Environmental Scientist). Some of the Key documents reviewed as source of secondary data include;

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

1.4.2. Data Collection Procedures

The Consultant used screening and scoping report to avoid unnecessary data. The data collection was carried out through questionnaires/standard interview schedules, key stakeholders' meetings, use of checklists, observations and photography, site visits and desktop environmental studies, where necessary in the manner specified in Part V (section 31-41) of the Environmental (Impact Assessment and Audit) Regulations, 2003 and World Banks ESS guidelines. The lead expert practicing license is attached in Annex (IX). The sample questionnaire and Key informant Interview schedule (KII) are in annex V. **The findings of the ESMF screening which informed the necessity for an ESIA Project report is in appendix (I) of this report.** The exercise was conducted through desk studies and field work. Before the fieldwork, specific areas were identified for subsequent site visits. These included areas where major operations and work would take place during construction and operation of the project. In many sections of this study, the history, designs, engineers', layout, Key informant and Focus Group Discussions feasibility report was used to inform the study. The general steps followed during the assessment were as follows:

- ✓ Environmental/social scoping that provided the key environmental issues
- ✓ Desk Stop studies and interviews
- ✓ Physical inspection of the site and surrounding areas
- ✓ Reporting

1.4.3. Environmental Screening and Scoping

This step was applied to determine whether an ESIA was required and what level of assessment was necessary. This was done in reference to requirements of the EMCA, 1999, and specifically the second schedule and World Bank Safeguard policies. Screening checklist form revealed that the water pan falls in second schedule 2 no 4.on Dams, rivers and water resources. The investment triggers OP.4.01 on environmental assessment and Kenyan law. An ESIA will therefore be carried out for the water pan. The approval will be done at the Tana River County County NEMA office.

Issues considered included the physical location, sensitive issues and nature of anticipated impacts. The Scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social, economic and cultural aspects whose analysis as given in Appendix II. The project does not trigger involuntary displacement and resettlement.

1.4.4. Desktop Study

This included review of existing documents in regard and review of proposed activities, project documents, designs policy and legislative framework (specified in section 1.4.1 above), as well as the environmental setting of the area among others. This was complemented with discussions with managers and design engineers and interviews with community.

1.4.5. Site Assessment

Field visits were carried out for physical observations of vegetation, water resources, physiography, geology and soil. At the visited sites, documentation on geology, soil characteristics and landscape were recorded. Photographs at selected sites were taken for inclusion in this report to further emphasize these observations. Field visits meant for physical inspections of the site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts were conducted. It also included further interviews with the community and key stakeholders.

1.4.6. Public Consultation

The ESIA experts, in consultation with KSCAP, Tana River sought the views of persons who may be affected by the proposed project. The public consultations were preceded by the identification of stakeholders and project affected persons (PAPs- appendix II) and plates 11-13. Public meetings were undertaken at the proposed site and the project area (Appendix on public baraza attendance- annex II). The general public baraza was attended by 20 persons because of the Covid 19 rules. While FDGs was attended by 35 persons. The record of minutes is provided in Appendices I evidence of attendance (photos) is provided in Appendix VI

1.4.6.1. Key Stakeholder Consultation

KII were carried out with the objective of improving the understanding of the procedures and key concerns in the ESIA process in general. The KII schedule is provided in Appendix (IV). A total of government 10 officers (lead agencies) were interviewed on specific issues of concern to the project implementation (administrative, legislative, policy instruments). The following were consulted

- ✓ Kenya Wildlife Service (KWS)
- ✓ Kenya Forest Service (KFS)
- ✓ County Environment Officers
- ✓ Department of Agriculture
- ✓ Governor office/ Ward office
- ✓ WRA (Water Resources Authority)
- ✓ Water Department
- ✓ Chief - Wayu Location
- ✓ Engineer civil works

1.4. Questionnaires

The aim of administering questionnaires was to capture community perception on the project's benefits, potential problems and possible solutions and whether they felt the project should be implemented or not. 90 % of the questionnaires were returned (Appendix V)

1.5. Data Analysis

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

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

In analysis of Environmental and social impacts the following were considered (provided in the checklist on appendix II)

- ✓ The current land use and impact of proposed project
- ✓ General land use of the adjacent sites
- ✓ Sensitive area and habitats or critical habitat
- ✓ Threatened plant and animal species
- ✓ Effects on Ambient/Natural Environment
- ✓ Topography- especially landscape and soil erosion
- ✓ Water quality aspects
- ✓ Soil conditions and potential contamination, landscape/aesthetics degradation
- ✓ Air quality in relation to atmospheric emissions and vehicles/machinery
- ✓ Noise and vibration
- ✓ Social issues
- ✓ project alternatives considerations such as scheduling, location, demand, technology, inputs and process alternatives

1.6. ESIA Responsibilities

The ESIA was to be carried out to full completion within a period of 21 days from the date of consultancy award. The Consultant (Lead Expert) coordinated the day-to-day functions and any related institutional support matters. The Consultant ensured constant briefing of the client during the exercise. The ESIA Report from the findings was compiled in accordance with the World Bank ESS guidelines as well NEMA and the findings where the (summary of the ESMP) subjected to community disclosure (Appendix viii) on 5th December 2020 where 20 community members attended under strict observation of Containment measures on COVID 19 and Ministry of Health Standard operating procedures (SOPs). Description plans and sketches showing various activities are part of the Appendices (Structural layout of the pan VII; **Ground layout and topographical map in Appendix VI and VII respectively**).

1.7. Organization of the ESIA Report

The report is organized into nine substantive chapters. Following this introductory chapter, Chapter 2 discusses the Nature of project and proposed activities. Chapter 3 highlights issues Policy, Legal, Regulatory and Institutional Framework. Chapter 4 provides an overview of Location and baseline information of the project. Chapter 5 analyses public participation and its outcomes chapter 6 discusses the project alternatives, Chapter 7 identifies the potential environmental and social impacts and mitigation measures. While chapter 8 provides the ESMP monitoring plan. Chapter 9 provides the conclusions and recommendation. This is followed by some of the literature sources consulted (References) and Annexes to the report.

1.8. Project Budget and Timelines

The estimates cost for constructing the water pan (Appendix) is estimated at a cost of Khs. **38,885,000**. The project construction and auxiliary works should be completed within 6 months will subject to satisfactory mainstreaming of World Bank ESS guidelines and operating procedures and upon NEMA and requisite statutory approvals.

CHAPTER TWO:

2.0 NATURE OF PROPOSED PROJECT AND PROPOSED ACTIVITIES

2.1. Location and Scale of Project

The proposed project is construction of water pan in Wayu ward, Galole sub County, Tana River County. Tana River County is one of the six Counties in the Coast Region. Wayu is a village found in Wayu Sub-location, Wayu Ward, and Galole Sub-County. It is situated approximately 35km west of Hola township. The main Shopping centre is in Hola which is situated 35km away. The coordinates of the water pan site is Longitude 039°48'03''E, Latitude 01°28'28''S. The Wayu Ward is predominantly inhabited by the Oroma Community whose main livelihood is pastoralism.

2.2 Project Description

The proposed project site is in Wayu village, Wayu location, Galole Sub County, Tana River County. The GPS Coordinates are Longitude 039°48'03''E, Latitude 01°28'28''S. Wayu is a village found in Dhanabale Wayu location. Galole sub-county, Tana River County, It is situated west of Tana River County. The main shopping market is Hola, the livestock market is Titila which is located 50km away from Wayu village. Wayu village is predominantly inhabited by Orma community whose main livelihood is livestock keeping. Population of Wayu Location stands at 5,045 persons. The project is envisaged to directly benefit community members from Wayu and its neighboring villages of migrant pastoralists. The households in the sub-locations are estimated to be 756 and 215 for Wayu and Koticha respectively (with an average of 6 persons per household for the two sub location).

Estimated livestock population likely to benefit from the project are as follows: cattle 10,000, goats 20,000, sheep 15,000, Donkey 200 and Camels 4,000 which are the average population of Livestock utilizing the area for dry season grazing. **The land parcel measures 4 Ha under the trustee of Tana River County government registration.** The proposed project is construction of a 50,000 m³(Cubic meter) water pan of

2.2.1 Proposed Works

The proposed works to be undertaken in the construction will consist of the following activities;

- Survey, design and preparation of BOQ
- Sites identification, Bush clearance and scooping of the reservoir
- Mass excavation
- Hauling and compaction of excavated materials
- Construction of 2No. Inlet channels
- Construction of outlet channel of average width 5m and depth of 0.5m
- Construction of rip rap and sill
- Stabilization of embankments through Grassing or planting drought resistant vegetation
- Grass planting, trees planting and terracing
- Fencing
- Draw-off system for both livestock and human beings
- Construction of latrines

2.2.2 . Design Drawings and Specifications

Drawings useful to prepare for the construction of the water pan will be:

- A plan of the pan wall and spillway.

- A cross section of the pan wall and
- A profile of the pan site (longitudinal drawing of the pan wall including key and crest)

2.2.3 Activities Involved

The Project activities will include: Clearing, Excavation to remove overburden, Hauling and Compaction of Excavated Material, Site the water pan and mark the embankment, inlet and spillway, Excavate the reservoir section and use the soil to build the embankment wall, with side slopes of 1:2.5 for shallow pans to 1:3 for deep pans. Spillway will then be construct to discharge excess runoff water when the pan is full. Construct silt trap(s) along the inlet channel to filter excess sediment load and close off the water pan with live fence to keep off the livestock. Livestock watering trough will also be provided off the fenced area, Fencing and Stabilization of embankment through Grassing or planting drought resistant vegetation. Other activities will be:

- Engineering designs and production of tender documents
- Supervision of the excavation works
- Supervision of the construction of water off take works, fence and possible cattle troughs
- Supervision of the fencing of the water pan.
- Facilitating the training of the communities in sustainability of the water pan to prolong abstraction periods.

2.2.4 .Expected Output

The expected output of the excavated Wayu Water Pan will include;

- At least 50,000m³ excavated reservoirs.
- Assured availability of water for both livestock and human use.
- Improved Food security
- Controlled Soil erosion
- Reduction in poverty levels among the beneficiaries
- A happy community and food self-reliant

The project activities will mainly involve the civil works associated with excavation and scooping taking into account environmental protection.

2.3 Mobilization of Construction Works.

Site mobilization includes the stepping up of a camp for construction works and transportation of machinery to site for excavation works. This stage of the project will also involve clearing of vegetation i.e. trees and shrubs to allow for the excavation of the pan.

2.3.1 Earth Works.

Earth works will involve the following activities that will eventually create a water storage structure of capacity 50,000m³.

2.3.2 Stripping of the Top Soil (Pan Excavation)

Top soils will be striped with an earth moving machine to an average depth of 200mm over the full foundation area. This will create a volume of spoils that will not be useful in the pan construction. The appropriate disposal of the spoils will be necessary to ensure no stockpiles.

2.3.3 Excavation below top soil and create an earth embankments

The anticipated water demand required is 277m³/day and arising from above one number pan of capacity 50,000m³ is proposed against an estimated requirement of 72,713m³. Strap trap dimensions will have an Inner dimension of 30 m by 20 m while outer dimensions will be of 45 m by 35. The Bottom inlet width will be of 6 m and top width at 10 m. The Spillway top width will be 10 m and

bottom width of 6m. This will create a volume of 50,000m³ in spoils to be transported and compacted in maximum layers of 200mm to form the embankment of the water pan maintaining a side slope of 1:2.5.

2.3.4 Prevention of local erosion

In order to check erosion and reduce the silt load into the pan all constructed or excavated area that is susceptible to erosion were to be protected using hardcore. These areas may include the livestock troughs, silt trap inflow and outflow channels.

2.3.5 Fencing and environmental conservation

The pan is to be fenced off using barbed wire on well-seasoned posts to ensure safety of the local community, livestock and wildlife. It is proposed that tree planting be done along the earth embankments in order to control soil erosion.

2.3.6 Excavation of silt trap

A silt trap will be constructed to check the amount of soil that is transported into the pan hence increase the life span of the structure. This will involve clearing of vegetation over a surface area of and excavating a depth of 2m. This will create a volume of spoils that would require to be disposed of appropriately. The silt volumes expected per year is 1,400m³ and hence adopt a standard silt trap of capacity 20m by 30m by 2m depth.

2.3.7 Catchment Yield

The catchment area is estimated at 35km² In view of the above, the catchment yield is estimated at 63,840m³ per year.

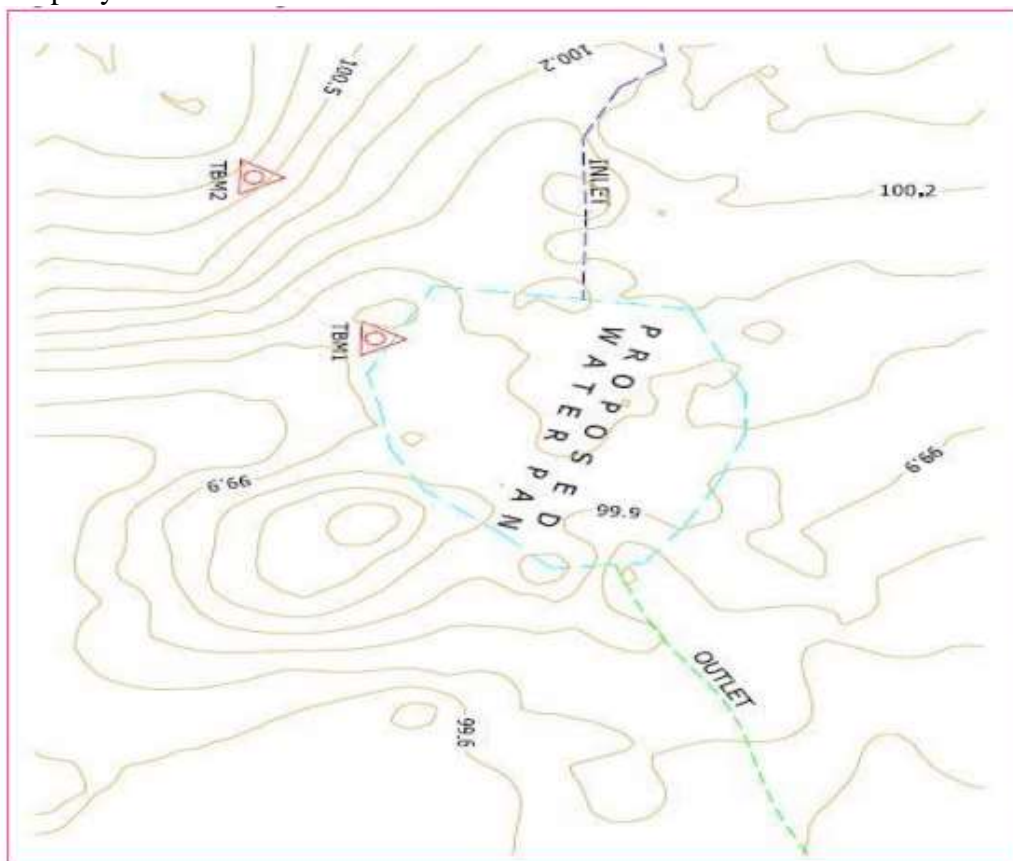


Figure 1: Contour map depicting topography of the Gururi catchment area

2.3.8 Availability of run-off

To establish the amount of run off to be expected in the catchment area, the size of the catchment area was estimated at 35km². This was arrived at after considering the topography of the catchment area and the extent of the favorable slope, as illustrated by the contour map in figure 1 above.

To sum up all the losses which includes losses due to evapotranspiration, seepage and deep percolation, a factor known as runoff coefficient is used as a fraction of the precipitation volume. The runoff coefficient is dependent on the surface type of the catchment. The run-off coefficients in table 1 below are used for calculating the fraction of rainfall that can be harvested (Water Supply Manual, 2005).

Table 1: Runoff Coefficients

Type of surface	Rational Run-off Coefficients, (f)
Roof tiles, corrugated sheets, concreted bitumen, plastic Sheets	0.8
Brick pavement	0.6
Compacted soil	0.5
Uncovered surface, flat terrain	0.3
Uncovered surface, slope 0-5%	0.4
Uncovered surface, slope 5-10%	0.5
Uncovered surface, slope >10%	>0.5
Pasture surface in ASAL areas with scanty rainfall	0.10 – 0.12

Source: MWI Water Supply Manual, 2005

2.3.9 Dimensions

Considering the shape of the catchment and available land, Rectangle shape is proposed. To avoid short circuiting, the length is normally double the width. Arising from above and avoiding wastage, Length of 110m against a width of 65m has been adopted.

2.3.10 Depth

According to the Ministry of Water and Irrigation Practice Manual for Small Dams, Pans and Other Water Conservation Structures in Kenya dated August, 2015 on page 142 requires pans to have a minimum depth of 2.50m and a maximum of 5.0m. However, for Wayu Water Pan, since it is located in a semi-arid zone where a depth of 10-12 foot is recommended, a depth of 2.8m has been recommended if clay soil is found beyond 2.5m but if less, a maximum depth of 2.5m with clay lining from shallow depths shall be pursued. The geotechnical investigations indicates that there is clay soil from 0.3m to 1.5m and may be beyond at an identified site. However, if this is not achieved, lining with the excavated clay soil should be considered

2.4 Projected Population Beneficiaries

2.4.1 Human

Population of Wayu Location stands at 5,035 persons where 2,461 and 2,584 are males and females respectively. The project is envisaged to directly benefit community members from Wayu and Koticha sub locations including villages of migrant pastoralists. The households in the sub-locations are estimated to be 756 and 215 for Wayu and Koticha (with an average of 6 persons per household for the two sub location).

2.4.2 Livestock

The main livestock kept are sheep, cows, goats, donkeys and camels. The area is rangeland utilized for livestock keeping

CHAPTER THREE:

3.0 POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

This chapter outlines the policy, legal, regulatory and institutional framework in Kenya particularly for environmental management, protection and assessment applicable to the proposed Wayu Water Pan Project. The Project will be subject to laws, regulations, guidelines and standards of the Government of Kenya and international institutions (IFC/World Bank). Note that wherever any of the laws contradict each other, the Environmental Management and Coordination Act (EMCA) prevails.

3.2 Policy Framework

Applications of national statutes and regulations on environmental conservation suggest that the owner of any project has a legal duty and responsibility to discharge wastes of acceptable quality to the receiving environment without compromising public health and safety. This position enhances the importance of an ESIA for the proposed water pan project to provide a benchmark for its sustainable operation when it is finally commissioned. The Wayu Water Pan Project complies with government policy framework by the act of the proponent conducting ESIA project report before initiating any civil works on the project.

