ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT STUDY REPORT

JANUARY 2023

PROJECT

PROPOSED AVOCADO PLANTATION WITH A DAM

LOCATION

WAMURA SUBLOCATION, LAIKIPIA CENTRAL SUB-COUNTY, LAIKIPIA COUNTY

GEOGRAPHICAL COORDINATES

LATITUDE:1°29'76.42 "S

LONGITUDE 36°7'63.547 "E

LAND REGISTRATION NUMBER

LR.NO.17510

PROJECT PROPONENT
Mutara Orchards Ltd
P.O BOX 51027-00200
NAIROBI

ASSIGNMENT

Environmental Social Impact Assessment study report for the proposed establishment of an avocado plantation consisting of a dam and supporting amenities within Wamura sub location, Laikipia central Sub-County, Laikipia County.

TEAM OF CONSULTANTS

This ESIA study was prepared by the following Team members;

1. Mr. Onyango Dan Amollo EIA/EA Lead Expert Reg No. 6078
2. Eric maingi Mwenda Finacial Economist
3. Henry Juguna Hydrologist
4. Eng. Geofrey Kiprotich Sang Civil engineer
5. Alice Abuya sociologist
6. Vincent Muli lead expert 1850
7. Hawkins Omore Associate expert
8. Nyiva Nthiana –Environmentalist
9. Rehema Wanjiku -Financial Advisor
10. Emma ndungu- Agronomist
11. Esther kabaka -Health & Safety Advisor OSH/ADV/083

Other contractors relevant to the proposed project

1. Design source – Architectural /interior designs
2. Qube Consultants Ltd – Quantity Surveyors /project management
3. Capillano Agencies – Building contractors
4. Rock Link geological consultants ltd – Geotechnical & geological surveyors
5. Cropnuts – soil testing
6. Timtrade convertors ltd – fencing

SUBMISSION OF DOCUMENTATION

ENVIRONMENTAL CONSULTANT

We hereby submit the following Environmental Social Impact Assessment Study Report for the proposed avocado plantation within Wamura sub location, Laikipia central Sub-County, Laikipia County.To the best of our knowledge, all information contained in this report is an accurate and truthful presentation of all findings as relating to the project proposal.

Mr. Onyango Dan Amollo (NEMA Lead Expert Reg No: 6078)

Signature: _____ **Date:** ……..

THE PROPONENT

We confirm that this ESIA study report has been prepared and forwarded to NEMA with our authority as the project proponent. We also confirm our commitment to implementing the Environmental Management Plan as proposed in this project report, as well as any other conditions that the NEMA may prescribe.

Name: _____ Position: _____

Signature:_____Date: _____

DECLARATION

This study report was prepared for submission to the National Environment Management Authority (NEMA) in accordance with Part VII, Section 58 of Environmental Management and Coordination (Amendment) Act (EMCA 1999, Amendment 2015), the Environmental (Impact Assessment and Audit) Regulations of 2003 (Amendment 2019), and other gazette legislations related to Environmental Management in Kenya.

The Environmental Consultants exercised due diligence during data collection and assessment of relevant data, in order to address potential significant environmental issues.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASL	Above Sea Level
CBD	Convention on Biological Diversity
CDE	County Director of Environment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO	Carbon Monoxide
COP	Conference of Parties
CSDS	Chemical Safety Data Sheets
EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EOSH	Environmental and Occupational Safety and Health
ESA	Environmental and Social Audit
ESIA	Environmental and Social Impact Assessments
ESMP	Environmental and Social Management Plan
GoK	Government of Kenya
HAIs	Health Care-Associated Infections
IESA	Initial Environmental and Social Audits
ILO	International Labour Organization
IPC	Infection Prevention and Control
MOH	Ministry of Health
MSDS	Material Safety Data Sheets
NCA	National Construction Authority
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NPEP	National Poverty Eradication Plan
OP	Operating Policy

OSH	Occupation Safety and Health
OSHA	Occupational Safety and Health Act
PHO	Public Health Officer
POP	Persistent Organic Pollutants
PPE	Personal Protective Equipment
SOP	Standard Operations Procedures
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WRA	Water Resources Authority

EXECUTIVE SUMMARY

This ESIA Study report entails the description of the proposed avocado plantation consisting of a dam and supporting amenities on Mutara orchards limited farm located on plot L.R. No. 17510 within Lamurai village, Lamurai area, Laikipia County. The farm's defining coordinates are latitude-1297642 and longitude 36.763547 respectively.

The project has been designed to cater for cultivation of avocados for commercial use. The trees will be cultivated under a plantation area of approximately 2000Acres. The farm will also cultivate vegetables including kale, spinach, cabbage, peeper among others. It is on this basis that the proponent has embarked on an Environmental and Social Impact Assessment (ESIA) study to ascertain the impacts likely to be associated with the implementation of the proposed project.