3.2.2 Kenya ASAL Policy-Sessional Paper No. 8 of 2012

The national policy titled ‘Releasing our full potential’, has five key elements among them affirmative action that equitable development needs the support of all Kenyans; an enabling environment for accelerated investment in ‘foundations’ to reduce poverty and build resilience & growth; a responsive government to the uniqueness of arid lands which include ecology, mobility, population distribution, economy and social systems.

Relevance

The policy also focuses on climate resilience requiring Government to find solutions to climate challenges and come up with measures to manage drought & strengthen livelihoods. All these elements are hinged on an institutional framework for their delivery and provision of water for domestic and livestock.

The ASAL Policy is complemented by Vision 2030 Development Strategy for Northern Kenya and other Arid Lands in Kenya, which accommodates the unique realities of the **ASALs** to achieve the goals of Kenya Vision 2030.

3.2.3 Vision 2030 Development Strategy for Northern Kenya and other Arid Lands

The strategy was developed to complement Vision 2030 by explaining how its goals would be realized in the specific context of Northern Kenya and other ASALs. The main policy challenge is to ensure food and nutrition security in a sustainable manner in environments that are prone to drought, insecure access to and control over livelihood resources such as land, and where climate change increase unpredictability. .

The strategy envisions a holistic and sustainable management of land and natural resources across the ASALs to allow for maintenance of their traditional movement arrangements.

Relevance

The proposed interventions include: *Pan Construction which will provide resilience to the pastoral communities by availing water even during periods of scarcity. The Environmental Management and Coordination Act (EMCA) gives more emphasis to ASAL-specific issues; increasing the institutional capacity and funding for arid lands research and extension services; ensuring that the interests of pastoralists, particularly women, are adequately and appropriately addressed*

3.2.4 Sessional Paper No. 2 of 2008 on the Livestock Policy (Revised 2014)

The policy recognizes that ASAL's have an enormous potential but are characterized by low development indicators and high incidence of poverty. Other factors that have negatively affected the development of the ASALs include: shift from pastoralism due to increase in human population; increased settlement of pastoralists; increased cultivation and land subdivision; land degradation; resource use conflicts; reduced dry grazing reserves and wildlife interaction.

The policy proposes a number of measures to support livestock production. These include: that the county governments undertake *initiatives* to enhance water and feed availability by encouraging appropriate grazing management strategies, fodder and pasture conservation; and proposes that the national and county governments promote development of water infrastructure and fodder.

Relevance

The policy notes the fragility of the range environment and the need to develop strategies that will protect the range resources. It recommends that county governments institutionalize the involvement of the communities in planning, development, utilization and monitoring of range resources. It also provides for the two levels of governments, in partnership with other stakeholders, to continue supporting pastoralism and agro-pastoralism and develop strategies to ensure sustainable utilization of the range resources mainly range water.

3.2.5 National Land Use Policy 2017

The overall goal of the national land use policy is to provide legal, administrative, institutional and technological framework for optimal utilization and productivity of the land related resources in a sustainable and desirable manner at national, county and community levels. The policy is premised on the philosophy of economic productivity, social responsibility, environmental sustainability and cultural conservation. Key principles informing it include efficiency, access to land use information, equity, elimination of discrimination and public benefit sharing

- ✓ *Measures to secure pastoralists livelihoods and tenure of land are proposed which ensures that all land uses and practices under pastoral tenure conform to the principles of sustainable resource management. The water pan development project would conform to the principles of sustainable resource management.*

3.2.6 HIV /AIDS Prevention and Control Act 2006 and Gender Mainstreaming:

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

- ✓ *The proponent will use the policy in promoting integration of reproductive health and HIV and AIDS services in all phases of the project. The proponent ensure that that there is integration of HIV and AIDS information and services into reproductive health services at all levels and ensure adequate capacity for provision of the integration at all levels. The project is therefore*

expected to create awareness on HIV/AIDs and gender issues in all the stages of implementation

3.2.7 Agricultural Sector Transformation and Growth Strategy 2019-2029

The importance of agriculture has been emphasized in Kenya through Vision 2030 and the Medium Term Plan III and most recently the President's Big Four priority agenda for 2017-2022, which emphasizes the importance of 100% food and nutrition security for all Kenya. To transform Kenya's agricultural sector and make it a regional powerhouse, the Government has formulated the Agricultural Sector Transformation and Growth Strategy (ASTGS). The Strategy is based on the belief that food security requires a vibrant, commercial and modern agricultural sector that supports Kenya's economic development sustainably and its commitments to regional and global growth

- ✓ *Among the key flagships in the ASGTS is support to irrigation infrastructure. Achieving our potential in agriculture will achieve food and nutrition security, improve our farmer/pastoralists and local community incomes, lower the cost of food, increase employment (particularly for women and youth).*
- ✓ *The proposed water pan will provide water for both domestic and livestock hence addressing some of the core objectives in the strategy*

3.2.8 Kenya National Youth Policy 2018

The policy seeks to provide an opportunity for improving the quality of life for Kenyan youth through their participation in economic and democratic processes as well as in community and civic affairs. It also advocates for creation of a supportive social, cultural, economic and political environment that will empower the youth to be partners in national development.

- ✓ *The proponent will ensure that the youth are involved in all phases of the project through participation, consultations management and during construction, operation and even decommissioning phases. The youth will also be given access to government procurement opportunities as per the public procurement authority act*

3.2.9 National Climate Change Action Plan 2018-2022

Kenya's National Climate Change Action Plan is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. The National Climate Change Action Plan (2018-2022) identifies priority adaptation and mitigation actions for transforming to a low carbon climate resilient development pathway. The priority adaptation actions for agriculture in the plan include Coordination and mainstreaming of climate change into agricultural extension; establishment and maintenance of climate change related information for agriculture; and upscaling specific adaptation and mitigation actions.

- ✓ *Development of the water pan would enhance ground cover water percolation and lead to low carbon resilient development through planting of indigenous trees fodder production around the catchment areas.*

3.2.10 National Gender Policy 2011

The purpose of this Ministerial Gender Policy is to institutionalize The Kenya National Policy on Gender and Development (NPGD), 2000 within the Ministry of Gender, Children and Social Development. It articulates the policy approach of gender mainstreaming and empowerment of women. This policy is designed to provide a framework for the conceptualization, design, implementation, monitoring and evaluation of the Ministry's programme. The Ministry of Gender, Children and Social Development is guided by the national policy as the national machinery leading gender mainstreaming in the country, recognizes that in the past its work has proceeded without a gender policy.

Since the conception of the project, KSCAP has engaged all stakeholder including women and the disadvantaged groups as compliance to this policy. Women are also encouraged to participate through inclusion to the various committees that the project use to implement the project.

3.2.11 National Policy for Prevention and Response to Gender Based Violence 2014

The policy seek to ensure; a coordinated approach in addressing GBV and effective programming; enhanced enforcement of laws and policies towards GBV prevention and response; increase in access to quality and comprehensive support services across sectors; and improve sustainability of GBV prevention and response interventions.

GBV is based on socially ascribed (gender) differences between males and females. Gender can be seen as the allocation of roles, attitudes and values that are deemed by the community to be appropriate for each sex. These roles define power relations between men and women regarding who makes decisions and who owns resources. They are learned and reinforced through interactions in the home and community.

Relevance

The proponent will ensure that there is no aspect of GBV based on the roles of the weak and vulnerable members of the community who will be participating in all phases of project implementation by undertaking the following measures

- ✓ *Capacity building for GBV response including training of GBV clinicians; the Post Exposure Prophylaxis (PEP) kits distribution programme; and the GBV Information Management System (GBVIMS).*
- ✓ *Protect vulnerable persons by implementing a witness protection programme for GBV victims and survivors.*
- ✓ *Establish an elaborate communication strategy incorporating all actors including the public, service providers, government agencies and non-state actors so as to effectively respond to GBV.*

3.2 Legal Framework

There are several pieces of legislation and policy documents related to this kind of development in Kenya. These include, but not limited to the Constitution of Kenya 2010, the Environmental Management and Coordination Act (No 8 of 1999), Sessional Paper No 9 of 1999 on Environment and Development, Physical Planning Act (Cap. 286), the Panel code (Cap 63), the Public Health Act (Cap.242) the County Government Act (No 17 of 2012) the Building code, the Factories and Places of Work Act (Cap.514), the Community Land Act (No 27 of 2016), Sustainable Development Goals(SDGs), Millennium Declaration and Brundtland Commission Report(“Our Common Future”) of 1987

3.2.1 Constitution of Kenya 2010

The constitution is the supreme law of the land of Kenya. The Constitution require the public to be consulted and the study has complied by consulting the public. It has also developed measures to mitigate foreseen impacts which will ensure sound management of the environment. Article 42 states “every person has the right to a clean and healthy environment, which includes the right a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69, and b) to have obligations relating to the environment fulfilled under Article 70”. There a number of provisions support this investment however key among others is Part 3 article 56. The State shall put in place affirmative action programs designed to ensure that minorities and marginalized groups— (b) are provided special opportunities in

economic fields; (c) are provided special opportunities for access to employment; (d) develop their cultural values, languages and practices; and (e) have reasonable access to water, health services and infrastructure.

Relevance

- ✓ *In conformity with the Constitution of Kenya 2010, every activity or project undertaken within the Republic of Kenya must be in tandem with the state's vision for the national environment as well as adherence to the right of every individual to a clean and healthy environment..*

3.2.2 The land Act, 2012 (Legal Notice 6)

This is an act of parliament to give effect to Article 68 of the constitution to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes. The Act applies to all land declared as: (a) public land under Article 62 of the constitution ; (b) private land under Article 64 of the constitution; and (c) community land under article 63 of the constitution and any other written law relating to community land. The utilization of land resources under this category of land provided in the constitution, this act or any other written law is guided by the following values and principals of land management and administration

- a) Equitable access to land
- b) Security of land rights
- c) **Sustainable and productive management of land resources**
- d) Transparent and cost effective administration of land
- e) Conservation and protection of ecologically sensitive areas
- f) Elimination of gender discrimination in law, customs and practices related to land property inland

The proposed water pan development project is a central development activity that utilizes sensitive components of the land hence the need to adhere to the values and principals of Sustainable and productive management of land resources.

3.2.3 Environmental management and coordination ACT (EMCA), Cap 387

Part II of the Environmental Management and Coordination Act entitles every person in Kenya a clean and healthy environment. It seeks to safeguard and enhance sustainability of the environment. The act is a consolidation of the various sectoral laws on the environmental conservation, which had hitherto made it difficult to coordinate environmental protection. In the act are provided guidelines on issues of environment and stipulates offences and penalties for failure to adhere to the act. The proposed project has been researched, compiled and written in accordance with the Environmental Impact Assessment and Audit regulations, 2003, regulation 7(1) and the second schedule. It will be submitted to NEMA which has the overall responsibility of enforcing this act. The Act also lists the type of projects which must be subjected to the EIA process. *The proponent appoints ESIA experts to conduct the ESIA and produce a project report to comply with and meet the requirements of this legislation*

3.2.4 Environmental (Impact Assessment and Audit) Regulations, 2003

This is a supplementary legislation to the EMCA. It gives additional punch by providing guidelines for conducting Environmental Impact Assessments and Audits. It offers guidance on the fundamental aspects on which emphasis must be laid during field study and outlines the nature and structure of Environmental Impact Assessments and Audit reports. The legislation further explains the legal consequences of partial or non-compliance to the provisions of the Act

Environmental impact Assessment (**EIA**) is carried out in order to identify the positive and the negative impacts associated with the proposed project with a view to taking advantage of the positive impacts and developing mitigation measures for the negative ones.

Relevance to the proposed project.

The water pan development project as an activity is listed in the second schedule of EMCA as among projects that require a Summary Project Report as per Legal Notice No 31 and 32, before commencement. The project cannot start before the license is granted, upon conducting the ESIA. For this reason, this report provides the legal requirements for the project approval and provision of license to the client by NEMA County Director's office.

3.2.5 Environmental Management and Co-ordination (Waste Management) Regulations, 2006

Regulations guiding waste management are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006. They offer legal provisions on handling of a variety of wastes emanating from various projects and activities. The waste categories covered by the regulations include;

Industrial wastes, hazardous and toxic wastes, pesticides and toxic substances, biomedical wastes, radio-active substances and other undesired wastes solid and soft wastes.

These Regulations outline requirements for handling, storing, transporting, and treatment / disposal of all waste categories as provided therein.

Relevance to the proposed project

The proposed water pan Project , during construction phase may involve the use of materials that release hazardous waste i.e. cement, oil spillage from moving vehicles carrying construction materials and during construction works, any other solid wastes hence the need for all project actors to abide by these regulations in dealing with such wastes which may be handled during operation phase, implementation phase and commission phase of the project and during continuation management of the project.

3.2.6 Environmental Management and Coordination (Noise and Excessive Vibration Pollution) Control Regulations, 2009

The regulation prohibits making or causing any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others (individual or communities) and within the surrounding environment and biodiversity.

Relevance to the proposed project

Under the regulation, the Contractor is prohibited from producing excessive noise and vibrations which annoy, disturb, injure or endanger the comfort, health or safety of others and the environment or excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source. Under the regulation, the Contractor will be required to undertake daily monitoring of the noise levels within the project area during construction period till completion to maintain the compliance in the project site and the close neighboring community.

3.2.7 Environmental Management and Coordination (Fossil Fuel Emission Control) Regulations, 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74 of October 2006 and applies to all internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnerships to control fossil fuel emissions.

Relevance to the proposed project

The fossil fuels considered are petrol, diesel, fuel oils and kerosene. This will be applicable to equipment and machinery used in ferrying construction materials in the project site during operation phases of the project, hence excessive emissions of combustion smoke should be controlled. Trucks ferrying construction every now and then to and from the project site should have acceptable combustion levels all the time.

3.2.8. Physical Planning Act, 1999

It provides for the preparation of a physical development plan for the purpose of improving the land and providing for the proper physical development of such land, and securing suitable provision for transportation, public purposes, utilities and services, commercial, industrial, residential and recreational areas, including parks, open spaces and reserves and also the making of suitable provision for the use of land for building or any other purposes. Section 29 of the Act empowers local authorities to control all development activities so as to ensure conformity to approved planning standards. Section 30 states that any person who carry out development without permission will be required to restore the land to its original conditions.

Relevance

- ✓ *The Act also provides an environmental impact assessment for a project which is likely to have injurious impact on the environment. Such an EIA is approved by the National Environment Management Authority (NEMA).*
- ✓ *Undertaking this ESIA project report was sanctioned by KCSAP is in tandem with the provisions and is in line with sectoral and spatial planning and Tana River County CIDP.*
- ✓ *The Project is likely to have a variety of changes acquiring land to enable construction works. For each development case, the stipulated procedure laid down by this Act shall be complied with before the activities begin in liaising with the County Government to have the title deed document for legality.*

3.2.9 County Government Act 2012

The Act replaces the Local Government Act (Cap. 265) and gives effect to chapter 11 of the constitution, spells County government powers, functions and responsibilities and range of services under the purview of County governments. The relevant sections of the Act which impact on the project are provisions which touch on:

- ✓ County planning
- ✓ Public communication and information access for effective citizen participation
- ✓ The Integration of minorities and marginalized groups in development planning (VMGs)
- ✓ Dispute resolution concerning planning processes in particular the CIDP, sectoral and spatial plans

In particular Section 115 of the act provides for Strategic Environmental Assessments and Environmental Impact Assessments (EIAs) in Project planning as decision making tools. Among the services devolved to county governments include waste management such as sewerage systems and solid waste handling infrastructure. County authorities thus have responsibilities to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with all kinds of refuse and effluent and where such service is established, compel its use by persons to whom the service is available. To effect the Act, County governments are empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided under the Act.

- ✓ *Undertaking this ESIA process comply with the outlined principle of citizen participation and aligns well with the CIDP, sectoral and spatial plans as the current site evidenced by registration of the Water pan management committee and water user associations*

- ✓ The Grievance Resolution mechanism has been ensured through awareness and sensitization meetings with the county department for public participation taking the lead
- ✓ The ESIA process captures Conflict resolution GRM protocols which is in line with county government Act on public participation and conflict resolution as well resonates and complements county government service provision obligations

3.2.10 Water Act No. 43 of 2016

The Act provides for the regulation, management, development and use of water resources, and water and sewerage services. It has provisions for formulation of five-year integrated water services strategy with plans, programs for protection, conservation, control and management of water resources; establishment of water sector institutions which include Water Resources Authority (in place of Water Resources Management Authority) to regulate water rights and works; the National Water Harvesting and Storage Authority (in place of National Water Conservation and Pipeline Corporation); the Water Services Regulatory Authority (in place of Water Services Regulatory Board); Water Works Development Agencies (in place of Water Services Boards); the Water Sector Trust Fund (in place of Water Services Trust Fund) to enhance water services; the Water Services Regulatory Authority to control water service providers, and the Water Tribunal (in place of Water Appeals Board) for dispute resolution.

Relevance to the proposed project

The proposed water pan will have to adhere to the regulations in the water act. The act addresses issues on conservation of water, water abstraction rights and water harvesting and storage to satisfy human and livestock needs, and to protect ecosystems to secure ecologically sustainable development, including the responsibilities of county governments and public private partnerships.

3.2.11 Forest Act

The forest Act, 2005 recognizes that forest play a vital role in the stabilization of soils and ground water, thereby supporting the conduct of reliable agricultural activity and that play a crucial role in protecting water catchment in Kenya and moderating climate by absorbing greenhouse gases. The act recognizes that forest provide the main locus of Kenya's biological diversity and major habitat for wildlife.

*In the proposed project site there are sparsely distributed standing indigenous trees *Acacia tortilis*, *Acacia brevispica* and bushes of *Salvadora persica*, *Sueda monoica* , *Cadaba farinose* If the trees and bushes are cut to open up the area then planting of similar indigenous trees must be done around the catchment areas upstream and downstream*

3.2.12. The Wildlife Conservation and Management Act, Cap 376

The Act provides for the protection, conservation and management of wildlife in Kenya. The provisions of this Act should be applied in the management of the project especially where it passes through protected wildlife habitats, migratory areas or dispersal corridors. The Act establishes the Kenya Wildlife Service (KWS) and provides for the establishment of national parks and national reserves and defines how they are to be managed. As per the Act the mandate of KWS is to License, control and supervision of all wildlife conservation and management activities outside the protected areas; conservation education and training; and Wildlife Research.