According to the World Bank's Operating Policies (OP), the Environmental Management and Coordination (Amendment) Act of 2015, The Environmental Impact Assessment (EIA) and Environmental Audit Regulations as revised in 2016 as well as the Legal Notice Number 31 of 2019, such as project should be subjected to an EIA Study. EIA is a planning tool generally accepted as an integral component of sound decision-making. EIA is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activity before action is taken. Early identification and characterization of critical environmental impacts allow the public and the government to form a view about the environmental acceptability of a proposed developmental project and what conditions should apply to mitigate or reduce those risks and impacts. This particular EIA sought to review the potential overall environmental and social performance of the proposed avocado farm in terms of regulatory compliance, incineration process, waste material management, emission compliance, safety and health management system, environmental management system and information disclosure. This is because an EIA is a tool for environmental conservation and has been identified as a key requirement for proposed projects such as the said incineration plant, to ensure sustainable operations with respect to environmental resources and socio-economic activities in the neighborhood of such projects.

This particular EIA involved meetings with representatives of Mutara Orchards Limited management, site visit/data collection, public consultation/questioning (for public participation), documentation and review, consolidation of findings, exit meeting and preparation of the EIA Study Report that includes an Environmental and Social Management Plan (ESMP).

The EIA established that the proposed project has yet to begin. The study identified a number of anticipated positive and negative impacts during and after the avocado plantation is implemented. Among the positive impacts expected, the communities in project areas are expected to benefit in a number of ways; namely: -

- Improvement on climate change and the environment in general.
- Employment opportunities to communities living around the area during implementation.

- Increased acreage of planted tree species country wide;
- Reduced soil erosion and sedimentation;
- Increased groundwater recharge with related increase in spring discharges and base flow, or at least more even year round flow;
- Improved people's livelihood especially for the private plantations;
- The proposed planting will lead to growth in the local economy and wealth creation.
- The sales of carbon emissions reductions will also lead to revenue
- Beneficial income to the proponent

As a requirement in the National Environment Management Authority, developers of projects for which ESIA has been carried out are required to carry out periodic monitoring to ensure that the mitigation and environment management measures identified and recommended through the ESIA are adhered to and implemented. It is further required, under the law, that such developers keep and maintain monitoring records which should be made available during inspections and that monitoring reports should be submitted to the appropriate authorities on an annual basis. We thereby conclude by putting the condition on the PROPONENT to ensure that periodic monitoring is carried out after implementation.

CHAPTER ONE

1.0 BACKGROUND INFORMATION

1.1 Introduction

The annual global demand for avocados is increasing at a faster rate than the annual global production resulting in higher prices on the world market. Despite the price increases demand continues to grow. In America alone, the annual per person consumption of avocados increased an incredible 7 times between 2009 and 2016. Kenya is the 6th largest producer of Avocados in the world. Avocados are also very popular for local domestic consumption.

It is not surprising, then, that avocado farming ticks lots of boxes in our 2030 Vision and most recently in Uhuru's Big 4. Food security and agricultural development are key pillars. There is a great deal of talk and action around avocado farming at county level. It is most important to retain our reputation for good quality sustainable production in the Global Market.

The cultivation of vegetables will also help in provision of affordable food for the workers and the country as well.

The proposed project entails planting of avocado seedlings in the farm in Laikipia county. The company intends to set up an agricultural farm consisting of staff housing, offices, garage, store, parking area, security offices, workshop. Water will be abstracted from a dam which will be constructed to provide water required in the farm. The company will also drill boreholes to supplement the other sources of water. The EIA for the boreholes will be done independently from the ESIA study.

1.2 Avocado (Persea americana)

The avocado (*Persea americana*) is a tree originating in the Americas which is likely native to the highland regions of south-central Mexico to Guatemala. It is classified as a member of the flowering plant family Lauraceae. The fruit of the plant, also called an avocado (or avocado pear or alligator pear), is botanically a large berry containing a single large seed. Avocado trees are partially self-pollinating, and are often propagated through grafting to maintain predictable fruit quality and quantity

Avocados are cultivated in tropical and Mediterranean climates of many countries, with Mexico as the leading producer of avocados in 2019, supplying 32% of the world total. Avocado production

is one of the most environmentally intensive fruits, using 70 litres of water per avocado, and over 400 grams of CO2 emissions. In major production regions like Chile, Mexico and California, the water demands for avocado puts pressure on overall water resources. Additionally other concerns with Avocado production, including environmental justice and human rights concerns, deforestation and connections of Mexican avocados with organized crime. Climate change is expected to cause significant changes in the suitable growing zones for avocados, and put additional pressure due to changes in water.

The fruit of domestic varieties has a buttery flesh when ripe. Depending on the variety, avocados have green, brown, purplish, or black skin when ripe, and may be pear-shaped, egg-shaped, or spherical. Commercially, the fruits are picked while immature, and ripened after harvesting. The high fat and smooth texture of avocados make it a useful and diverse food in different cuisines, and is traditionally important in Mexican foods. The high nutritional value and concentration of fat, make avocados a commonly used food in vegetarian foods and generally is thought nutritious and healthy

Propagation and rootstocks

Avocados can be propagated by seed, taking roughly three to six years to bear fruit, although in some cases seedlings can take 10 years to come into bearing. The offspring is unlikely to be identical to the parent cultivar in fruit quality. Prime quality varieties are therefore propagated by grafting to rootstocks that are propagated by seed (seedling rootstocks) or by layering (clonal rootstocks). After about a year of growing in a greenhouse, the young rootstocks are ready to be grafted. Terminal and lateral grafting is normally used. The scion cultivar grows for another 6–12 months before the tree is ready to be sold. Clonal rootstocks are selected for tolerance of specific soil and disease conditions, such as poor soil aeration or resistance to the soil-borne disease (root rot) caused by *Phytophthora*. Advances in cloning techniques that can produce up to 500 new plants from a single millimetre of tree cutting have the potential to increase the availability of rootstocks.

Commercial avocado production is limited to a small fraction of the vast genetic diversity in the species. Conservation of this genetic diversity has relied largely on field collection, as avocado seeds often do not survive storage in seed banks. This is problematic, as field preservation of living cultivars is expensive, and habitat loss threatens wild cultivars. More recently, an alternate method

of conservation has been developed based on cryopreservation of avocado somatic embryos with reliable methods for somatic embryogenesis and reconstitution into living trees

Avocado fruit

young avocado plant (seedling)

1.3 Justification for Preparation of Safeguards Instruments/EIA

Concern has been growing in Kenya and at global level that many forms of development activities cause damage to the environment. The main challenge today is how to maintain sustainable development without damaging the environment. Environmental and social impact assessment is a useful tool for the protection of the environment from negative effects of development activities. Development projects must be viable, socially acceptable and environmentally sound.

It is now a statutory requirement that developers involved in the scheduled activities (*Second Schedule of EMCA*) conduct environmental impact assessment (EIA), especially for those activities that are likely to have significant impacts on human health and the environment.

1.3.1 Definition and Purpose of the ESIA/EIA

ESIA/EIA is a systematic analysis of projects, policies, plans or programmes to determine their actual and potential environmental impacts, the significance of such impacts and to propose measures to mitigate the negative ones, *(NEMA, 2002).* ESIA is mainly used at the level of specific developments and projects such as the mentioned proposed avocado plantation *(IIED, 1998).* They are site specific, i.e. for specific and definable projects, in specific areas; hence each project must have its own ESIA report. The underlying key principles of ESIA are that every person is entitled to a clean and healthy environment and that every person has a duty to enhance and safeguard the environment.

ESIA is both a planning and decision-making tool. As a planning tool, ESIA presents methodologies and techniques for identifying, predicting and evaluating actual and potential environmental

impacts of projects, policies, plans and programmes in the project cycle (planning, implementation, operation and decommissioning phases). As a decision-making tool, the ESIA process presents decision-makers with the information necessary to determine whether or not a project should be fully implemented (if still under implementation or not yet implemented), its operations continued or not (if up and running), and if it should, then under what conditions (*NEMA, 2002*). Thus, this ESIA is intended to identify the impacts-actual and potential (both beneficial and adverse-environmental (biophysical) social and economic) of the proposed avocado farm project implementation and operation activities.

1.4 Objective of the EIA Study

The aim of this Environmental and Social Impact Assessment (ESIA) is to provide guidelines that are easy to follow and practical means for assessing environmental impacts, recommending mitigation measures and proposing monitoring for:

- Planning the actual extent and location of area to be planted
- Land clearing activities
- Biomass management and disposal

Further objectives of the study include:

- To assess the activities and impacts that will take place during the establishment and operation of the proposed Project
- To assess the Social Impacts of the proposed tree plantation as well as dam establishment in the proposed locality.
- To increase the projects proponent's awareness of Environmental Management (Environment Awareness Policy and Regulations)
- To comply with the EMCA 1999 (Revised 2015) and EIA/EA Regulations (2019).
- To prepare an Environmental Management Plan for the proposed Project.

1.4.1 Specific Aims and Objectives of the EIA study

To submit report findings acquired from the Environmental and Social Impact Study acquired from the site that provided the basis for establishment and maintenance of internal environmental management program within the proposed project.

To formulate an ESIA Study report based on the Environmental (Impacts Assessment and Audit) Regulations, 2003(2019) of National Environmental Authority (NEMA).

To establish recommended action plans and mitigating measures for the possible environmental impacts likely to be posed by the proposed project to the environment with a view to demonstrating its performance to other interested parties and affected groups.

1.5 Terms of Reference (ToR)

The terms of reference agreed between the expert and the project proponent wereas follows:-

1. To provide a description of the proposed project activities with a potential focus on potential adverse impacts in the design, construction, operation and abandonment (decommissioning) phases caused by the inputs, waste generated and disposal and social economic aspects.
2. To establish the legal and regulatory aspects, administrative frame of reference, to identify governing standards, legislation and guidelines, and to determine permits and authorizations which will be required for the different sectors agencies and institutions involved.
3. To describe the area of influence, and select methods of measuring the environmental aspects of concern including physical (water, air, soil and noise), biotic environment (vegetation, flora and fauna), chemical, socioeconomic (socio and economic structure, demographic, and socioeconomic background), cultural (aspects of cultural, archaeological, oranthropological interest) and landscape
4. To establish the methods to be used in identifying and quantifying environmental impacts, methodologies for predicting those impacts and how those impacts will be described in terms of; character (negative or positive), condition (reversible or irreversible), period (short, medium, or long-term), scope (cumulative, synergistic, direct, indirect) and establishing what standards will be used for the EIA.
5. To establish at what stages of the project the mitigating, corrective, compensatory and other measures will be used to eliminate, minimizing or mitigating adverse/significant impacts and how these measures will beselected.
6. To define a schedule of activities, reaction with regard to risk prevention and accident control, objectives, specific tasks and budget through an Environmental Management Plan (EMP) and a Social Impact Assessment Plan (SIAMP).