Relevance

- ✓ *The project site has birds and snake's species of insignificant biological conservation. Further, the sub- project will have minimum if any impact on the present wildlife. However, the*

contractor as provided for in the ESMP will replant all removed vegetation and enhance the site aesthetics by planting indigenous trees

3.2.13 The Community Land Act, 2016

This is an act of parliament that effects the administration and management of community land. It states that a registered community may by a resolution of the majority members of that community in a general meeting, reserve a portion of the community land for communal purposes.

Subject to Article 40 (3) of the Constitution and the Land Act, no interest in, or right over community land may be compulsorily acquired by the State except in accordance with the law, for a public purpose, and upon prompt payment of just compensation to the person or persons, in full or by negotiated settlement.

County governments shall hold in trust all unregistered community land on behalf of the communities for which it is held. (2) The respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land.

A county government shall not sell, dispose, transfer, and convert for private purposes or in any other way dispose of any unregistered community land that it is holding in trust on behalf of the communities for which it is held.

For the avoidance of doubt, until any parcel of community land has been registered in accordance with this Act, such land shall remain unregistered community land and shall, subject to this Act, be held in trust by the county governments on behalf of the communities for which it is held pursuant to Article 63(3) of the Constitution.

The community shall elect between seven and fifteen members from among themselves to be the members of the community land management committee as provided in section 15, who shall come up with a comprehensive register of communal interest holders.

Relevance

In compliance to the Community Land Act, members of the Wayu community held a meeting and a resolution was made that the land can be designated for the water pan. Documentation of consent by the community leaders is annexed in the report.

3.2.14 Occupational Health and Safety Act, 2007

The Act provides for the safety, health and welfare of workers and all persons lawfully present at work place, as well as the establishment of the National Council for Occupational Safety and Health and for connected purposes. **Section 3(1) and (2)** of the Act explains that it applies in all workplaces where any person is at work, either temporarily or permanently. It expounds on the purpose, which is to secure the safety, health and welfare of persons at work as well as protecting persons other than persons at work against risks resulting from, or connected to, activities at workplace. Further, sections 43 and 44 of part V give regulations on registration of work places

Relevance to the proposed project

The construction of the water pan will require significant manpower to work and will thus result in employment of quite a number of people. There will also be need for designated workplaces for operation. Thus, compliance with the relevant provisions in this Act will be vital in ensuring that workers operate in safe healthy environment, and that their welfare shall be catered for. Also to ensure a safe working environment for the workers, through provision of appropriate Personal Protective Equipment (PPE), adequately equipped clothing, first aid kits, and fire safety apparatus, training on use of the above, emergency response mechanisms and health schemes as required by the Act.

3.2.15 Public Health Act (Cap 242)

This Act makes provision for securing and maintaining health. Part III and IV of the Act focuses on notification, prevention and suppression of infectious diseases, including inspection, disinfection and provision of medical aid to affected parties in case of outbreaks of infectious diseases. Part IX regulates on sanitation and housing, granting health authorities powers to prevent or remedy any dangers to health arising from poor handling of sanitation issues as well as improper housing and nuisances arising there from. Besides, regulations governing prevention and destruction of mosquitoes, encompassing due maintenance of yards, premises, wells, cesspits and identification and destruction of breeding places are entailed in part XII. Also disposal of wastes.

Relevance to the proposed project

Sanitation and waste disposal, built structures, disease outbreaks and communal resource sharing are obvious issues in project during construction and implementation phase. The Public Health Act provides the necessary legal guidelines regulating measures aimed at effective control and management of the said issues is adhered to avoid break down of communicable and other diseases. During the commissioning phase there may be increased incidences of malaria due to large standing water mass hence the need to undertake capacity building on appropriate hygiene sanitation and provision of mosquito nets.

3.2.16 Work Injury Benefits Act (WIBA), 2007

The **WIBA** Act provides for compensation to employees for work related injuries and diseases contracted in the course of their employment in work places and for connected purposes.

Section 7(a) of the Act, on the obligations of the employer, requires an employer to obtain and maintain an insurance policy with an insurer approved by the State in respect of any liability that the employer may incur under this Act to any of his employees.

Section 10(1) States that an employee who is involved in an accident resulting in the employee disablement or death is subject to the provisions of this Act, and entitled to the benefits provided for under this Act. It also states expressly that an employer is liable to pay compensation in accordance with the provisions of this Act to an employee injured while at work.

On First Aid covered in **section 45(1)**, an employer is supposed to provide and maintain such appliances and services for the rendering of first aid to his employees in case of any accident as may be prescribed in any other written law in respect of the trade or business in which the employer is engaged.

Relevance to the proposed project

As workers are employed by the project contractors during the construction works, they may face myriad of challenges to their health, safety and security, either from the equipment of use or work processes. WIBA offers legal backing on the incidents or accidents at the workplace or while on duty, including First Aid and compensation aspects. It is thus important to integrate the relevant provisions of this Act in the proposed water pan development project Activities by the contracting agency.

3.2.17 HIV /AIDS Prevention and Control Act 2006 and Gender Mainstreaming:

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

Relevance to the project

It addresses the gender issues in sexual and reproductive rights which is the unequal social relations between men and women that give rise to gender inequalities in health. One of the key challenges identified is the inadequate integration of reproductive health and HIV and AIDS services. It proposes to ensure integration of HIV and AIDS information and services into reproductive health services at all levels and ensure adequate

capacity for provision of the integration at all levels. The project is anticipate to create HIV/ AIDs and gender issues in all the stages of implementation.

3.2.18. The Sexual Offences Act, 2006

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

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

3.4 Institutional Framework

3.4.1 The National Environmental Council

The Act (EMCA) has established a public Complaints Committee, which provides the administrative mechanism for addressing environmental harm. The committee has the mandate to investigate complaints relating to environmental damage and degradation. Its members include representatives from the Law Society of Kenya, NGO and the business community.

3.4.2 The National Environmental Management Authority

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of the government in implementation of all policies relating to the environment

3.4.3 The Standards and Enforcement Review Committee

In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee (SERC)

3.5 World Bank Environmental safeguards

3.5.1 OP/BP 4.01 (Environmental Assessment)

The World Bank has well-established environmental assessment procedures, which apply to its lending activities and to the projects undertaken by borrowing countries, in order to ensure that development projects are sustainable and environmentally sound. Although its operational policies and requirements vary in certain respects, the World Bank follows a relatively standard procedure for the preparation and approval of an environmental assessment study, which:

- Identifies and assesses potential risks and benefits based on proposed activities, relevant site features, consideration of natural/human environment, social and trans-boundary issues
- Compares environmental pros and cons of feasible alternatives
- Recommends measures to eliminate, offset, or reduce adverse environmental impacts to acceptable levels (siting, design, technology offsets)
- Proposes monitoring indicators to implement mitigation measures
- Describes institutional framework for environmental management and proposes relevant capacity building needs.

The environmental assessment evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating

and managing adverse environmental impacts throughout project implementation. The assessment takes into account: the natural environment (air, water, and land); human health and safety) social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects. Preventive measures are favored over mitigation or compensatory measures, whenever feasible. This approach is universally applied in many institutional projects.

The World Bank considers environmental impact assessment (EIA) as one among a range of instruments for environmental assessment. Other instruments used by the World Bank include regional or sectoral environmental assessment, strategic environmental and social assessment (SESA), environmental audit, hazard or risk assessment, environmental management plan (EMP) and environmental and social management framework (ESMF). The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of environmental assessment. Proposed projects are classified into one of three categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts:

- Category A: The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. For a Category A project, the Proponent is responsible for preparing an EIA report.
- Category B: The proposed project has potential adverse environmental impacts on human populations or environmentally important areas such as wetlands, forests, grasslands, and other natural habitats - but these are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases, mitigation measures can be designed more readily than for Category A projects. Like Category A the environmental assessment examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.
- Category C: The proposed project is likely to have minimal or no adverse environmental impacts. Beyond screening, no further environmental assessment action is required for a Category C project.

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental associated with Bank lending operations. The purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable and that potentially affected people have been properly consulted.

The magnitude of the proposed project falls under category B.

3.5.2 OP/BP 4.04 (Natural Habitats)

The policy is designed to promote environmentally sustainable development by supporting the protection, conservation, maintenance and rehabilitation of natural habitats and their functions. The policy seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products, which natural habitats provide to human society. The policy strictly limits the circumstances

under which any Bank-supported project can damage natural habitats (land and water area where most of the native plant and animal species are still present).

This project has no notable interaction with notable natural habitat apart from limited opening up of the site by cutting trees to allow for the pan construction. After construction indigenous trees will be planted around the pan

3.5.3 OP/BP 4.09 (Pests Management)

The policy is meant to minimize and manage the environmental and health risks associated with pesticides use and promote and support safe, effective and environmentally sound pest management.

This project will not use pesticides hence this policy is not triggered.

3.5.4 OP/BP 4.10 (Indigenous Peoples)

This policy contributes to the Bank's mission of poverty and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies and cultures of indigenous peoples. For all projects that are proposed for Bank financing and affect indigenous peoples, the Bank requires the borrower to engage in a process of free, prior, and informed consultation. The broad support of the project by the affected Indigenous Peoples such as Bank-financed projects includes;

- Preventive measures to adverse effects to the indigenous cultures and practices,
- Avoid potential adverse effects on the Indigenous Peoples' communities;
- When avoidance is not feasible, minimize, mitigate, or compensate for such effects.

Bank-financed projects are also designed to ensure that the Indigenous peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.

The objective of this policy is to design and implement projects in a way that fosters full respect for Indigenous Peoples' dignity human rights and cultural uniqueness and so that they receive culturally compatible social and economic benefits and do not suffer adverse effects during the development Process. Space intensive sub-projects such as solid waste dumping sites, wastewater disposal areas and commuter rail stations has a potential for disruption of indigenous people. Improved Social and economic systems across the metropolitan leads to potential intrusion to existing cultures.

The project site is not inhabited. It is a livestock grazing area and the design takes full consideration of the inhabitants who are indigenous and will actually benefit directly since the water pan will actually provide water for both livestock and human

3.5.5 OP/BP 4.11 (Physical Cultural Resources)

This policy is meant to assist in preserving physical cultural resources including the movable or immovable (above or below ground, or under water) objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance including sites and unique natural values. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.

There are no physical cultural resources in the proposed project area, hence this policy is not triggered.

3.5.6 OP/BP 4.12 (Involuntary Resettlement)

The policy states that "Where large-scale of population displacement is unavoidable, a detailed resettlement plan, timetable, and budget are required. Resettlement plans should be built around a

development strategy and package aimed at improving or at least restoring the economic base for those relocated. Experience indicates that cash compensation alone is normally inadequate. Voluntary settlement may form part of a resettlement plan, provided measures to address the special circumstances of involuntary resettles are included. Preference should be given to land-based resettlement strategies for people dislocated from agricultural settings. If suitable land is unavailable, non-land based strategies built around opportunities for employment or self-employment may be used”.

Involuntary resettlement is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The objective of this policy is to avoid or minimize involuntary resettlement, though participation in resettlement planning and implementation and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

*However in this project there will be **no displacements**.*

3.5.7 OP/BP 4.36 (Forests)

The policy on forest safeguards seeks to realize the potential of forests to reduce poverty in sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Among the principles is to screen as early as possible for potential impacts on forest health and quality and on the rights and welfare of the people who depend on them. *There is no forest in the project area except for indigenous scattered trees which the project takes cognizance of their existence*

3.5.8 Activities Triggering World Bank Safeguards

The schedule below justifies the extent to which the World Bank safeguards apply to the implementation of the proposed project implementation. This implies, further investigations may be necessary to ensure compliance with the World Bank requirements.

Table 2: Activities Triggering World Bank Safeguards

Policy	Criteria in the Project area	Discussions
Environmental Assessment (OP 4.01, BP4.01, GP 4.01)	Yes	The project triggers OP. 4.01
Forestry (OP4.36, GP 4.36)	No	There are no significant forested areas around the project area
OP/BP 4.04 (Natural Resource Habitats)	No	There are no notable natural habitats
Involuntary Resettlement (OP4.12, BP 4.12)	No	There will be no displacement of communities because land is communally owned and there has been unanimous consensus by local communities to provide the land for the intended activity
Physical Cultural Resources (OP/BP 4.11)	No	There are no physical cultural resources at the project site
Indigenous Peoples Policy OP/BP 4.10	No	All the community members in the area are categorized as vulnerable and marginalized groups according to the Constitution of Kenya (COK) 2010.
OP/BP 4.09 (Pests and control management)	No	The project will not entail use of pesticides hence not triggered
OP/BP 4.37 (Safety of Dams)	Yes	Appropriate catchment protection measures by planning of indigenous trees and shrubs within the catchment area and along the embankments. Fencing of the pan and construction of sanitary and water usage facilities away from the water source

3.6 International Conventions

3.6.0 Introduction

Kenya is a signatory to a number of conventions on sustainable development and is a member of various bilateral and multilateral organizations. This EIA study is also based on internationally respected procedures recommended by the World Bank in the World Bank Operational directives 4.01 and Environmental Source Book Volume II, which provides the relevant sectoral guidelines. Some of the relevant international treaties and conventions which are related to the project are mentioned in the subsequent items

3.6.1 The World Commission on Environment (the Brundtland Commission of 1987)

The international policy recommends development that produces no lasting damage to the biosphere and to particular ecosystems. Economic sustainable development is the development for which progress towards environmental and social sustainability occurs within available financial resources: Kenya is ratified or acceded to numerous international treaties and conventions. Those that have implications on the project are described below

3.6.2 The Ramsar Convention on Wetlands of International Importance

Kenya ratified in June 1990. The Ramsar Convention on wetlands is primarily concerned with the conservation and management of wetlands. Parties to convention are also required to promote wise use of wetlands in their territories and to take measures for the conservation by establishing nature

reserves in the wetlands, whether they are included in the Ramsar list or not. Wetlands are defined in the Ramsar convention as “ areas of marsh, fen, peat or water, whether natural or artificial, permanent or temporary with water that is static or flowing fresh brackish or salty, including areas of marine water depth of which at tide does not exceed 6 meters.

The National wetland standing committee of Kenya’s Inter-Ministerial Committee on Environment (IMCE) defines wetlands as “areas of land that are permanently, seasonally or occasionally water logged with fresh saline, brackish or marine water, including both natural and man-made areas that support characteristic biota” while EMCA defines wet as “an area permanently or seasonally flooded by water plants and animals have become adapted. *For this reason, the proposed water pan project is expected to strictly observe the Ramsar Convention’s principles of wise use of wetlands in the project areas*

3.6.3 Convention on Biological Diversity (CBD)

The CBD is one of the outcomes of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The CBD establishes a global legally binding framework for the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of utilization of genetic resources. *The provisions of this convention should be taken into account in the conservation of various species of plants, animals and the variety of ecosystems in the project area by any development agency/sector/Government.*

3.6.4 United Nations Framework Convention on Climate Change

The framework sets an ultimate objective of stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (Human Induced) interference with the climate system. *Development projects in Kenya such as the proposed project are expected to take climate change considerations into account, to the extent possible, in their relevant social, economic and environmental policies and actions*

3.6.5 United Nations Convention to Combat Desertification 1994:

The convention addresses the problem of the degradation of the land by desertification and the impact of drought particularly in arid and semi -arid and dry semi-arid humid areas.

This convention is domesticated in EMCA 1999 via Section 46 where Sub county Environmental committees are required to identify areas that require re-forestation or afforestation as well as to mobilize locals to carry these activities.

Relevance

The project area is in the lowlands zone under agro-climatic zone 5 and sub county environmental committees will mobilize the locals to undertake afforestation programmes around the pan and at the catchment areas both upstream and downstream.

3.6.6 Sustainable Development Goals

On September 25th 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. Each of the 17 goals has specific targets to be achieved over the next 15 years. *The proposed water pan project is aligned to the goals of ending poverty, zero hunger, clean water and sanitation, responsible consumption and production, climate action and life on land*

CHAPTER FOUR

4.0 LOCATION AND BASELINE INFORMATION OF THE PROJECT

4.1 Introduction

This chapter provides the main features of the baseline biophysical and socio-economic information of the project area. Environmental description also known as baseline studies, is intended to establish the present state of the environment, taking into account changes resulting from natural events and from other human activities. The baseline study below covers within the scope of the project area.

4.2 Biophysical Environment

4.2.1 Position and Size

Tana River County is one of the six Counties in the Coast Region. It borders Kitui County to the West, Garissa County to the North East, Isiolo County to the North, and Kilifi County to the South. The county lies between latitudes 000'53'' and 200'41'' South and longitudes 38025'43'' and 40015' East. The county has a total area of 38,862.2 Km² with a projected population of 349,338(KNBS, 2018) and has a coastal strip of only 76 Kms as shown in **Figure**. The County is composed of three administrative sub-counties namely: Bura, Galole and Tana Delta, and three constituencies namely: Galole, Bura and Garsen with 15 electoral wards. The net area being proposed for pilot development is 10ha situated **at** GPS coordinates S 02° 14.044'', E 040° 10.735'' as shown in figure below



Figure 2: Map of Kenya indicating the location of Tana River County

4.2.2 Demographic attributes

Dhanabale Wayu village, Koktcha location in Galole sub-county. It is situated west of Tana River County town Wayuboro village. The main shopping market is in Hola and the livestock market is in Titila about 50km from Wayu village. Wayu village is predominantly inhabited by Orma and Wardei community. Population of Wayu Location stands at about 5,045 people, men and women are 2,641 and 2,584 respectively. The households in the sub-location are of Koticha and Wayu are 215 and 756 respectively (with an average of 6 persons per household) as shown in table 2 below:

Table 3: Distribution of human population by sub locations in Wayu Location

Distribution of Population by Sex, Number of Households, Land Area, Population Density and Sub Locations						
	Sex			Households	Land Area	Density
	Total	Male	Female	Conventional	Sq. Km	Persons per Sq. Km
WAYU location	5,045	2,461	2,584	971	792.7	6
Koticha Sub Location	1,072	523	549	215	266.3	4
Wayu Sub Location	3,973	1,938	2,035	756	526.4	8

Source: KNBS, 2019

4.2.3 Physiographic and Natural Conditions

Topography and Geology

The major physical features in Tana River County is an undulating plain that is interrupted in a few places by low hills at Bilibil (around Madogo) and Bura administrative sub-units which are also the highest points in the county. The land in Tana River generally slopes south eastwards with an altitude that ranges between 0m and 200m above sea level.