7. To provide a monitoring program of relevant environmental issues, specific variables to be included in the environmental follow-ups, detection limits and standards to be used and contents of the follow-up program.
8. To establish the stakeholders to be involved in the community/public participation process, methods of reporting the project to the public, procedures to be used for community participation and aspects to be considered in the community participation plan during the development and review of the study.
9. To establish the criteria to be used in defining the composition of theworking team of experts and the special requirements and information needed to form the team and characterize the same respectively.
10. To produce a systematic EIA report in accordance to the EnvironmentalImpact Assessment and Audit Regulations of 2003 (2019).

Final ESIA Study report to the client which will be submitted to NEMAas required by law

1.6 The ESIA Scope

The scope of the ESIA covered all the agricultural related activities of the farm, as well as the operationalization of the whole project. The scope of activities included the following:

I. Determining how far the activities that relate to the agricultural practices and dam construction can be made to comply with sound environmental health and safety (EHS) management practices.
II. Identifying any mitigation to improve its implementation and operation effectiveness.
III. Identifying gaps in environmental management measures and to prepare an action plan that will be implemented during the rest of the project period

Preparing this environmental study report on the potential environmental consequences on the environment, and socio-economic impact of the operationalization of the farm if any.

1.7 Methodology Applied for the ESIA

There are many different plans and processes for carrying out ESIAs. Different circumstances require different approaches and plan frameworks. But for this particular ESIA, we applied the following process:

a. **Pre-ESIA Activities** which included:

   i. Selection of EIA team;
   ii. Via the guide/contact person from the project proponent, reached out to the area administration and
   iii. There was planning of the ESIA.

b. **Site Activities:** which were divided into 3 steps as follows:

   i. Understanding and Assessment of planned environmental controls;
   ii. Gathering of ESIA evidence;
   iii. Evaluation of ESIA findings

Under this section, there was also environmental scoping that provided the key environmental issues being addressed in this report. It involved the following activities:

I. Desktop studies and interviews;
II. Public consultation;
III. Physical inspection of the project site and surrounding areas;

c. **Post ESIA Activities that include:**

   i. Production of draft ESIA Study report that included draft ESMP;
   ii. Review of the draft ESIA Study report by the client;
   iii. Production of a final ESIA Study report

The above process was married with the following activities:

I. Preparation of an ESIA framework and checklist;
II. Review of relevant documents such as the existing environmental laws and regulations, World Bank standards, OSH standards, good EHS management practices, the client's own environmental and social management plans etc. and existing environmental and occupational safety and health (EOSH) legislations and standards, environmental safeguard policies and guidelines of the World Bank and the Government of Kenya;
III. Site visits to where the farm will be located. This included physical inspection of the proposed facility site and its surroundings, carrying out interviews and discussions with project management and staff, and holding meetings and consultations with key stakeholders and the surrounding communities;
IV. Verification of procedures, instructions and equipment in place designed to help the facility apply and adhere to existing environmental laws, regulations, World Bank standards/policies, OSH standards, good environmental and safety management practices
V. Evaluation of findings, developing a prioritized list of concerns related to past and ongoing activities at the facility site, making recommendations (including the Expert's opinion of the farm's overall environmental/social performance with respect to regulatory, World Bank

corporate environmental requirements, cost estimates for the implementation of remediation action plan deemed necessary to comply with World Bank's Safeguard Policies and those provided for by the EMCA, 2015 etc.);

VI. Compiling the findings / report writing

1.8 Organization and Structure of the ESIA Study Report

The ESIA was carried out to full completion within a period of 20 days from the date of undertaking. The Consultants coordinated day-to-day functions and any related institutional support matters. All formal communications will be directed to NEMA through the proponent.

The ESIA report is divided into a main body, an ESMP plan and supporting documentation assembled into several appendices. Basically, the main body of the report:

a) Establishes clear procedures and methodologies for the ESIA assignment, review, approval and implementation of the proposed project;

b) Specifies appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to project activities;

c) Determines the technical assistance needed to successfully implement the provisions of the ESMP; and,

d) Proposes a budget to implement recommendations defined in the ESMP.

All relevant documentation that was available during the ESIA study is referenced in this document, where necessary. **Copies of these documents are and annexed in the appendices section.**

1.9 Responsibilities and Undertaking

The consultants undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material. The consultant arranged for own transport and travels during the exercise.

The proponent provided the consultants with all the relevant information and contact person for further assistance. The proponent also provided site plan(s) showing roads, buildings layout and the actual sizes of the sites, details of raw materials, future development plans, operation permits and

conditions, land-ownership documents and site history, and estimated investment costs **(as attached in Appendix).**

All relevant documentation that was available during the ESIA study is referenced in this document, where necessary. **Copies of these documents are annexed in the appendices section of this report.**

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Nature of the project

The project will involve setting up of an avocado plantation. The farm will also be used to cultivate other vegetables such as kale, cabbage spinach and many others. The proposed project sits in an area that has not been cultivated before and is currently covered in grass and shrubs. The area that will be opened up for cultivation initially will be approximately 2000acres on LR 17510 and will be used mainly for production of avocados. The water for irrigation will be drawn from surface runoff within the project area directed to the Dam that will be constructed in the proponent's farm and water harvested from the roofs of the constructed house. The project also involves construction of staff housing, parking area, medical clinic camp, offices, storage area (including a cold room), security guard housing and garage area.

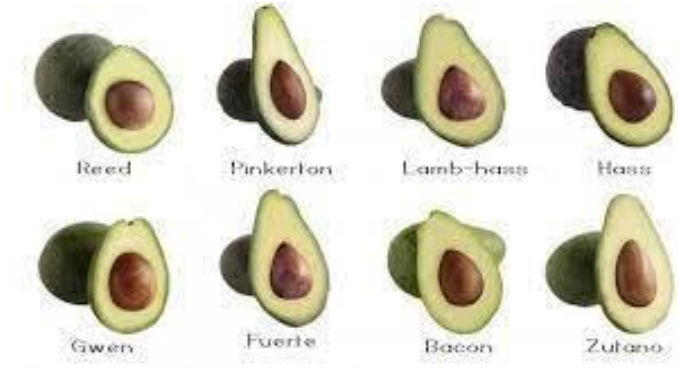
2.1 2.2 Avocado cultivation

Kenya has over 40 varieties of avocado. Hass is the main export variety and Fuerte is preferred for processing. Other commercial varieties are Keitt, Reed, Booth 8, Simmonds, Pinkerton, Nabal, Puebla, Tonnage, Ettinger, Hayes, G6 and G7. Varieties used as rootstocks include Puebla, Fuerte, Duke, G6, and G7.

Table 1 avocado types "A" and "B"

"A" varieties	"B" varieties
Hass	Bacon
Gwen	Ettinger
lamb	Fuerte
Pinkereton	Sharwil
reed	Sir prize
GEM	Walter hole

harvest	Zutano




bacon variety


hass variety

Soil type

Avocado thrives in deep (about 1 m of topsoil), permeable and free draining soil with adequate moisture retention and a pH of 5.5-6.5. Mulches and manure should be added to soils low in organic matter. Waterlogged soils favour the development of Phytophthora root-rot. It has very low tolerance to salinity. If the pH is above 6.5, Gypsum ($CaSO_4$) may be used to lower it

Land preparation

When laying out the field, one should consider the type of soil and climatic conditions, tree type and size, irrigation, and farm machinery access. The initial cultivation should be deep to allow better and faster root proliferation. Aggressive perennial weeds such as Kikuyu grass should be eliminated before planting. Prepare the land in such a way that water will not be stagnated. Adding enough farm yard manure (the company will locally source this from the nearby cattle keeping neighbours) Will help increase the fertility of the soil.

Propagation

The avocados will be propagated through seeds. Generally, the avocado viability of seds can be increased storing the seed in sand at 5^0c or storing the seed in dry peat. Mature seeds taken from avocado fruits will be used in a nursery bed in polythene bags where grafting will also be done. The seedlings will grow for around 3 months before they are transplanted.

Planting and spacing

Phosphate and manure

Prepare holes 60 x 60 x 60 cm (length x width x depth) a month before planting. Separate the top and sub-soils. Mix the top soil with 20 kg (debe) of decomposed Farm Yard Manure (FYM) and 120 g of Double Superphosphate (46% P2O5) with the top soil.

The pit size for transplanting are 90cm* 90 cm. the pits are first filled with farmyard manure and topsoil in 1:1 ratio. Plant spacing will depend on the growth habit of the plant as different varieties grow differently. However, spacing of 8M to 10 M is recommended. Fuerte and Hass are typically spaced at 9 x 9m (120 plants/ ha)

Carefully remove the plant from the polythene with the soil intact and place it in the centre of the hole and cover firmly with the mixture of top soil and FYM. Make a basin around the seedling for holding water. Transplanting is more successful when carried out during the long rains either early morning or evening. Plant the seedlings at the same depth as it was in the nursery and water the plant immediately after planting. In hot areas, shade the seedlings after transplanting

Fertilizer

Soil analysis must be done to determine the type and rate of fertiliser to be applied before any recommendation is given. Quantity of manure and fertilizer application is dependent on the soil fertility and the age of trees. Nitrogen is the most important nutrient in avocado

Irrigation

Irrigation should be done when necessary to increase yield and spread production. In case of heavy rains or flooding, water should be drained out as avocados are very sensitive to water stagnation. Drip irrigation is preferred as it improves the size of the fruit and oil percent and also reduces harvesting time

Pollination

The type of avocado cultivars planted in an orchard will contribute to the expected yield. There are two types of avocados that flower at different times of the year (type A and type B). Mix both types in an orchard so that type A pollinates type B and vice visa (Table 1). Hence cross pollination leads to higher yields than self -pollination. The presence of bee hives within the orchard is recommended as bees are the main pollinators of avocado. One should avoid applying chemicals that are harmful to bees.