The most striking topographical feature is the river Tana that traverses the county from the Aberdares in the North to the Indian Ocean in the South covering a stretch of approximately 500km. Besides the river Tana, there are several seasonal rivers in the county popularly known as *lagas*, which flow in a west-east direction from Kitui and Makueni Counties draining into river Tana and eventually into the Indian Ocean. The river beds support livestock as well as wildlife during the dry season since they have high ability to retain water. River beds are most appropriate sites for shallow wells, sub-surface dams as well as earth pans.

The proposed project site is on a relatively flat area.

4.2.4 Ecological conditions

The county is divided into four agro- ecological zones namely: CL 3 Coconut – Cassava zone (non ASAL), CL4 Cashew nuts- Cassava zones where the main economic activity is peasantry mixed farming; CL5 Lowland Livestock zone and CL6 Lowland Ranching zones where the locals are involved in pastoral activities. The soils range from sandy, dark clay and sandy loam to alluvial deposits. The soils are deep around the riverine environments but highly susceptible to erosion by water and wind. Soils in the hinterlands are shallow and have undergone seasons of trampling by livestock, thus are easily eroded during rainy seasons.

The vegetation ranges from scrubland to thorny thickets within the riverine area. Shrubs and annual grasses dominate most parts of the region. However, there are enclaves of trees and perennial grasses dominating wetter parts. An invasive tree species called *Prosopis Juliflora*, commonly known in the area as ‘*Mathenge*’ (named after the person who introduced it) has spread rapidly in the area and is threatening to replace most of the indigenous vegetation. It was introduced for fuel-wood production

in the Bura Pilot Irrigation Scheme. It grows fast and chokes other vegetation, watering points and the canals, and is colonizing most of the areas that are not cropped, including the riparian

4.2.5 Hydrology

Tana River is the longest river in Kenya, it covering a distance of about 1,012 kilometers from the farthest source to the Indian Ocean. It has an annual mean discharge of five billion cubic meters of water. The highest flood flow of water in Tana river is 3,560 m³/s and the average is 165.228 m³/s for Garissa gauging station (DHV, 1986) Tana River is situated between latitude 00 30' north and 20 30'south and longitude of 370 00' and 410 00'.The whole catchment area of the Tana river is about 100,000 km², covering about 20% of the land area of the country. This catchment holds a major portion of Kenya's agricultural potential (530,000 ha) and is the main source (80 %) of hydro-electric power. It sustains a population of about five million people.

Tana River is not confined within the county's boundaries. It traverses the Tana delta Sub County from Tharaka Nithi in the North to the Indian Ocean to the south. The river has influenced settlement patterns and economic activities along the areas it flows. As the River traverses the expansive coastal hinterland, it meanders in its lower course forming a large basin whose width ranges between two and forty two kilometers. Towards its mouth between Mnazini area and the Indian Ocean, the river creates an extensive delta, which is characterized by wetlands. There also exist seasonal rivers in the County found in the area west of river Tana in the North-eastern part of the County; popularly known as *Lagas*.

These rivers flow in an East-west direction from Kitui, Makueni and Mwingi eventually draining to river Tana. The hydrology for Tana River is dominated by series significantly large hydropower reservoirs that have been constructed on the Tana River and tributaries. Consequently the downstream flows no longer follow their natural patterns but are largely regulated by releases from these dams.

The river regimes have changed over time as the volume of water flowing has reduced. This is evident as floods are not as frequent as before. The main water uses are-domestic and agricultural. Tana River has changed its course several times over the year resulting in major changes both along the channel and at the river mouth.

4.2.6 Soils

Tana Delta area is comprised of sedimentary rocks from the tertiary and quaternary periods, more specifically from the Pliocene, Pleistocene and recent epochs. The sedimentary deposits are made up of clayey soils intercalated with marine, deltaic, fluvial, lacustrine and coastal- lacustrine sands, silts and clays which give rise to relatively flat topography. On the higher areas there are reddish brown soils while in low-lying areas; rich clays and silt are found. Alluvium deposits including gravel, sand, silt and clay cover the Tana River basin. Low to moderately fertile soils are found in the hinterland. According to the FAO/UNESCO classification, four major soil types were identified in the area distributed as follows:-

- Solonetz – 52% of the area;
- Cambisols – 31% of the area;
- Calcisols – 11% of the area;
- Vertisols 6% of the area

4.2.7 Vegetation

Vegetation in the area comprises of woodlands, bush land and scrubland. The harsh climate and the perennial River Tana determine the natural vegetation in and around the Bura Irrigation Scheme. The vegetation can broadly be classified into three zones as follows:-

- The river line forest;
- The transitional zone;
- Dry bush-land / thorn-bush savannah.

The Tana river-line forest is of high diversity with 300 species recorded. Some of the plant species found here includes: *Hyphaene Conipressa*, *Acacia robusta*, *Acacia elatior*, *Spirostachys venenifera*, *Cadaba farinose*, *Anisocycla blepharospala*, *Rhus quartiniana*;
The dry bush-land or thorn-bush savannah is dominated mainly of -: *Acacia indica*, *Acacia recifiens spp*, *Acacia bussel*, *Acacia melifera*, *Salvadora persica*, *Sueda monoica*

4.1.7.1 Fauna

The fauna in and around the scheme is also determined by the harsh climate, the perennial river Tana and the natural vegetation found in the area. The existing fauna is classified as -:

- Protected wildlife areas: The wildlife found here includes: Terrestrial animals-Elephants, Buffalos, Giraffes, Gazelles, Warthogs, Columbus monkeys, Baboons, Vervets, Sykes, Bushbuck and Dikdiks.
- Aquatic animals: Crocodiles, Hippos, Turtles, Catfish, Tilapia, Frogs.
- Birds (Terrestrial)-Quails, Ostrich, Guinea fowls, Marabou stokes, Eagles, Herons, Bustards, Secretary Birds, Doves, Kites, Vultures, East coast Akalat, Tana River Cisticola, Malindi Pipit, Fischers Tulaco and the Southern Banded Snake Eagle.

4.1.8 Climate

The region has a hot and dry climate within ecological zones ranging from III (in the very high grounds) to VII (in the plains or lowlands). Average annual temperatures are about 30⁰C with the highest being 41⁰C around January-March and the lowest being 20.6⁰C around June-July. Rainfall is low, bimodal, erratic and conventional in nature. The total annual rainfall ranges between 280 mm and 900 mm with long rains occurring in April and May, short rains in October and November with November being the wettest month. The Inter Tropical Conventional Zone (ITCZ), which influences the wind and non-seasonal air pattern for the river Tana, determines the amount of rainfall along the river line. The dry climate in the hinterland can only support nomadic pastoralism.

The proposed project site receives a rainfall of 417mm annually.

4.2 Infrastructure and Access

4.2.1 Roads, Rail Network, Ports and Airports, Airstrips and Jetties

The total road network in the county is 3,377km with about 55 per cent in motorable condition. The total road network is composed of 1,108km (class A – E) of classified roads and 2,269km (class U) of unclassified roads. Out of this only 449km is bitumen surfaced. The major roads in the county include the Madogo – Hola – Malindi road which is dilapidated and impassable at various points during rains. The Kenya National Highways Authority (KeNHA) has however put in place plans to upgrade the 330km stretch to bitumen standard, and the project is in the design phase and construction is set to begin as soon as funds are available. The county boasts of seven airstrips with major ones located at Hola, Bura and Garsen. The county has a 76Km sea front with Kipini operating as a fish landing site which can be potential sea port for fishing vessels. The LAPSET project will potentially open up the county with road and rail network.

The proposed project site can be accessed through the Hola-Garissa Highway.

4.2.2 Posts and Telecommunications: Post Offices, Mobile Telephony & Landline

There are two banks (KCB and Equity bank), two bank agencies (KCB and Equity bank), one SACCO, one Micro-Finance Institution (MFI) and 10 village banks in the county. The banks, SACCO and the microfinance institutions are located in Hola and Garsen as these areas have electricity connection with many commercial activities. These institutions will help to boost the county's economy through provision of various financial services and credit facilities.

The proposed project site has a good network coverage from Safaricom.

4.2.3 Energy Access (Main Sources of Energy, Electricity Coverage)

Majority of the population (87.5%) use wood fuel for cooking and 78.2 per cent use kerosene for lighting. Only 0.9 per cent of the households are connected with electricity. There is a lot of potential for the exploitation of renewable energy sources such as solar and wind, and expansion of electricity transmission in the county through the main grid.

4.2.4 Markets and Urban Centers

There are 10 major trading centers in the county with 24 registered wholesale traders and 773 registered retail traders. There are two registered Jua Kali associations in the county with 31 members. These trading centers are the main economic hubs of the county since major business activities are done here.

4.2.5 Education Institutions: Primary/Secondary schools, Polytechnics, Colleges, Universities

The County has 315 ECDE centers, 152 primary schools and 13 secondary schools. Some of the structures in the institutions are dilapidated. Although the National Government Constituencies Development Fund (NG-CDF) from the three constituencies in the county has been putting concerted efforts to build classrooms, administration blocks, dining halls, laboratories and even dormitories, there is still a glaring shortage of the aforementioned structures. There are three youth polytechnics in the county that need to be expanded to accommodate the rising numbers in enrolment.

CHAPTER FIVE

5.0 PUBLIC STAKEHOLDER CONSULTATIONS

5.1 Introduction

Public consultation is useful for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans if any. Public consultation process for the water pan project took place at the screening stage, scoping stage and the ESIA process stage. A community management disaster risk reduction process was also undertaken as a priority requirement by the proponent. The main objective for the consultation process was to involve the community at the very early stage of design so as to identify likely negative impacts and find ways to minimize negative impacts and enhance positive impacts of the project within the final design and construction phase.

At the initial consultations, key stakeholder interviews were held within and without the project area.

The key stakeholders consulted included:

- Dhanabale village inhabitants both men, women and the youth
- Wayu community members both men, women and the youth
- The members and staff of the Wayu primary school
- Staff of the local dispensary
- Local area administration;
- Line ministries, departments partners;
- Target beneficiary community;
- Non-Governmental organizations operating in the area e.g Somaritan pas, German Agro Action

5.2 Objectives of the Public Consultations/meetings

The overall goal of the consultation process is to disseminate project information and to incorporate the views of the Project Affected Persons (**PAPs**) in the design of the mitigation measures and the management plan.

The specific aims of the consultation process were to:-

Improve project design and, thereby, minimize conflicts and delays in implementation;

- Facilitate the development of appropriate and acceptable entitlement options; Increase long term project sustainability and ownership.
- Reduce problems of institutional coordination.
- An important element in the process of impact assessment is consulting with stakeholders/community to gather the information needed to complete the assessment.

The main objectives of community consultations were to:-

- Provide clear and accurate information about the project to the beneficiary community;
- Obtain the main concerns and perceptions of the population and their representatives regarding the project;
- Obtain opinions and suggestions either individually or directly from the affected communities on their preferred mitigation measures
- Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.
- Enable the indigenous knowledge of the local community to identify benefits, flow of storm water, possible effects and mitigation measures.
- Identify plant species that have to be cleared and promote the indigenous palatable plants species within the project site.

The process of consultation and public participation was aimed at obtaining local knowledge, increasing public confidence and reducing conflicts

Stakeholder Identification

To enhance maximum participation and achieve a better output, the right stakeholders were taken on board. This was done through stakeholder identification and involvement based on their needs, interests, and potential impact on project outcome that is the water pan project construction.

5.3 Participation Consultation/Interviews

The participant consultations were done on two levels, that is apart from the desk top studies from the various offices in the county and Sub County levels, community participatory meeting at the project site done at two levels that is Focused Group discussions (**FGDs**) and individual interviews on persons sampled among men, women and youth among the participants. Information collected to enrich the EIA study report. Individual interviews done on prepared questionnaires to capture individual perception on the project (*Sample example of questionnaire attached as appendix*)

A visit was organized to the proposed water pan development site by the project team. During the visit a field tour of the general area was undertaken and a detailed examination of the ecological setting of the area was carried out. Types of existing plant species and wild animals were recorded. The environmental condition existing in the proposed project area were documented to provide baseline data. The possible impacts of the proposed project activities were thereafter assessed against the documented baseline data. Section 35-2 of the environmental Impact Assessment and Audit Regulations 2003, requires that an EA should “*examine and seek views on environment, health and safety issues from the local community and other potentially affected communities*”

5.3.1 Sources of Information

During the environmental impact assessment, public participation was a key component in getting information to be incorporated in writing this report. Positive and negative views of the perceived affected neighbors were sought. The exercise was conducted through administration of pre-designed questionnaires, and interviews in various areas surrounding the proposed project site

The neighboring communities were asked to comment and give views concerning the proposed project on various issues concerning the following:

- ❖ The positive impacts that may emanate from the development of the proposed project
- ❖ Measures that the developer should put in place during and after the project to mitigate impacts
- ❖ Whether the proposed project construction and occupation will cause the negative impacts on the following:
 - a) Local residents
 - b) Natural ecology of the area
 - c) The human environment
 - d) Public health and safety
 - e) Effects on the soil
 - f) Effect on areas of scenic beauty
 - g) Effect on plant species composition

Many respondents were consulted during public appraisal exercise although, some declined to give their contacts or real identification card numbers. However their views have been incorporated in this project.

The sub item below summarizes issues were raised and captured in the questionnaires from the community (respondents) towards the proposed water pan project and issues captured during the

desktop studies analysis. The issues have been categorized as positive and negative issues (Selected Sampled filled questionnaires attached as appendix)

5.4 Issues raised by the surrounding community

5.4.1 Employment opportunities

The respondents consulted indicated that the project will create employment opportunities during the project cycle from construction to operation and the staff that will be involved in the daily cores within the project after its completion such as guards, pasture seed collection.

5.4.2 Availability of water for domestic and livestock

There will be minimal livestock migration and mortalities as result of adequate water. Livestock will be sold at good prices in the market due to good body condition. Issues of overgrazing will be reduced. There will also be minimal conflicts over access to natural resources.

5.4.3 Improved Economic status

Income at household level will be enhanced because communities will be able to sell their livestock and livestock products like milk at fairly good prices. Poverty incidences will be reduced and food security status of the community members will be enhanced

5.4.4 Enhanced livelihood resilience and alternatives

The respondents noted the youth and women will be involved in pasture development and production. Along the value chain there will be marketing hence strengthening the resilience of the beneficiaries within and around the project area

5.4.5 Increased wildlife and livestock conflicts

Some of the respondents felt that the proposed project would bring a problem of wildlife (herbivores particularly warthogs, antelopes or even elephants that are within the area) and livestock conflict due to inadequate water in the dry season. They however advocated that the community should explore possibility of identifying sites outside the locality for wildlife to water and avoid sharing of water with wild animals

5.4.6 Accidents during construction

There is likelihood that during the construction phase of the proposed project, construction workers may get involved in accidents as a result of falling building stones/bricks, sharp metals and machines used in the construction. The proponent will strictly adhere to safe working practices to protect the workers, neighbors and passers-by

5.4.7 Improved local socio-economy

During public participation, neighbors anticipated that the proposed development will contribute to improved household incomes, water availability and the county Government

5.4.8 Noise pollution

There was concern over the possibility of high noise and vibration levels in the project site as a result of excavation and construction works. The sources of noise pollution will include transport vehicles, construction machinery and metal grilling and cutting equipment. However the proponent will take appropriate steps to minimize noise impacts including provision of appropriate protective equipment to construction workers, planning and minimizing the frequency of materials transport, ensuring that all equipment are well maintained

5.5 Analysis of the questionnaire

5.5.1 Questionnaires Summary

Prior to administering the questionnaires, the residents and stakeholders were taken through the EIA questions concerning the proposed water pan as contained in the questionnaires and how they fill them. They were asked to freely fill the questionnaires individually and give a clear picture of potential impacts of the proposed development.



Participants filling individual questionnaires to give an independent view of the impacts and mitigation issues

Plate 1: participants filling individual questionnaire forms

The respondents reside around the proposed water pan. The summaries of questionnaire are given in pie charts and graphics. Out of the total number of respondents who are residents in the proposed project site 29 % are below 20 years old, the respondents who are between 21 and 40 years accounted for 14%, while 57% are 40 years and above

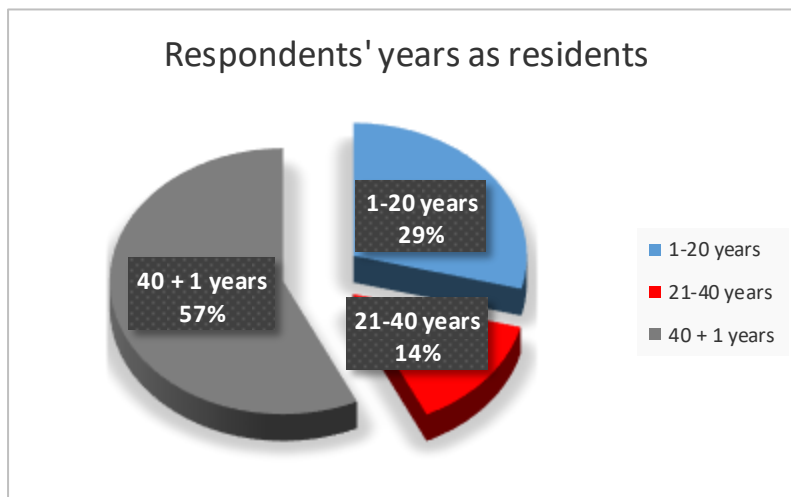


Figure 3: Proportion of respondents by age

All the respondents were of the in agreement that the water pan be constructed as shown in figure 3

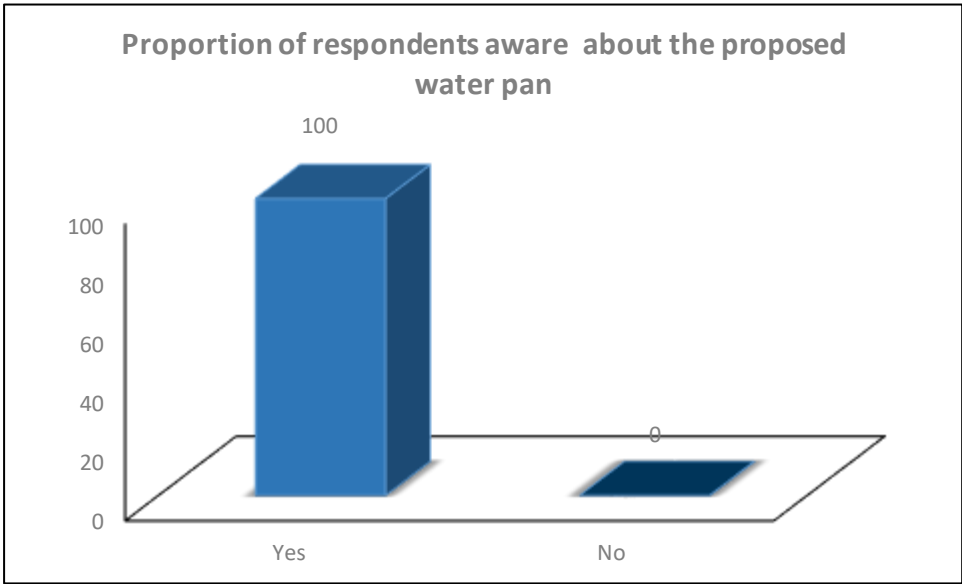


Figure 4: Respondents awareness on existence of the proposed project

On analysis by gender the highest number of the participants in attendance was men, followed by women and the youth in proportion as 70, 35 and 5 percent respectively.