Bearing

Avocado starts bearing within 3 years after transplanting. Peak harvest occurs between July-August

Mulching and weeding

Mulching is undertaken to conserve moisture and to add organic matter to the soil. Mulching will therefore improve water retention of soil and subsequently promote avocado growth. The most common mulch for avocado is well-dried grass that is pest free. Sawdust should be avoided as it decomposes and ties up nitrogen. Dry leaves may also be used as mulch. Cultivate around the trees to keep them weed free. Note that use of herbicides is not recommended

Pruning

Apical bud of young plants should be nipped to slow growth and lead to a compact tree. Lower branches that interfere with cultural activities including irrigation should be pruned. Heavy pruning

Intercropping

Avocado orchards may be intercropped with other crops such as beans, peas, kale, or cabbage during the first 3-5 years to get economic returns from the land before the trees start bearing or produce economic return should only be carried out to reduce the size of the tree after 12 to 15 years of bearing. Intercropping provides extra income and these crops may fix the nitrogen and suppress the weeds and increase soil fertility. Care should be taken to grow the crops a little far from the avocado plant.

Yield

An avocado tree yields 230-320 kg (7.5-11 t ha–1) of fruit per year. Grafted trees start bearing after 3-4 years after planting but economical crop is obtainable from the sixth year. 3-5 year-old tree

yields 300-400 kg fruits per hectare while a tree older than 5 years yields 800-1000 kg fruits (80,000-100,000 fruits per hectare).

Harvesting

Avocado is harvested between April and September in Kenya. Since most varieties do not change colour on maturity, a few fruits should be picked and stored at room temperature for 7- 10 days. If they soften without shrivelling, then the fruit is ready for harvesting. Fruit should not be pulled from the stalk but be cut off leaving a 3-cm stalk.

Postharvest

After harvesting, avocadoes must be cooled as quickly as possible to the optimum storage temperature of 5oC for Fuerte and Hass varieties; within 5 h of harvesting.

Grading and packaging

Avocado fruits are graded according to size and weight. Injured and diseased fruits should be removed. The fruits are packed as per the orders and quality standards in 4 kg cartons after all debris, soil and foreign particles are removed using a water bath. This water must be changed periodically to avoid cross contamination. A fungicidial treatment (Thiabendazole) at 300 ml per 100 L of water is used. The fruits are waxed, and dried in hot air. Avocado fruits are stored in cold storage (5°C).

Pests and diseases in avocado farming

The common pests found are maelybugs, scales and mites. Control measures should be taken by sprtaying the appropriate insecticides

Diseases found in avocados are fruit spot, leaf spot, and root rot. To control the root rot disease, apply metalaxyl by mixing with soil just before planting the seedling.

2.3 Objectives of the Proposed Project

The proposed project has the overall objective of growing avocados for commercial purposes
The proposed project objectives are:

- To meet the demand of the food market in and outside the country
- To meet the economic desires of the proponent;
- To put the current land into more productive and economic use.

2.4 Project Site

Administratively, the proposed project site is located plot L.R. No. 17510 within Lamurai village, Lamurai area, Laikipia County. The farm's defining coordinates are latitude-1297642 and longitude 36.763547 respectively.

The neighbours adjacent to the proposed site are a few residential dwellings whose main activities are farming and cattle keeping.


2.5 Project Implementation

2.5.1 Pre-construction phase

The pre-construction will involve getting to collaborative agreements with key stakeholders including project manager, architects, quantity surveyors, engineers / contractors (structural, mechanical, electrical), material suppliers, landscapers, and financiers). A programme has been set and an agreement made between the proponent and the project consultants.

KEY SOCIAL CONSIDERATIONS IN DESIGN AND SUPERVISION OF THE PROJECT

The objective for incorporating Social considerations in this phase was to ensure designing of socio-cultural -friendly physical facilities with minimal negative impacts to the well-being of people around the project area and procuring contractor that will enhance the social well-being of the community members. Some of the key considerations included;

Security: Contractors to aim at providing maximum security for the workers at site, to also ensure workers maintain maximum cooperation that will not bring conflicts, fights and crime within the project site

1. **Safety and Health**: aims at constructing physical facilities that are safe and healthy for use, use materials and technology that will not be harmful to the people within the project sites
2. **Marginalization of Minority groups e.g. VMG, PLWDs and women:** Consider mechanisms of incorporating women, Vulnerable and Marginalized Groups and people living with disabilities in all phases and levels of construction
3. **Economic Empowerment-Income and Employment opportunities:** This aims at ensuring that contractors help in bringing income to the communities around the project site by sourcing materials that are available locally within the area, by hiring skilled and non-skilled labour from the local communities
4. **Sexual Exploitation, Gender based violence, prostitution and HIV**: The design and in the event of procuring contactors, should ensure the contractors brought on board will not bring activities that will enhance sexual exploitation, prostitution and increase HIV prevalence within the project sites
5. **Social Evils**-- Substances use, crime, excessive alcohol consumption, physical attack: Ensure buildings are sited where they will not have impacts of promoting social evils like substance use, excessive alcohol consumption and physical attacks, contractors to ensure the workers on site are not on any kind of substance and alcohol
6. **Child protection-Child labour, Child safety, child delinquency, school dropout**: Ensure the design is one that will not allow violation of child rights, will provide child safety all the time, will not incorporate children involved in the construction or any kind of labour at construction site
7. **Sustainability:** Consider the designs, technology that are user friendly, easy to maintain and cost effective for sustainability after the financier phases out.