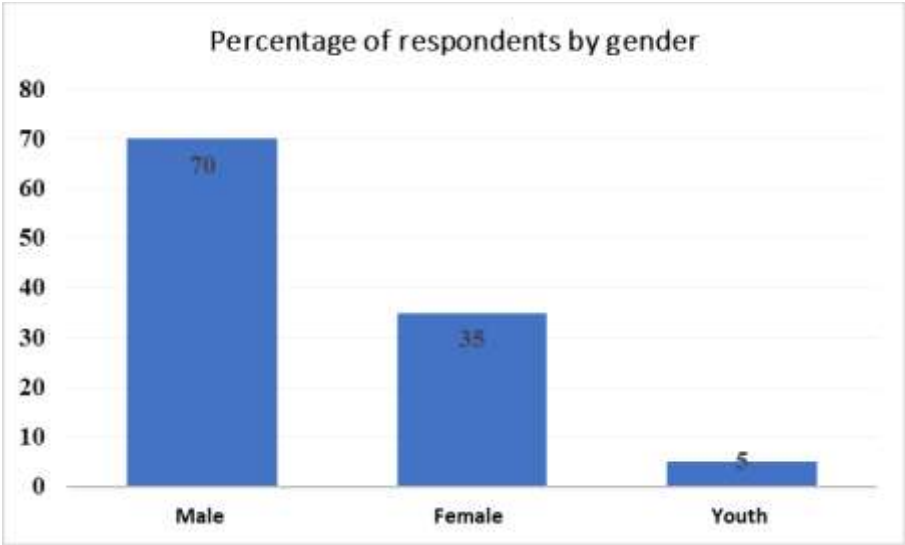


Figure 5: proportion of respondents by gender segregation

5.5.2 Stakeholders Public Meetings

Consultative experts' meetings were continuously held during the field exercise to consolidate the issues affecting the project as well as capturing issues raised by the project affected persons. One comprehensive public meeting as well as and technical meetings were held on various dates December ,2020, with the local residents, chiefs, Village elders, and other local administrative leaders in attendance in the project area . The issues arising in the meeting are captured in ANNEX (I).



Lead expert taking the participants through a public participation meeting by explaining the objective of ESIA and the role of the community in the exercise

Plate 2: Lead expert addressing the participants on ESIA procedures

5.5.3. Positive Issues arising from public participation

Analysis in figure below indicate positive impacts that were given out through pulic participation and individual questionnaire

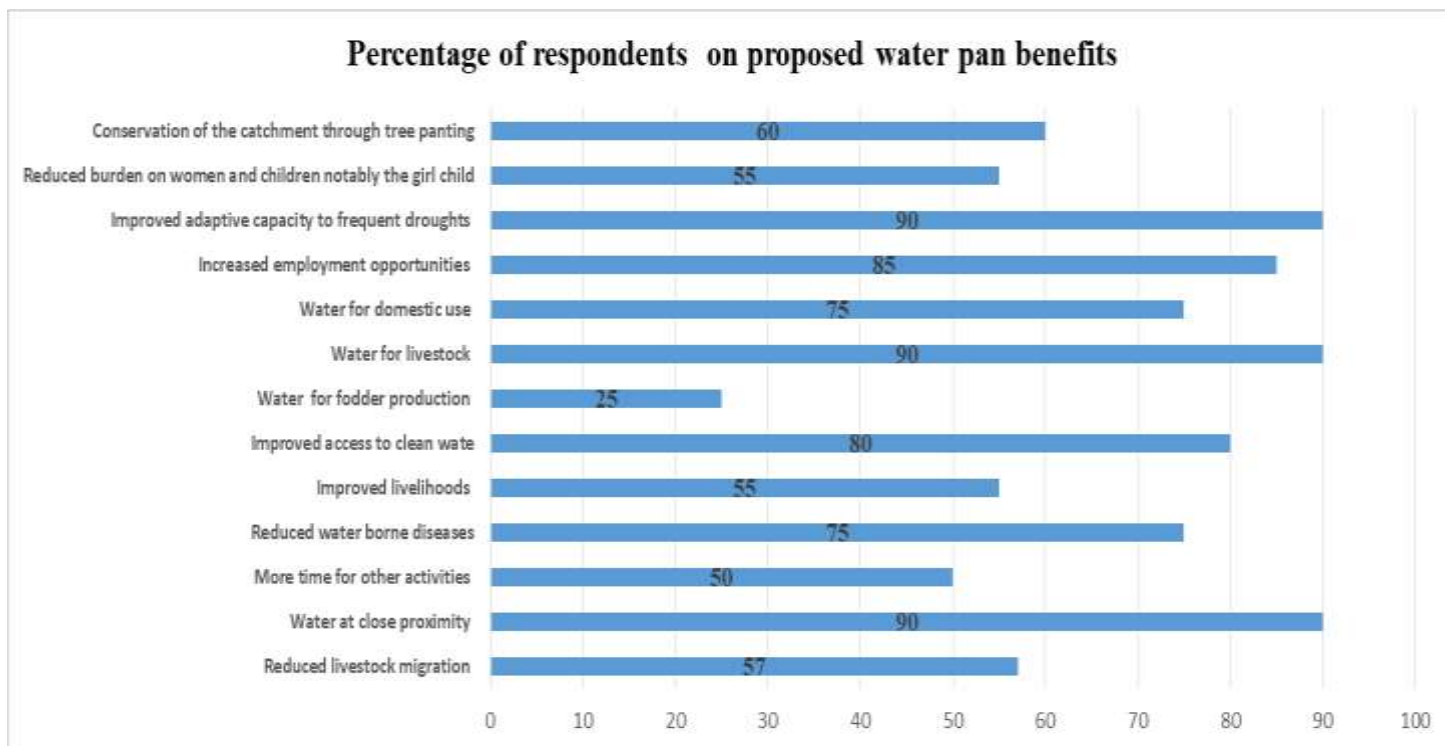


Figure 6: Respondents comments on benefits of the project

5.5.4. Negative Issues arising from public participation

In general there was no community objection to project implementation during the consultative process. Among the stakeholders during the public participation exercise were: the local community and relevant sector agencies from County Government of Tana River and Lead agencies such as departments of livestock, forest, social services, water and County NEMA office. Among the issues raised have been analyzed below.

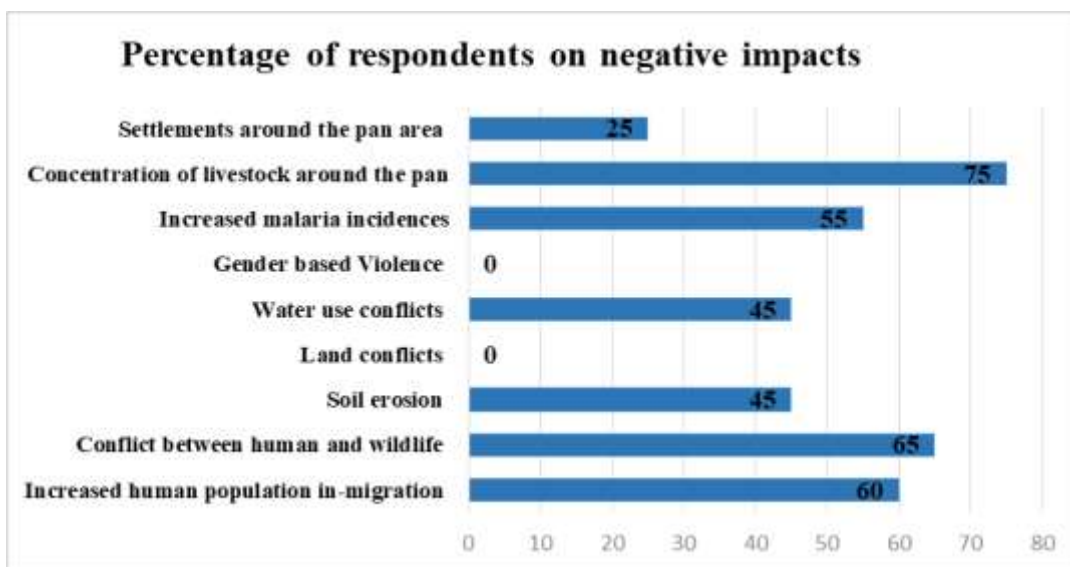


Figure 7: Respondents comments on negative impacts of the project

5.5.4.

Mitigation measures arising from public participation

Mitigation measures arising from the impacts were analyzed. The largest number of the participants 90% were of the opinion that the water pan be protected by fencing. Water utility facilities was alomo among the highest about 85 %. Participants recommended that livestock watering troughs and water collection points be established outside the water pan as Shown in Figure :

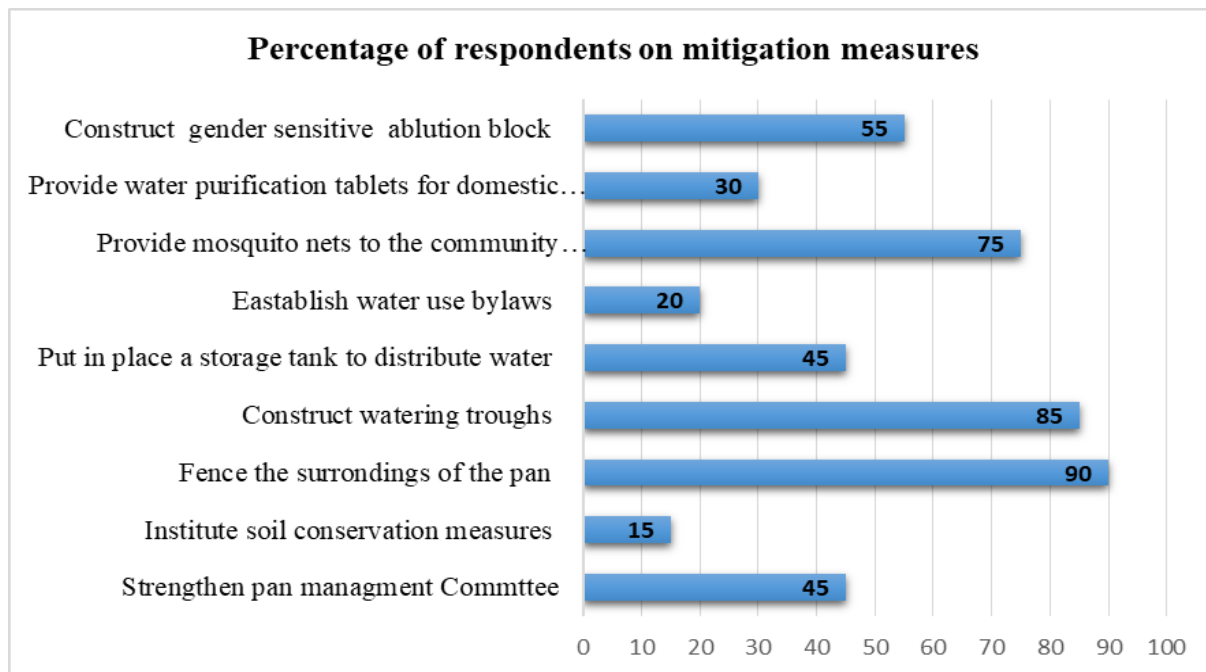


Figure 8 Respondents comments on mitigation measures



Lead expert discussing with the participants the positioning, vegetation soils of the proposed pan site

Plate 3: Lead expert discussing with participants on the proposed site



Participants raising their hands in show of acceptance of the project

Plate 4: Participants raising hands in show of acceptance

CHAPTER SIX :

6.0 PROJECT ALTERNATIVES

The section analyses the project alternatives in terms of site and technology

6.1 Project site

The project is more dictated by the government policy on water supply development and conservation. During inception period a sensitization session was held to inform members about the proposed project and its objective. The community in consultation with health, environment, water, engineers and livestock experts among others sited the area. The site was selected based on:

- Land was readily allocated by the community
- The area has soils with suitable properties for water pan construction
- It is within a strategic catchment area within reach of a larger portion of the residents
- The drainage within the catchment is strategically placed along a gentle slope which can collect water as it drains into the River Tana downstream from the Ukamabani hills
- The land is idle apart from being grazed by livestock and wildlife

6.2 No Project Alternative

The “No project” Alternative would be a big disservice to those who will benefit from the water pan and are severely in need of water for domestic and livestock. Despite the destruction of flora and fauna that are going to be affected during construction, these will easily be restored during operation phase of the project. Beneficiaries of water for domestic and livestock would be impacted negatively

because there is a likelihood of more households losing sources of livelihoods due to drought and severe water scarcity. Having status quo not only deprives the proponent an opportunity to improve resilience on the effects of climate change but also deprives the local community source of livelihood due to prolonged droughts. The economy will also lose from livestock body condition losses and low milk availability at the household level.

The community will continue to use the land at sub-optimal levels owing to increased climate variability leading to increased frequency and intensity of droughts. The No Project option is least preferred from socio-economic and partly environmental perspectives due to the following:

- ❖ The economic status of the local communities would remain unchanged
- ❖ The local natural resources would remain under-utilized
- ❖ No employment opportunities will be created for local people who will work in the proposed project
- ❖ Increased rural poverty
- ❖ Discourage stakeholders from investing in this type of project hence stagnated economy
- ❖ Improvement of development facilities will be undertaken

From the analysis above, it becomes apparent that the No Project alternative is not available alternative to the local people, Kenyans and the government of Kenya

6.3 Relocation Option

Relocation to a different site is an option available for the project implementation. At present the proponent does not have an alternative site. It means that the proponent in consultation with community has to look for the land. Looking for land to accommodate the scale and size of the project and carrying out required public participation may take about 6 months, although there is no guarantee that the land would be available. The proponent will take another 6 months to design and approvals since design and planning has to be according to site conditions.

Project design and planning before the stage of implementation will cost the developer millions of Kenya Shillings. Whatever has been done and paid to date will be accounted as a loss to the proponent. Assuming the project will be given a positive response by the relevant authorities including NEMA and Tana River County, this project would have been delayed by over (1) year before implementation. This is a delay that the county economy cannot afford. This would also lead to a situation like NO project alternative option. The other consequence of this is that it would be a discouragement for the livestock sector development stakeholders in their bid to address effects of climate change. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a viable option.

6.4 Analysis of Alternative construction Materials and Technology

The proposed construction of water pan will be done using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental as well as aesthetic requirements. Equipment that saves energy and water will be given first priority without compromising on cost or availability factors. The auxiliary structures will be made using locally available source where appropriate. Cement, sand from the surrounding, ballast, metal bars and fittings that meet the Kenya Bureau of Standard requirements.

Alternative technologies available include the conventional brick and mortar style. Due to cost and durability, the brick and mortar style is most popular more so in Kenya. The scale and extent of the project is determined by design, the area allocated and funds available. Other various technologies

available include: Sand locally available along the dry riverbeds. Stones from the surroundings For part of the fence areas the proponent can use branches of Acacia reficience trees which are thorny and very effective to destruct wild animals and livestock. The branches will be cut selectively and with a lot of caution not to cut down the trees. .Hardened quality plastic pipes, prefabricated space frame construction, steel frame and aluminum frame. The technology to be adopted will be the most economical and one sensitive to the environment. Heavy use of wood during construction is discouraged because of destruction of forests.

CHAPTER SEVEN

7.0 ANTICIPATED IMPACTS AND MITIGATION MEASURES

7.1 Introduction

This chapter largely focuses on the anticipated impacts from the construction and operation of the Wayu Water Pan project. Impacts to the environment can be positive or negative, direct or indirect, reversible or irreversible. The extent of the environmental impact is determined by its significance and adversity, as well as its temporary or permanent state, long or short-term effect, localized or widespread nature.

A number of positive and negative anticipated impacts to the environmental and social wellbeing have been identified. Among the broad areas of impacts include:

- Waste generation; soil erosion and sedimentation; dust emissions; Oil spills; and occupational health and safety issues during the construction phase; and
- Positive impacts such as increased business opportunities, as well as negative impacts on biological diversity and occupational health and safety issues during the operations phase.

7.2 Impacts during construction

7.2.1 Positive Impacts

a) Employment opportunity

Both direct and indirect forms of employment shall arise from the project initiation. Direct employment will be mainly through skilled and unskilled laborers whose workforce shall be needed in the construction. Employment opportunities will be a benefit both in economic and social science. In the economic sense it means abundant unskilled labor will be used in economic production,. Several workers including casual laborers, masons and carpenters are expected to work on the site for a period that the project will start to the end. Apart from casual labor, semi- skilled and unskilled labor and formal employees are also expected to obtain gainful employment during the period of construction. Indirect employment will be experienced while buying the construction materials and food for the construction team in the neighborhood.

b) Economic gains

The local economy shall gain much from the project in that materials for building shall be sourced locally within the country and that all the materials are charged VAT, hence increasing revenue collection in the country

c) Provision of Market for Supply of Building Materials

The project will require supply of construction materials most of which will be sourced locally within the vicinity and environs. This provides ready market for construction material suppliers such as quarrying companies, hardware shops and individuals with such materials

d) Informal business Growth

During construction the informal sector will benefit from the operations. This will involve informal traders who will sell their products to be used on site. Such a move shall promote local informal entrepreneurs in the local project area

7.2.2 Negative impacts

7.2.2.1 Construction Waste Management

Waste during the construction period will arise from: excavation work, deleterious material from aggregate screening; maintenance and repair of machinery and workers domestic waste. The most appropriate options in waste management are: identification of the waste types; segregation into the various categories; and the establishment of suitable mechanisms for collection, storage, transfer, and final disposal.