2.5.2 Construction Phase

The following are processes that will be undertaken during the construction phase of the project.

a) Recruitment of staff

The commencement of the construction and farm works will require both skilled and semi-skilled labour. Cheap labour will be sourced from the wamuria area locals and surrounding environs. This in turn will lead to employment opportunities to the many unemployed locals, thus leading to improvement of their livelihood.

b) Dam construction

The proposed project will entail construction of a concrete gravity dam. Dam water will be harvested as per the surface runoffs farm and not from the river. The reservoir capacity of the dam is 350,000m^3 and the area occupied by the dam is approximately 76,800m^2. It's estimated that in one rainy season pattern, the dam is expected to get filled to the capacity and will release excess water to the river simultaneously. The top soil excavated during the dam construction will be reused in the farm during ploughing.

The hydrological study is annexed

c) Site preparation,

The site will be prepared by clearing any existing vegetation, excavation, levelling the ground and proper site hoarding where applicable. The trees cut during clearing will be grinded into sawdust and reused in the farm during ploughing.

d) Transportation of building materials

Building materials will be transported safely from the distributors to the project site by the use of lorries. These materials include building stones, sand, cement, rubble, ballast, glass, tiles and cabro. These materials will be sourced from the nearest sources and distributors to give both environmental and economic logic to the proponent. The proponent intends to source these materials from hardware shops within the project area and the surrounding environs, in order to minimize the materials' carbon footprint and reduce transportation costs.

e) Storage of the construction material

Construction material will be stored on site and guarded for safety purposes. The bulky materials such as the stones, ballast, steel and tiles will be piled in the site while the less bulky material such as cement, paints and glasses will be kept in the store. All these will be stored in an orderly manner to observe good housekeeping. Many accidents and near misses may occur due to poor housekeeping.

Additionally, the proponent will order for material in considerable quantities to minimize stockpile on site. Careful design, planning and good site management would be maintained to minimize over-ordering and waste of raw materials such as ready mixed concrete, mortars and cement grouts.

f) Pre-planting (planning/Initial) phase

This phase involves and seeking of the appropriate approvals from the relevant authorities, consulting with different stakeholders, analyzing the baseline conditions and procurement of avocado seedlings.

The seedlings will be locally sources and put in a nursery. They will be later grafted and transplanted after 2 months.

Other types of trees will be planted i.e on the fencing area.

Land clearance and levelling will also be done during this phase. Other processes of development including ploughing, harrowing and application of organic manure.

g) Installation and Civil Works

The project will be constructed based on applicable standards of Kenya and any other standards which may be incorporated. The construction will as well incorporate environmental guidelines, health and safety measures. The project inputs will include the following;

i. Construction raw materials will include sand, cement, stones, gravel, ballast, metals, among others. All these will be obtained from licensed dealers and especially those that have complied with the environmental management guidelines and policies.

ii. Construction machines will include machinery such as trucks and other relevant construction equipment. These will be used for the transportation of materials, clearing of the vegetation and resulting construction debris. Most of the machinery will use petroleum products to provide energy.

h) Installation of utility services

This will include plumbing works to install piping for water and waste water drainage, electrical supply and wiring, communication and information cables.

i) External works

This will entail the completion of the driveways, footpaths, parking lots, water supply, wastewater drainage, and solid waste disposal facilities. Landscaping and tree planting will also be undertaken to restore the cleared trees. A proper gate will be installed to limit access to the site to authorized personnel only and enhance security.

j) Auxillary Facilities

The proposed project will not be complete until support facilities are put into place. These will include;

i. Offices,
ii. Sanitation facilities (toilets, bathrooms, hydrants, wastewater drains,
iii. Health and safety provisions (fire extinguishers, hydrants, signage, exits, first Aid points etc.,
iv. Security arrangements.
v. staff housing
vi. garage

2.5.3 Operation Phase

This follows compliance with all relevant authorities and it involves Procurement of inputs, Application of fertilizers, actual planting, Irrigation, Control of diseases and pests, plantation management Harvesting, storage and packaging, and Waste management activities

a) Solid waste management;

The project proponent will provide facilities for handling solid waste generated within and around the facility. These will include dustbins/skips for temporarily holding waste within the premises before final disposal at the designated dumping site by NEMA approved solid waste handling company.

b) Effluent and waste water management;

The area is not served by a sewer system. Waste water generated from the farm will be directed to a bio digester to help with recycling of water.

c) Cleaning

The proponent will be responsible for ensuring regular washing and cleaning of the pavement of the entire facility. Cleaning operations will involve the use of substantial amounts of water, disinfectants, detergents e.t.c.

2.5.5 De-commissioning stage

General decommissioning of a facility and property include the removal of hazardous materials and wastes, cleaning and removal of equipment, decontamination and remediation and the termination of the operational permits and licenses, land physical reconstitution. Although the decommissioning of this project is not probable it is still a probability. It is therefore prudent to develop a decommissioning strategy.