Mitigation Measures for Solid Waste

- ✓ *Contractor to provide temporal waste disposal receptacle in site.*
- ✓ *Domestic solid waste to be stored in refuse bins temporarily before being taken away for proper disposal by NEMA licensed waste management firms;*
- ✓ *Excavated soil shall be disposed at a minimum distance of 20 meters on the opposite side of the inlet and compacted for use*

7.2.2.2 Soil erosion and sedimentation

Construction activities have the potential to loosen soils, particularly on slopes, which can then be washed down into the lower areas (streams and valleys) and soil quality degradation is also likely to occur during construction as a result of disposal of construction materials on the adjacent lands,

Mitigation Measures:

- ✓ *Contractor to ensure excavated earth should be held on locations of the site not susceptible to storm water runoff. The earth removed for external disposal should be deposited carefully on selected sites without the risk of being washed away during heavy rains and where such deposits will not compromise other land use activities in the areas affected; and*
- ✓ *Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate erosion of soil through surface water runoff and wind erosion*

7.2.2.3 Loss of Vegetative Cover

During the construction phase of the project, bush and tree clearing will be undertaken in the areas to be inundated to minimize the impacts of water pollution from decaying vegetative matter that would die after inundation. Actual construction activities will lead to further loss of vegetative cover at the site of the construction camp for the workers who are likely to be engaged in the actual construction activities. This impact is however not expected to be significant. While no endangered or threatened species were identified in the area, clearing and subsequent inundation constitutes a loss of biodiversity on flora. The vegetation is also home to many invertebrate and avifauna, who will be rendered dispossessed of their habitats.

Mitigation Measures

- ✓ *Contractor to undertake enhanced planting of trees along the buffer zone and the adjoining areas where the vegetative cover is evidently sparse; and*
- ✓ *Rehabilitate all sites that are being used for construction activities such as camps, materials site (borrow pits and quarries) sites for storage materials and any paths, tracks that may be established during the construction phase*

7.2.2.4 Surface and ground water pollution/ contamination

Earth movement, disposal of vegetation and other cleared materials and the inadequate disposal of liquid and solid waste, including the human waste from the workers, are likely to cause physical and chemical alteration of surface and ground water quality. Civil works, excavations, or an inadequate planning of cuts and fills, may affect the water table significantly. The excavation for spillway and

diversion channel may also affect the turbidity and water quality, as well as the level and course of Changes in surface hydrology are likely to alter the flow of water into the pan

Mitigation measures

- ✓ *The contractor to construct a standard temporary pit latrine for the workers*
- ✓ *Contractor to identify an appropriate site pit for disposal of vegetation and biodegradable plant material*
- ✓ *A temporary incinerator to be constructed to burn non bio degradable solid wastes such as plastics*
- ✓ *Civil works, excavations, cuts and fills to be compacted so that there is minimal soil loss*

7.2.2.5: Geomorphology and soils.

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

Mitigation measures

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

7.2.2.6 Landscape disturbance,

Building material such as hardcore, ballast, cement, rough stones and sand will be required and obtained from quarries, hardware shops and natural sites such as river banks. This may result in landscape changes, displacement of habitats and reduction in visual quality of the surroundings.

Where possible the contractor to exercise selective removal of existing acacia and other plant species

Mitigation Measures

- ✓ *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 tress 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*

7.2.2.7 Air Quality

The following emissions will be expected to result from construction activities. This would in turn lead to poor quality of life as well as upper to lower respiratory infections and silicosis condition:

- a. *Dust from excavations and earth moving vehicles as well as materials delivery;*
- b. *Emissions such as smoke, hydrocarbons and nitrogenous gases among others from machinery exhausts*

Mitigation Measures

- ✓ *Personal protective equipment (PPE) such as dust masks must be worn in the immediate vicinity of the operations during excavation;*
- ✓ *The stockpiles of earth generated during construction works should be suppressed by spraying water or water based mixtures. Spraying should also be carried out on unpaved road accesses regularly;*
- ✓ *All machinery and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of Nitrogen and Sulphur, as well as suspended particulate matter;*

- ✓ *Drivers of construction vehicles and delivery trucks should be cautioned to drive slowly near the site to avoid creating dusty conditions.*

7.2.2.8 Oil spills/Fuels and Lubricants

Petroleum hydrocarbons presents both an environmental and fire risk. The storage of petroleum hydrocarbons on site presents a hazard source and the release of hydrocarbons into the environment could result in significant impacts on a variety of receptors. The pathway for pollution is soil or water, and the primary receptors include the sub-soil and groundwater. Other receptors include air (from fuel vapors) and people (through dermal contact, inhalation or ingestion). It is however worth noting that the risks of a major oil spillages occurring are minimal.

Mitigation Measures:

- ✓ *The contractor should properly handle, storage, and disposal off oils and greases and their wastes during construction by ensuring that servicing is strictly done at designated servicing yard or external petroleum stations*
- ✓ *Proper maintenance of vehicles and other equipment (using petroleum products) to avoid fuels and lubricants spills at the project site;*
- ✓ *Safety procedures for fuel storage and re-fuelling should be well understood and implemented by site staff; and*
- ✓ *Oil residuals including waste oil, lubricants, used filters, should be carefully collected and stored for safe disposal, in order to prevent migration of contaminant hydrocarbons into storm water or groundwater resources.*

7.2.2.8 Occupational Health and Safety Issues

Risk of Accidents

During Construction phase, increased traffic flow into and through the site will occur. This increases the risk of accidents unless the traffic is properly controlled. Erection of proper signage and appropriate warning at least 100m from the hazard will mitigate against the chances of accidents. Hauling of equipment (plant and machinery) and other materials and supply to the project site may pose a potential risk of accidents to animals and even people, especially children.

Proposed mitigation measures

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

7.2.2.9 Noise and Vibration

There will be noise and vibrations generated during the construction phase but it will be no different from that on any other typical construction site. The noise impact during construction is expected to be negative and short-term. Major sources of noises and vibration will come from: drilling during construction equipment to place charges and earthmoving machinery, as well as noise from the work force itself. The major receptors are expected to be the construction workers as well as any immediate neighboring premises.

Mitigations Measures:

- ✓ *Conduct noise measuring to determine levels and extent of harmful noise and provide PPE (hearing protection) to persons who must operate within or visit the identified high noise areas;*

- ✓ *Investigate the possibility of investing in silencers on machines to reduce the quantity of noise produced*
- ✓ *Inform local residents of any abnormal noise generating construction activities to minimize disruption to local resident*

7.2.2.10 Impact on Access Roads

Although it is anticipated that the existing access roads are adequate for the transportation of materials, the contractor must maintain these roads during the construction period.

Mitigation:

- ✓ *Vehicles should abide by the speed limits and by-laws of the area;*
- ✓ *Movement of heavy construction vehicles should be planned appropriately.*

7.2.2.11 Camp Site

The project is likely to have camp site, namely workers camps and operation camp (offices, stores and workshops). The anticipated impacts to the environment would be as follows:

- *Workers camps associated with domestic wastes (sewage and garbage) running into water sources and land. People's health would be at risk,*
- *Uncontrolled disposal of wastes could also be a nuisance to the local inhabitants and the environment,*

Mitigation Measures:

- ✓ *Exhaust and rehabilitate one material site before opening another section;*
- ✓ *Provide PPE for employees (safety gears) and safety warnings for the public;*
- ✓ *Hold top soils and vegetation matter near the quarries for backfilling;*
- ✓ *Ensure reduced stagnation of water in abandoned quarries and borrow pits;*

7.2.3: Anticipated Social Impacts

The factors considered in this section includes implication of the sub project implementation

7.2.3.1 Labour Influx Effects

During construction the project will attract jobseekers and hawkers with possibility of thieves intruding into the area. The community is categorized as a vulnerable marginalized community, it may result in 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.*
- ✓ *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 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*

- ✓ *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 should institute a security plan e.g. through a register for all visitors and workers.*
- ✓ *The contractor will Adopt and adapt Nyumba Kumi strategies*

7.2.3.2 Spread of COVID-19 amongst community members during construction

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

Covid Mitigation Measures

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

Mitigation measures

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

7.2.3.3: Gender Based violence and Sexual Harassment

While such cases are difficult to assess, there is likelihood of rape cases around the construction site and from work related operations. This impact is triggered during Project Construction Phase when the Contractor fails to comply with the following provisions;

- Gender Inclusivity requirements in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.
- Failure to protect Human Risk Areas Associated with, Disadvantaged Groups, Interfering with Participation Rights, and interfering with Labour Rights.

Mitigation measures

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

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

- ✓ *Ensure clear human resources policy against sexual harassment that is aligned with national law*
- ✓ *Integrate provisions related to sexual harassment in the employee COC*
- ✓ *Ensure appointed human resources personnel to manage reports of sexual harassment according to policy*
- ✓ *The Contractor shall require 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*
- ✓ *the contractor shall develop specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc*
- ✓ *The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level is reported related to project implementation.*

7.2.3.5 Child Abuse

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

Mitigation Measures to Child Protection

- ✓ *The contractor will develop and implement a Children Protection Strategy that will 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.*
- ✓ *Not invite unaccompanied children to workers home, unless they are at immediate risk of injury or in physical danger.*
- ✓ *Refrain from physical punishment or discipline of children).*
- ✓ *Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.*

7.2.3.6: 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 Measures to Risk of SEA

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

7.3 Impacts during Operations and Maintenance

The following potential impacts have been identified during operations and maintenance:

7.3.1 Positive Impacts

It is anticipated that the operations phase of this project will result in:

- i. An improvement in the standard of living of the beneficiary residents. More specifically, a reduction in the distances traveled and time spent in search of water, especially for women. This would in turn allow them to spend their energy and time on economically and socially viable activities for their families;
- ii. Reduction in water related conflicts
- iii. More access to water by community satellite herds during dry season
- iv. Food, nutritional and livelihoods security.
- v. Improved water availability even during the dry season

7.3.2 Negative Social Economic and Environmental Impacts

7.3.2.1 Social Impacts and Mitigation Measures

Social conflicts between water users may be the key negative impacts experienced at the pan as more water will now be available and may attract more interested parties like livestock keepers and wild animals.

These negative social economic impacts can be mitigated through;

- Enhancing awareness creation properly.
- Providing a watering schedule including wise use of the water resources.
- Fencing of the water pan

7.3.2.2 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 walk-ways 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*

7.3.2.3 Changes in water quality of the impounded reservoir

Mitigation Measures

- *Periodically sample water, test, treat (where possible) and release; and*
- *Provide alternative treated water fit for consumption and discourage the use of untreated water from the reservoir for domestic uses*
- *Check upstream sanitation practices*
- *Partner in enlightenment for increased environmental awareness in surrounding communities*
- *Clear vegetation and remove it from areas to be impounded*

7.3.2.4 Introduction of vector borne diseases

Some of the most common vector borne diseases includes bilharzias, malaria, 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*

7.3.2.5 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

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.*

7.3.3.1 Environmental Impacts and Mitigation Measures

7.3.3.2 Loss of Biodiversity

Due to increased human activities during operation, biodiversity may be affected. Excavated soils may cover vegetation leading to loss of habitats.

Mitigation measures

- *Only critically affected vegetation by the projects should be removed and reestablished later*
- *Fence off and replant trees and grass around the water pan.*
- *Protect sensitive vegetation from soils excavated*

7.3.3.3 Overgrazing

Due to influx of livestock and increased human settlement around the pan there may be loss of grazing area which may result to grazing and poor management of the rangelands.

Mitigation

- *Discuss with the local communities about rotational sites for grazing and advise them on ways and means to develop such alternatives*
- *Sensitize the community on the need to destock where necessary*

7.3.3.4 Water quality nitrate pollution by livestock dung and pesticides

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 pesticides and disposal of washings and waste containers*

7.3.3.5 Project Sustainability

For effective sustainability of the proposed project, record keeping should be done throughout the project lifecycle for the purpose of monitoring and evaluations. The management committee may fail to run the facilities that may lead to the destruction of the pan

Mitigation measures

- *The records that must always be kept include agreements on land use and all other documents relating to the site ownership transfers. This is for reference and administrative purpose in future.*
- *The by-laws should be enforced throughout the project lifecycle.*
- *All disputes will be solved internally where they are not criminal in nature and more serious ones referred to the police or the local Chief.*
- *Plant wind breaks around the pan in form of Neem trees in rows around the perimeter fence*

7.3.3.6 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 from the catchment that may include prosodies seeds into the reservoir that may lead to growth of invasive prosodies in the reservoir. Poor workmanship or failure to maintain the sedimentation ponds may lead to excessive siltation closure of the project.

Mitigation measures

A silt trap will be constructed to check the amount of soil that is transported into the pan hence increase the life span of the structure. This will involve clearing of vegetation over a surface area of and excavating a depth of 2m. This will create a volume of spoils that would require to be disposed of 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.*

7.4 Decommissioning Phase Impacts

The pan may be decommissioned due to aging of the structures such as weakening of embankments, siltation of the spillway and the pan itself. It may end up being more costly to desilt the pan and rather construct a new pan. The maintenance cost of rehabilitating the pan may exceed the benefit and if a cost benefit analysis is done by calculating the net present value and its internal rate of return, it may be negative. Therefore costs incurred to sustain the pan may be too high

7.4.1. Possible Positive impacts

7.4.1.1 Structural safety:

As water pan structures ages, they weaken, water pan may become unsafe to operate. Water pan history of safety incidents and unsuccessful remedial repairs determine water-pan safety risk

7.4.1.2 Reservoir siltation:

Siltation may reduce the water pan's ability to store and supply water. Financial implications may show that it will be costly to dredge hence decommissioning

7.4.1.3 Restoration of habitat diversity

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

7.4.2. Possible Negative impacts

7.4.2.1 Solid waste Generation

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

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

Proposed mitigation and management measures

Solid waste resulting from pan construction will be recycled or reused. Proponent to ensure that demolition materials are used in other projects rather than being disposed of. The demolition materials can be used for refurbishing and use in other projects. Measures can include sale or donation of recyclable/reusable material to construction firms, local groups, institutions and individual residents

7.4.2.2. 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

Table 4: Summary of anticipated Environmental and Social Impacts and mitigation measures

Possible Negative Impacts	Mitigation Measures
Construction Phase	
Solid Waste	<ul style="list-style-type: none"> • Contractor to provide temporal waste disposal receptacle in site. • Domestic solid waste to be stored in refuse bins temporarily before being taken away for proper disposal by NEMA licensed waste management firms; • Excavated soil shall be disposed at a minimum distance of 20 meters on the opposite side of the inlet and compacted for use • Ensure recycling of recyclable wastes such as paper, metals, and plastics
Soil erosion and sedimentation	<ul style="list-style-type: none"> • Contractor to ensure excavated earth should be held on locations of the site not susceptible to storm water runoff. • The earth removed for external disposal be deposited carefully on selected sites without the risk of being washed away during heavy rains and where such deposits will not compromise other land use activities in the areas affected • Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate erosion of soil through surface water runoff and wind erosion
Loss of Vegetative Cover	<ul style="list-style-type: none"> • Contractor to undertake enhanced planting of trees along the buffer zone and the adjoining areas where the vegetative cover is evidently sparse; and • Rehabilitate all sites that are being used for construction activities such as camps, materials site (borrow pits and quarries) sites for storage materials and any paths, tracks that may be established during the construction phase
Surface and ground water pollution /contamination	<ul style="list-style-type: none"> • The contractor to construct a standard temporary pit latrine for the workers • Contractor to identify an appropriate site pit for disposal of vegetation and biodegradable plant material • A temporary incinerator to be constructed to burn non bio degradable solid wastes such as plastics • Civil works, excavations, cuts and fills to be compacted so that there is minimal soil loss
Geomorphology and soils	<ul style="list-style-type: none"> • Large amount of fills will be transferred to appropriate disposal sites. • Compaction should be limited to the construction area.
Landscape disturbance	<ul style="list-style-type: none"> • 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 tress around the pan area as per the ESMP recommendations • Excavations of the site will be confined only within the sections upon which construction is

	<p>taking place</p> <ul style="list-style-type: none"> Excavated earth will be held away from drainage channels The PCU will develop catchment conservation plans to address soil erosion concerns in the catchment
Air, Dust and noise pollution	<ul style="list-style-type: none"> Personal protective equipment (PPE) such as dust masks must be worn in the immediate vicinity of the operations during excavation; The stockpiles of earth generated during construction works should be suppressed by spraying water or water based mixtures. Spraying should also be carried out on unpaved road accesses regularly; All machinery and equipment should be maintained in good working order to ensure minimum emissions including carbon monoxide, oxides of Nitrogen and Sulphur, as well as suspended particulate matter; Drivers of construction vehicles and delivery trucks should be cautioned to drive slowly near the site to avoid creating dusty conditions.
Oil spills/Fuels and Lubricants	<ul style="list-style-type: none"> The contractor should properly handle, storage, and disposal off oils and greases and their wastes during construction by ensuring that servicing is strictly done at designated servicing yard or external petroleum stations Proper maintenance of vehicles and other equipment (using petroleum products) to avoid fuels and lubricants spills at the project site; Safety procedures for fuel storage and re-fueling should be well understood and implemented by site staff; Oil residuals including waste oil, lubricants, used filters, should be carefully collected and stored for safe disposal, in order to prevent migration of contaminant hydrocarbons into storm water or groundwater resources
Occupational Health and Safety Issues Risk of Accidents	<ul style="list-style-type: none"> Drivers to be instructed not to speed especially near settlements when supplying materials to the site to prevent accidents especially to animals and children Provision of PPEs to all workers Installation of warning signage at the construction site and identified Contractor to register the site with DOSH and insure workers Use of helmets and other protective devices
Anticipated Social Impacts	✓
Labour influx and conflicts	<ul style="list-style-type: none"> The contractor awarded the Project will develop a labour Management Plan (LMP) in consultation with local leaders.

	<ul style="list-style-type: none"> • 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 • 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 should institute a security plan e.g. through a register for all visitors and workers. • The contractor will Adopt and adapt Nyumba Kumi strategies
COVID-19 Pandemic	<ul style="list-style-type: none"> • Avoid concentrating of more than 15 community members at one location. Where more than one person are gathered, maintain social distancing of at least 2 meters and wearing masks rightly • The team carrying out engagements within the communities on one-on-one basis be provided with appropriate PPE for the number of people they intend to meet • Encourage open air meetings and handwashing or sanitization • Hold meetings in small groups, mainly in form of FGDs if permitted depending on restrictions in place and subject to strict observance of physical distancing and limited duration.
Gender based violence and sexual harassment	<ul style="list-style-type: none"> • Community and construction workers awareness on GBV • Separate toilets for each gender • Scheduling operations to daytime and communal policing • Establishment of appropriate grievance redress mechanisms
HIV/AIDS and STIs risks	<ul style="list-style-type: none"> • Community sensitization on HIV/AIDs • Contractor to sensitive workers and provide condoms
Child Abuse	<ul style="list-style-type: none"> • The contractor will develop and implement a Children Protection Strategy that will ensures minors are protected against negative impacts associated by the Project including on SEA... • All staff must sign, committing themselves towards protecting children, a contract which clearly defines what is and is not acceptable behaviour. • Wherever possible, ensure that another adult is present when working in the proximity of children. • Refrain from physical punishment or discipline of children). • Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury

Operation and Maintenance Phase	
Occupational Health and Safety Issues	<ul style="list-style-type: none"> • 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
Changes in water quality of the impounded reservoir	<ul style="list-style-type: none"> • Periodically sample water, test, treat (where possible) and release; and • Provide alternative treated water fit for consumption and discourage the use of untreated water from the reservoir for domestic uses • Check upstream sanitation practices • Partner in enlightenment for increased environmental awareness in surrounding communities • Clear vegetation and remove it from areas to be impounded
Introduction of vector and water borne diseases	<ul style="list-style-type: none"> • 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
Water demand conflicts	<ul style="list-style-type: none"> • 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 • PMU to establish and maintain a community run pan management committee
Environmental Impacts	
Loss of biodiversity	<ul style="list-style-type: none"> • Only critically affected vegetation by the projects should be removed and reestablished later • Fence off and replant trees and grass around the water pan. • Protect sensitive vegetation from soils excavated
Overgrazing	<ul style="list-style-type: none"> • Discuss with the local communities about rotational sites for grazing and advise them on ways and means to develop such alternatives • Sensitize the community on the need to destock where necessary

Water quality nitrate pollution by livestock dung and pesticides	<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 pesticides and disposal of washings and waste containers • Promote the use of Integrated pest management in order to discourage use of pesticides
Increased pressure on infrastructure	<ul style="list-style-type: none"> • Protect the pan by fencing off and put appropriate conservations measures around by planting grass along the embankments and trees species that do not extract a lot of water from the ground the proponent will undertake this measures in collaboration with forestry department in the county. • Construct water collection points atleast 5meters away from the protected pan • Observe Covid 19 guidelines by maintaining social distance and avoid congestion or public gathering around the water pan
Siltation	<ul style="list-style-type: none"> • 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.
Decommissioning Phase	
Solid waste Generation	<ul style="list-style-type: none"> ✓ Solid waste resulting from pan construction will be recycled or reused to ensure that materials that would otherwise be disposed as wastes are divided for productive uses. ✓ Proponent is to ensure that demolition materials be used in other projects rather than being disposed off. ✓ Sale or donate recyclable/reusable material to construction firms, local groups, institutions and individual residents
Oil spills/Fuels and Lubricants	<ul style="list-style-type: none"> ✓ Proper maintenance of vehicles and other equipment (using petroleum products) to avoid fuels and lubricants spills at the project site. ✓ The contractor should properly handle, storage, and disposal off oils and greases and their wastes during construction by ensuring that servicing is strictly done at designated servicing yard or external petroleum stations

CHAPTER EIGHT

8.0 ENVIRONMENTAL SOCIAL MANAGEMENT PLAN (ESMP)

8.1 General

Along with the potential impacts presented in this chapter, proposed mitigation measures have also been highlighted for appropriate action. Some impact mitigation has already been proactively addressed in the design, legal and regulatory framework, while others would be undertaken through considered incorporation in the implementation of the project and guided by the environmental management plan (ESMP) developed under this report. The ESMP provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitor able indicators. Implementation timeframes and responsibilities are also defined.

The responsibility for the integration of the mitigation measures for the proposed development lies with the Contractor during the construction stage while the Proponent takes over the duty upon commissioning of the project. At every stage, the objective would be to ensure that the specified mitigation measures are implemented.

8.2 Environmental Social Management Plan

The scope of this environmental social management plan (ESMP) document is to give guidelines to all parties involved in construction, maintenance and utilization of the water pan in fulfillment of environmental and social requirements. The management plan has a long-term objective to ensure that:

- i. Environmental management conditions and requirements are implemented from the start of the project and post construction period, and
- ii. Precautions against damage to environment and property and claims arising from damages are compensated expeditiously.

The tables below therefore summarize the Environmental Social Management Plan for this project. They describe the parameters that can be monitored, and suggests how monitoring should be done, how frequently, and who should be responsible for monitoring and action

Table 5: Environmental Social Management and Monitoring Plan

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
Design and formulation	<ul style="list-style-type: none"> Misunderstanding and conflict during project formulation especially on site 	<ul style="list-style-type: none"> Adequate community consultations and disclosure meetings 	50,000.00	Community group, project designer	During the design process
Construction	<ul style="list-style-type: none"> Noise pollution and increase dust levels during excavation activities 	<ul style="list-style-type: none"> Minimize emission of exhaust fumes through servicing of machinery in use Use only heavy machinery and equipment during daytime Provide workers with ear plugs and muffs 	20,000.00	Community group /partner, contractor	
	<ul style="list-style-type: none"> Loss of trees, bushes and grassland in the impoundment area to excavation and clearing 	<ul style="list-style-type: none"> Contractor should only clear enough area for the pan. Mature trees should not be cut unless extremely necessary. Plant indigenous palatable plant species around the project site 	50,000.00	Community group /partner, contractor	During Construction of the project
	<ul style="list-style-type: none"> Substandard construction of the facility 	<ul style="list-style-type: none"> Ensure a monitoring system and supervisory task are instituted to ensure the construction team adheres to the design specifications Merits in the selection of the contractor should be major considerations 	60,000.00	Project supervisor Community group / stakeholders (CWO)	During planning and rehabilitation
	<ul style="list-style-type: none"> Solid waste disposal 	<ul style="list-style-type: none"> The base camp of the contractor should not be in the catchment area of the water pan. Dispose all spoils and soil mould appropriately Recycle any useful material during water pan excavation phase 	Part of construction cost	Project supervisor, Community group	During planning and rehabilitation
	<ul style="list-style-type: none"> Risks and accidents 	Fencing of the water pan to be done to ensure the safety of the community members as well as their livestock.	Part of construction cost		During planning and rehabilitation

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
		<ul style="list-style-type: none"> • Install a gate at the entrance to control the movement of people and livestock as well as security • The contractor to work closely with the local leaders to sensitize the community members on the presence of the excavation works within the area and caution as expected • Precautionary measures should be undertaken by the contractor when excavation of the pan is in progress to avoid accidents to the local populace • Provide draw off facilities and watering points to prevent direct access to the pan. • Remove all objects that would obstruct visibility or pose site accident. 			
	<ul style="list-style-type: none"> • Occupational health and safety of workers 	<ul style="list-style-type: none"> • Provide workers with appropriate personal protective clothing: helmets, boots and overalls. • Provide a well-stocked first aid kits on the site • Sensitize workers on safety measures required during water pan excavation and maintenance phase • 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. 	NIL	Project supervisor, Community group	During planning and construction

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
	COVID-19 Pandemic	<ul style="list-style-type: none"> • Avoid concentrating of more than 15 community members at one location. • Where more than one person are gathered, maintain social distancing of at least 2 meters and wearing masks rightly • The team carrying out engagements within the communities on one-on-one basis be provided with appropriate PPE for the number of people they intend to meet • Encourage open air meetings and handwashing or sanitization 	100,0000	County Project Coordination Unit, Pan Management Committee	During consultation, construction and operation
	Gender based violence and sexual harassment	<ul style="list-style-type: none"> • Community and construction workers awareness on GBV • Separate toilets for each gender • Scheduling operations to daytime and communal policing • Establishment of appropriate grievance redress mechanisms • 	40,000	County Project Coordination Unit, Pan Management Committee	During consultation, construction and operation
	HIV/AIDS and STIs risks	<ul style="list-style-type: none"> • Community sensitization on HIV/AIDS • Contractor to sensitive workers and provide condoms 	Variable	Group members, Ministry of Health	Monthly
	Child Abuse	<ul style="list-style-type: none"> • The contractor will develop and implement a Children Protection Strategy • All staff must sign, committing themselves towards protecting children, a contract which clearly defines what is and is not acceptable behaviour. 	20,000	County Project Coordination Unit, Pan Management Committee	During consultation, construction and operation

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
		<ul style="list-style-type: none"> Refrain from physical punishment or discipline of children). Refrain from hiring children for domestic or other labor, 			
	<ul style="list-style-type: none"> Interference with the physical environment 	<ul style="list-style-type: none"> Dispose all spoils and soil mould appropriately Landscape and restore all disturbed areas Improve the ambience of the area by minimizing the destruction of the existing vegetable at the site 	Nil	Project supervisor, Community group	During planning and construction
Operation	<ul style="list-style-type: none"> Possible breeding of disease causing vector due to the presence of the pan Increase in water borne and other related diseases 	<ul style="list-style-type: none"> Conduct health training measure for the community members Awareness creation; mosquito nets; Boiling and treatment of drinking water if collected when polluted; regular supervision of the pan in order to identify any malfunctioning early enough Monitor reported illnesses and improve health services and proximal to the site. Regular spraying of homes and houses within the water pan project area to rid them of mosquitoes; Improving the immediate hospital capacity to handle probable increase in incidences of malaria; Supply of mosquito nets at a subsidized cost; 	100,000.00	Community group, Health and Water Officers.	4 months after commissioning and periodically thereafter
	<ul style="list-style-type: none"> Degradation of vegetation and soil loss around the pan due to increased visits by the community livestock 	<ul style="list-style-type: none"> Restrict water use to very dry periods when all the other water sources available are dry to allow for regeneration. Provide other watering points distributed evenly to reduce over-concentration 		Community Management Group	

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
	and wildlife				
	<ul style="list-style-type: none"> • Sedimentation/Siltation of the pan and loss of storage 	<ul style="list-style-type: none"> • Construct a silt trap upstream of the pan • Desilt the silt trap on regular basis • Compaction of removed soil by a roller to reduce risk of erosion by rain and wind. • Construct adequate draw off facilities to ensure no direct access by the users human, livestock or wildlife • By-laws to ensure operation and maintenance. • Training project members on maintenance of the facility. 	Factored within the project cost	Contractor Community group	Quarterly
	<ul style="list-style-type: none"> • Possible water pollution 	<ul style="list-style-type: none"> • Provide draw off facilities to deter direct access to the facility • Settlements should be on the opposite side of the catchment 	Factored within the project cost	Contractor, Community group	Quarterly
	<ul style="list-style-type: none"> • Vandalism of property 	<ul style="list-style-type: none"> • Community sensitization; Community policing and Proponent support 	120,000	Management group	Biannually
	<ul style="list-style-type: none"> • Diversion of surface runoff 	<ul style="list-style-type: none"> • Spillway to direct discharge back to the natural course 	5,000	Contractor, group	Continuous
	<ul style="list-style-type: none"> • Loss of Biodiversity (Flora and Fauna) 	<ul style="list-style-type: none"> • The areas should be re-vegetated with local area vegetation <ul style="list-style-type: none"> •The walk ways should be designated. •Soil conservation techniques should be addressed mostly on critical areas e.g. building check dams. •Adaptable tree species should be introduced on mostly on water ways and other affected areas by human activities. These trees include Neem and local acacias, Acacia seamea and other recommended species. •Spill way should be located on appropriate location so as to reduce chances of floods 	Varies	Community water pan management committee	Continuous

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
	<ul style="list-style-type: none"> • Soil degradation 	<p>downwards during heavy down pour.</p> <p>Soil erosion, pollution, compaction and contamination should be controlled by having interval of grass strips or land cover vegetation on the pan embankment; stock piled soils should be covered and protected from erosion; revegetate areas cleared of erosion; scrub compacted areas.</p> <p>Stabilize the excavated and heaped soils Replant trees and grasses around the reservoir. Landscape water ways to avoid siltation. Protect the dams by fencing off. Serious soil conservation measures on water ways and catchment area should be carried out.</p>	Varies	Community water pan management group	Continuous
	<ul style="list-style-type: none"> • HIV/AIDS 	HIV/AIDS awareness and reduction among the community members sharing the water point.	Variable	Group members, Ministry of Health	Monthly
	<ul style="list-style-type: none"> • COVID-19 Pandemic 	<ul style="list-style-type: none"> • Avoid concentrating of more than 15 community members at one location. • Where more than one person are gathered, maintain social distancing of at least 2 meters and wearing masks rightly 	20,0000	Pan Management Committee	Continuous
	<ul style="list-style-type: none"> • Water quality nitrate pollution by livestock dung, pesticides and fertilizers 	<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 	Variable	Group members, Ministry of Health, Ministry of water	Continuous

Project phase	Description of impacts	Mitigation measures	Approximate Cost (Kshs)	Responsibility	Time frame
	<ul style="list-style-type: none"> Population Pressure and Water Demand Conflicts 	<p>Monitor the trend of migration during the project operation plan and adjust the required pan capacity by regular distillation. Increased pressure on the existing water sources in the project area.</p> <p>Schedule should be set for reduced water use during the dry season</p> <p>By laws should be followed and enforced. Penalties and fines should be introduced.</p>	100,000	Group members, Contractor	Continuous
	<ul style="list-style-type: none"> Project Sustainability(<ul style="list-style-type: none"> The records that must always be kept include agreements on land use and all other documents relating to the site ownership transfers. This is for reference and administrative purpose in future. The by-laws should be enforced throughout the project lifecycle. All disputes (GRM) should be solved internally where they are NOT criminal in nature and more serious ones referred to the police or the local Chief. 	Variable	Community group members, Partners, Contractor	Continuous
Decommissioning Phase	<ul style="list-style-type: none"> Solid waste generation 	<ul style="list-style-type: none"> Do re-vegetation of the site to the donor satisfaction. All buildings structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible Constant monitoring and inspection of the demolition works to prevent accidents. 	200,000	Community group members, Partners, Contractor	During decommissioning

CHAPTER 9: MONITORING GUIDELINES

9.1 Introduction

There must be continuous monitoring and follow-up on the Wayu Water Pan activities to ensure that the environmental management plan (ESMP) is implemented and that its objectives are achieved. The implementing staff, the community, and the Contractor should ensure that the mitigation measures are put in place as outlined in the ESMP. The monitoring guidelines are based on the following parameters:

- Increased potential of Wayu Water Pan
- Preservation of species in synergy with the water pan
- Level of coliform and other bacteria in the sampled water not to forget the ppm solid elements
- Severity to water pan watershed encroachment
- Number of prosecuted cases of livestock trespasses to the neighboring areas
- Number of pan equipment vandalism and or illegal drawing points
- Public safety
- Malaria and other disease prevention and control
- Livestock – wildlife - human conflicts management
- Improved vegetation cover
- Safety of equipment and property
- Capacity building and skills improvement of water users
- Removal of invasive species around the water pan area and catchment

CHAPTER 10: CONCLUSIONS AND RECOMMENDATION

10.1 Conclusions

From an environmental point of view, the project poses minimal negative impacts especially due to its size and normal impacts associated with any excavation works. The negative impacts were found to be of low magnitude and can be easily mitigated at minimal costs or cost free. On the other hand, the positive impacts of the project are mainly socio economic and would contribute immensely towards the achievement of vision 2030 objectives of wealth creation, income generation and poverty reduction within the rural communities of Kenya. The potential negative impacts of the project are low, easy to mitigate, and the benefits to the community are very significant. In addition, if the proponent and the community undertake the necessary measures to mitigate the negative impacts as identified in this report, then there should be no reason to prevent the project from proceeding on as planned.

10.2 Recommendations

Wayu Water Pan has the potential to have multiple benefits to the community of Wayu and the surrounding areas. The positive impacts of the project far out ways the negative impacts of the project.

- To ensure environmental sustainable development, the following recommendations should be considered for implementation.
- All materials from the demolished existing bond to be reused maximally and if unusable the materials to be disposed according to the existing rules and regulations
- The dam project will lead to improved water accessibility and security at community level, the few negative impacts identified have been adequately mitigated through diverse measures proposed in the ESMP and thus we recommend that the project be considered for an ESIA clearance and subsequent implementation
- The local area administration to guide in providing community policing especially during project operation period for avoidance of influx of other communities which could be a potential source of conflict and the current ravaging Covid 19 pandemic
- Finally the potential negative impacts of the project are low, easy to mitigate and the benefits to the community are very significant. If the proponent and beneficiaries undertake the necessary measures to mitigate the negative impacts as identified and recommended in the EMP, then there should be no reason to prevent the project from proceeding on as planned.

11.0 KEY REFERENCES

- Kenya gazette supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 2015. Government printer, Nairobi
- Kenya gazette supplement number 56. Environmental Impact Assessment and Audit Regulations 2003, Government Printers, Nairobi
- The County Integrated Development Plan, Tana River County, 2013 – 2017
- Kenya gazette supplement Acts Local Authority Act (Cap. 265), Government Printers, Nairobi
- Kenya gazette supplement Acts Penal Code Act (Cap.63) Government Printers, Nairobi
- Kenya gazette supplement Acts Physical Planning Act, 2015, Government Printers, Nairobi
- Pollution prevention and abatement handbook – Part III, (September, 2001)
- Noise Prevention and Control Rules 2005, Legal Notice no. 24, Government Printers, Nairobi
- The Occupational Safety and Health Act, 2007, Government Printers, Nairobi
- World Bank (1991), Environmental Assessment sourcebook volume I: Policies, procedures and cross-Sectoral issues. World Bank, Washington.
- Kenya gazette supplement number 57, Environmental Management and Coordination (Controlled Substances) Regulations, 2007, Government printer, Nairobi
- Kenya gazette supplement number 68, Environmental Management and Coordination (Water Quality) Regulations, 2006, Government printer, Nairobi
- Kenya gazette supplement number 69, Environmental Management and Coordination (Waste management) Regulations, 2006, Government printer, Nairobi

11.1 ANNEX 1: MINUTES OF THE COMMUNITY CONSULTATION MEETINGS

MINUTES OF THE COMMUNITY BARAZA/MEETING ON PROPOSED WATER PAN CONSTRUCTION FOR LIVESTOCK DEVELOPMENT IN DHANABALE VILLAGE, WAYU WARD, GALOLE SUB COUNTY, TANARIVER COUNTY HELD ON 15th DECEMBER , 2020 AT DAHANABALE VILLAGE AT 10.00 AM

Members Present:

List attached

Agenda

Project Brief

Community Sensitization on ESIA

Public participation

AOB

Min 1. 15./12/2020: Introduction

The meeting commenced at 11a.m with a word of prayers from the Ward Administrator Mr Adhan Shidie, He welcomed the participants and informed the meeting that water scarcity is a problem and currently livestock have migrated to dry season grazing areas along the riverine areas. The community has lost their main source of livelihoods due to livestock migration in search of water. Water is not available in the households, this is evident of women carrying jerrycans all over in search of water. He stated that water is a problem in the village and the only option is to construct a water pan. He welcomed the visitors from Hola CPC office and Nairobi and expressed their happiness for receiving the visitors again. He then introduced the County Environmental Social Safeguards Officer (CESSCO) for the KCSAP project

Min 2. 15/12/2020: KSCAP CESSCO's Remarks

The CESSCO reminded the community of the last visit the team had paid to the community during the prioritization exercise and the promised to return, which had now been fulfilled. He gave a brief highlight on the objective of the visit and the need to conduct an Environmental Social Impact Assessment on the proposed water pan Project He at the same time briefed them on their proposal of how to undertake selective bush clearing during opening up of land for the water pan construction. He further narrated the importance of the Environmental Social Impact Assessment Exercise and called on proper attention to the lead experts' quest for further clarifications. The team leader invited the ESIA lead experts to explain in detail the purpose of the visit

Min 2./15/12/2020: Community Consultation/Sensitization on EIA

The ESIA expert enlightened the meeting about ESIA; its purpose objectives; legal framework including legislation and policies governing environment; the rights and role of community towards environmental protection and management. He further took the community through selected legislation governing the environment including the new constitution

The community was informed that it is mandatory to hold at least one baraza to give the community/neighbours/stakeholders an opportunity to give their views with respect to the benefits; impacts both negative and positive in order to establish

whether the project is economically viable, socially accepted and environmentally friendly/sound

Min 3./15/12/2020: Community participation

The ESIA lead expert guided the community members on procedures of giving their opinion and that each speaker was to follow but not limited to the following criteria:

- Personal identification by: location names, age, gender, mobile telephone number
- Indicate whether he or she is aware of the proposed bush water pan construction and its related activities incidental thereto and connected therewith the under the Resilience Project? Yes/No
- Give opinion on the expected benefits from the water pan project
- Give opinion on the anticipated negative/adverse impacts that may result from this project and related activities
- Propose mitigation measures to avoid, alleviate or reduce the adverse effects
- Identify any conflict, complaints expected to arise due water pan construction
- Suggest ways to resolve conflict, complain amicably
- Indicate other issues relevant to the implementation of the water pan project

The community beneficiary opinions were documented below:

Mr Kushushu Ismail Informed the meeting that the region is predominantly a water scarce area. If the water pan was in place then water would be available for domestic and livestock use and migrations would be minimal. Availability of milk in the households would be enhanced and incidences of malnutrition would be low.

Balisa Salad Chari a community youth member who is also the secretary to the water pan management committee reported that there will be employment creation. The project will open avenues for the youth to make hay and sell as feed for livestock. It will also cushion livestock keepers from the recurring droughts and frequent movement in search of water

When asked about benefits of proposed water project they identified the following;

1. Employment creation
2. Water for livestock
3. Reduced livestock migrations
4. The invader non palatable plant species will also be removed.
5. The water from the pan will be used to Increase of fodder production and enhance milk availability and improve food security.
6. The project will sensitize the community on planting of appropriate pasture types and conservation of animal feeds

Min 3./15/12/2020: Possible adverse effects of the project and suggested mitigations

One of the women representatives in the meeting Madina Hashako informed members that she doesn't see any serious adverse impact from the proposed water pan she actually said that the are much more benefits that outweigh negative impacts The following issue were raised by the participants

- The community were unanimous that there will be no negative environmental impacts resulting from the bush clearing activity.
- However, some minimal environmental degradation as a result of selective bush cutting and thinning might occur while opening the area for excavating the pan

-
- There will be removal of selected vegetation creating open spaces that would be used for pasture development,
 - However the removed vegetation would be mitigated by planting indigenous palatable forage for livestock which would still cover the soil around the embankments and catchment areas.
 - Formation of establishment water pan management committee to coordinate access and utilization of water in the pan.

Min 4./15/12/2020: A.O.B

OWNERSHIP OF THE LAND TO BE OCCUPIED BY THIS PROJECT INVESTMENT?

The Community participants reaffirmed that the land belongs to the community and no individual person in the community could claim ownership of the land. The ESIA Expert then informed the community that they would be expected to put their names down to show that they were consulted and they agreed that they would have this project implemented in their area.

CONSENT

The Community members present agreed unanimously that project implementation should continue. They acknowledged that the entire community was not present at the meeting but they would inform them all that had been discussed and agreed during the meeting.

RESOLUTION

The Lead Expert thanked the Community for giving consent for project implementation. He stated that the Community response to the ESIA exercise will go to the experts to facilitate issuance of other certification as the case may be.

CLOSING REMARKS

The CESSCO's thanked the participants for attending the meeting and informed that he will be available frequently during project implementation to monitor progress. He noted that success of the project depends on all stakeholders The Management Committee from the community must remain as a family and know that there will be maintenance cost.

There being no other business to discuss to discuss, the meeting was closed with a word of prayer at 2.30 pm.

11.2 ANNEX 11 LIST OF PARTICIPANTS



TANRIIVER COUNTY GOVERNMENT

KENYA CLIMATE SMART AGRICULTURE PROJECT-TANRIIVER COUNTY



ATTENDANCE SHEET

Activity: ESIA Purpose: Participation for Dhanagete Watershed Date: 5/12/2020

Location: Wachu Sub Location

S/N	Name	Gender (M/F)	Age (A=20-34, B=35-50, C=50 And Above)	Department/organization	Designation	J/G	ID NO	Tel.No	Email Address	Signature
1	Mohamed Abdulla Ibrahim	M	B	Dhanagete	Member	-	24110257	0700096296		[Signature]
2	Harrison Othman Bony	M	B	"	"	-	24300619	0735387495		[Signature]
3	Barisim Sathan Chiro	M	A	"	Secretary	-	27662174	0744028210		[Signature]
4	Kishtu G. Ismail	M	A	"	Chairman	-	24769633	0710283392		[Signature]
5	Reza Hani Alango	M	C	"	Member	-	5325826	0713358216		[Signature]
6	Mohamed A. Hani	M	C	"	Member	-	10811498	0791089170		[Signature]
7	Boda H. Wako	M	G	"	Headman	-	5955230	0791151710		[Signature]
8	Bugi S. Mwakid	F	A	"	Member	-	29493444	0740281829		[Signature]
9	Sandee G. Kondo	F	B	"	Member	-	2267117	0741518306		[Signature]
10	Hadi G. Kondo	F	A	"	Member	-	3925275	0740529094		[Signature]
11	Mabini M. Heshiko	F	A	"	Member	-	3229254	0740281826		[Signature]
12	Ismael G. Aradula	M	A	"	Member	-	3229254	0704019425		[Signature]
13	Imani J. Solomoni	M	A	"	Member	-	3229254	079265711		[Signature]
14	David Iddi Alango	M	A	"	Member	-	22683577	0700617740		[Signature]
15	Abdulla S. Sidi	M	B	Tanriiver	Member	-	24300619	07276015		[Signature]
16	Frederic Atid	M	C	NEMA	Driver	P	3648440	0726584447	Production Services	[Signature]
17	George Wasonga	M	B	KCSAP	CEO	K	21290688	0715760286	Production Services	[Signature]

11.3 ANNEX III: PUBLIC CONSULTATION QUESTIONNAIRE.

ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED CONSTRUCTION OF A WATER PAN AT DHANABALE VILLAGE IN TANA RIVER COUNTY.

County Project Coordinator (CPC), Kenya Climate Smart Agricultural Project (**KCSAP**), Ministry of Agriculture, Livestock and Fisheries. P.O. Box 10 - 70101 Tana River intends to establish an irrigation project under their Investment structures in Dhanabale village in Tana River County.

To ensure that the project is implemented in an environmentally and social sound manner, the proponent the **County Project Coordinator (CPC)**, Kenya Climate Smart Agriculture Project (**KCSAP**) in consultation with ESIA Lead expert is conducting an Environmental Social Impact Assessment_(**ESIA**) for the proposed site.

The main objective of the **ESIA** study is to identify key environmental, health, social and economic issues associated with the proposed project and establish appropriate mitigation measures for the negative impacts while enhancing the positive impacts.

Public Participation of interested and affected parties in the **ESIA** is a requirement of the Environmental Management and Coordination Act, 1999.

In public and partnership participation, you have been identified as one of key informant. You are requested to document your views, opinions and concerns regarding the proposed water pan project

This questionnaire acts as a guide for the respondent to provide relevant information on the proposed project. All the information obtained shall be used entirely for the proposed study on the project and shall be treated confidential.

We appreciate your cooperation and thank you for your willingness to participate in this exercise.

Please return the completed questionnaire to the ESIA/EA lead Expert.

Fredrick Aloo

Phone numbers: -

+254-726-589 117

E-mail address: -

fredrick.aloo@gmail.com

Address: -

P.O. BOX 45963-00100

NAIROBI – Kenya

11.4 ANNEX IV: KEY INFORMANT QUESTIONNAIRE.

The World Bank is funding proposed Construction of Dhanabale Water Pan - KCSAP Project in Tana River County. As the project falls under the second schedule of EMCA, an Environmental Impact Assessment is to be undertaken. This is in addition to mainstreaming of World Bank ESS guidelines and operational procedures. As a Key informant resource your contribution in decision making and ultimate licensing of the project is critical. Please make your comments regarding the following

Are you aware and been involved in theof the project? Yes.....
No.....

What are the main statutes in your docket that touch on this project?

Are there any issues of concern (Social and environmental) that you think should be considered in this project?

Any other comment

Thank You for your cooperation

Summary of key issues from KII

- ✓ There is no known heritage site in the project area however chance find procedures should be observed
- ✓ Not afforested area
- ✓ It is a traditional grazing area which experience frequent water scarcity
- ✓ The water pan is being implemented in a marginalized pastoralist community whose livelihood is dependent on livestock keeping

11.5 ANNEX V: QUESTIONNAIRES ADMINISTERED

QUESTIONNAIRE (STAKEHOLDERS): DHANABALE WATER PAN KOTICHA LOCATION, WAYU WARD. GALOLE -SUB COUNTY, TANA RIVER COUNTY
INTRODUCTION

Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MAL, F&C), the state department of Crops through World Bank Funded Kenya Climate Smart Agriculture Project (KCSAP) intends to construct a water pan in this area for domestic livestock and other related use. We have been assigned the responsibility to carry out an **ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT** for the development. We are pleased to seek your views (as beneficiary/neighbor/stakeholder) concerning the intended development. For this purpose it would be appreciated if you would kindly fill in this brief questionnaire. The information is **STRICTLY** for the purpose of this study and shall remain confidential

1. Age of the Respondent.....50.....
2. For how long have you resided or worked in this area.....10.....(years)
3. Do you know about the proposed water pan construction project under the Kenya Climate Smart Agriculture Project? Yes No
4. In your opinion; in what ways will the above water pan benefit the community, country and nation in general?
 - i. provision of water Domestic
 - ii. provision of water for livestock & wild animals
 - iii. water irrigation - small scale - Pasture vegetables
 - iv. Can grow fish - improve food security
 - v.
 - vi.
5. Mention the negative impacts that the water pan may pose to the neighborhood and environment in general
 - i. land degradation due to concentration of animals in the pan area
 - ii. breeding of human especially small children
 - iii. breeding ground for mosquito
 - iv.

6. What do you think can be done to mitigate the negative impacts you have listed in 4 above?

- i. Sensitization to the Community
- ii. supply mosquito nets to the Community near the pan
- iii. Do range rehabilitation and reseed to the surrounding area
- iv.

7. a) Do you anticipate any conflict or complain against proposed water pan 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
- Others

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

- i.
- ii.
- iii.
- iv.

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

9. 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 County Director Livestock Production

PERSONAL INFORMATION

Name of Respondent Nzioka Wambui ID No. 8352576

Mobile 0722420037 Signature..... [Signature]

Thank you for your cooperation

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

11.6 ANNEX VI: PHOTOS OF THE PROJECT SITE

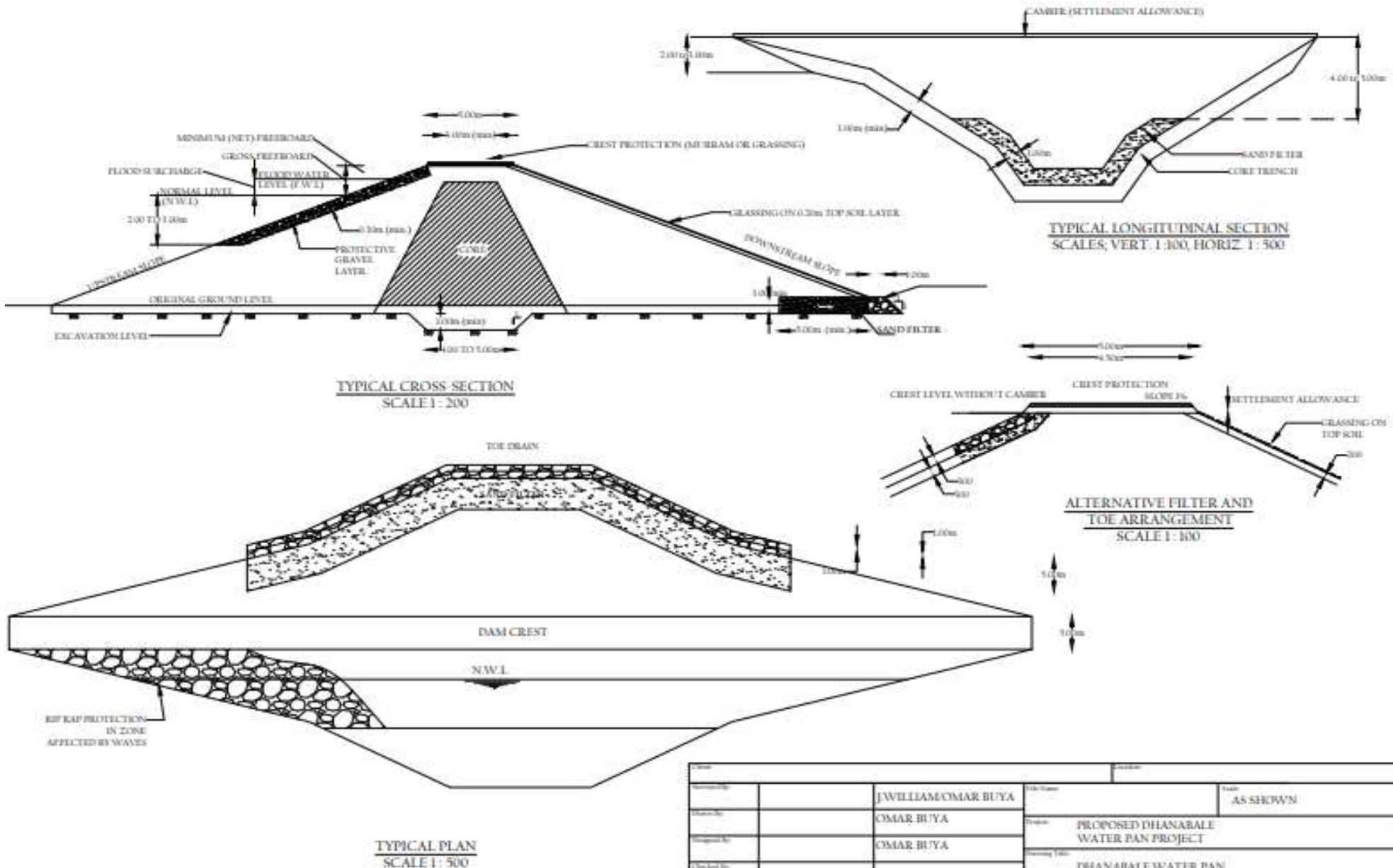


Proposed sign for construction of the water pan a water way dry river bed which is occupied with fine sand . Silt traps around the catchment are can be constructed in order to control siltation of the pan



Community members holding discussions at the proposed water pan site on the backyard is *Acacia reficiens* woody scattered vegetation and *Sueda monoica* shrub vegetation which can be used to control flow of water. The ground is bare and indigenous shrubs and grass species will be used to cover the ground

11.7 ANNEX VII DESIGN OF THE PAN



Author	JVILLIAMOMAR BUYA	File Name	AS SHOWN
Checker	OMAR BUYA	Project	PROPOSED DHANABALE WATER PAN PROJECT
Designer	OMAR BUYA	Drawing Title	DHANABALE WATER PAN
Checked By		Drawing No.	TYPE DRAWING I
Approved By		Date	

11.8 ANNEX VIII ESIA SCREENING REPORT

ISHAWA AME WATER PWD PROJECT

Activities
 (i) water for construction
 (ii) Fodder planting
 Approximate Area: 50 acres.

Completed by: [Type Name]
 Name: [Type Name] KUSUMBI/1/1

Position / Community: [Type Name] CHAMPAGON

Date: [Type Name] 2nd OCTOBER 2019

Field Approval Officer (FOO): [Type Name] EDWARD MUSA
 Signature: [Signature] 02 057 307

Date: [Type Name] 2nd OCTOBER 2019

Remarks on FOOS RETURN
 The project being machine work so for hydrology
 3.1 Section 2 (6a) of 2019, you are required to prepare
 and submit a NEMA 6 Completion Environmental
 Impact Assessment project report.

11.9 ANNEX IX ESIA CERTIFICATE OF REGISTRATION

FORM 5

(r.14(4))



**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
CERTIFICATE OF REGISTRATION AS AN ENVIRONMENTAL IMPACT ASSESSMENT/
AUDIT EXPERT**

Certificate No: NEMA/EIA/RC/2344

Application Reference No: NEMA/EIA/ER/5235

This is to certify M/s **Fredrick Onyango Aloo** of
P.O. Box 45963-00100 Nairobi, (Address) has been registered as an Environmental
Impact Assessment Expert in accordance with the provisions of the Environmental Management and
Coordination Act Cap 387 and is authorized to practice in the capacity of a Lead Expert/Associate
Expert/Firm of Experts (Type) **Lead Expert**

Expert Registration No: **9049**

Issued Date : **2/23/2017**

Signature

(Seal)

Director-General
The National Environmental Management Authority

P.T.O.



11.10 ANNEX X ESIA PRACTISING LICENCE

FORM 7

(r.15(2))



**NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTISING LICENSE**

License No : NEMA/EIA/ERPL/11426

Application Reference No: NEMA/E A/EL/13/06

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: **1/2/2020**

Expiry Date: **12/31/2020**

Signature.....

(Seal)

**Director General
The National Environment Management
Authority**

E.I.A.