It marks the end of the project and may involve dismantling of plant and equipment, clearance of the site, closure of septic tanks and re- establishment of grass/vegetation on the land and possibly growing of other viable crops

a) Demolition works

Upon decommissioning, the project components including buildings, pavements, drainage systems, parking areas and perimeter fence will be demolished. This will produce a lot of solid waste, which will be reused for other construction works or not reusable, disposed of appropriately by a licensed waste disposal company.

b) Dismantling of equipment and fixtures

All equipment,electrical installations, furniture, finishing fixtures partitions, pipe-work and sinks among others will be dismantled and removed from the site on decommissioning of the project. Priority will be given to reuse of these equipment in other projects. This will be achieved through resale of the equipment to other building owners or contractors or donation of these equipment to schools, churches and charitable institutions.

c) Site restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil and re-vegetation using indigenous plant species.

2.6 Project Cost

The proposed project is estimated to cost the sum of 159,639,069.60 Kenya Shillings only. This budget will meet the cost of site preparation, waste management, and all the helipad construction works.

See attached bill of quantities

CHAPTER THREE

3.0 REVIEW OF THE APPLICABLE ENVIRONMENTAL LEGISLATION IN KENYA

3.1 Introduction

The desire for continued improvement on our ways of life comes with associated impacts on the environment. Environmental and social impacts can either be positive, negative, small scale, large scale, temporary, permanent, reversible or irreversible depending on the nature of the activities/ operations being undertaken. In the face of continued development and the resultant impacts, a lot of legislative tools have been developed to guide development, safeguard environmental and social concerns and offer probable mitigation interventions. Kenya has a policy, legal and administrative framework for environmental and social management. Under the framework, NEMA is responsible for ensuring ESIAs on proposed facilities as per the provisions of EMCA and other International regulations.

ESIAs are carried out in order to identify positive and negative (actual and potential) impacts associated with proposed projects such as the proposed avocado farm, with a view to taking advantage of the positive impacts and developing mitigation measures for the negative ones. The guidelines on ESIAs are contained in sections 58 to 67 of EMCA. Hence, ESIA is a tool for environmental conservation and has been identified as a key requirement for proposed projects to ensure sustainable operations with respect to environmental resources and socio-economic activities in the neighborhood of such project sites. The government has established guidelines to facilitate the process on ESIAs that are contained in the Kenya Gazette Supplement No. 56, legislative supplement No. 31, Legal Notice No. 101 of 13th June 2003 and which was revised in 2016 not forgetting the Legal Notice Number 31 of 2019. In order to ensure that the farm establishment and operations conform to existing policies and laws, a number of key statutes were reviewed. These included the following:

1. Environmental Management Principles and Guidelines
    i. The Principle of Waste Management
    ii. The Principle of Environmental and Social Assessment
    iii. Sustainability
    iv. Principle of Intergenerational Equity
    v. Principle of Prevention
    vi. Precautionary Principle
    vii. Polluter Pays Principle
    viii. Principle of Public Participation
2. Policy Framework
    a. Environmental Policy Framework
    b. National Injection Safety and Medical Waste Management Policy 2007

c. Infection Prevention and Control Policy and Guidelines 2011
d. The National Poverty Eradication Plan (NPEP), 1999-2015
e. The Kenya National Environmental Action Plan (NEAP, 2009-2013)

3. Legal Framework

a. Environment Management Coordination Act (Amendment) 2015.
b. Physical Planning Act, (Revised Edition, 2012).
c. The Environmental (Impact Assessment and Audit) Regulations, 2003 (revised in 2019).
d. County Government Act, 2012 (Amended in 2014)
e. EMCA (Waste Management) Regulations, 2006 Legal Notice No.12.
f. Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations, 2006
g. Environmental Management and Co-ordination (Air Quality) Regulations, 2014
h. The Public Health Act, Cap 242.
i. Occupational Safety and Health Act (OSHA) 2007.
j. Noise and Excessive Vibrations Pollution Control Regulations 2009.
k. Way leave Act, 2010.
l. Water Act of 2016
m. The Constitution of Kenya, 2010

4. International Conventions and Treaties

a) Sustainable Development Goals (SDG's)
b) United Nations Framework Convention on Climate Change (UNFCCC)
c) Kyoto Protocol

5. Safeguard Policies for World Bank

a) Environmental Assessment Operational Policy OP/BP 4.01
b) Indigenous people OP/BP 4.10
c) World Bank Group Environmental, Health and safety guidelines

3.2 REGULATORY FRAMEWORK

3.2.1 Environmental Management and Coordination Act (2015).

This is an Act of Parliament that provides for the establishment of the appropriate legal and institutional framework for the management of the environment and for matters connected there with and incidental there to. The Act recognizes the fact that the environment constitutes the foundation of national economic, socio- cultural and spiritual advancement.

Section 51 of the Act provides for the conservation of biological resources in-situ and mandates NEMA to issue guidelines that can be used to ensure that biological resources are protected. This include the development of land use guidelines that are compatible with the conservation of biological resources, selection and management of buffer zones including special arrangements for the protection of species, ecosystems and habitats threatened with extension. Section 112, 113, 114 and 115 provide for the application, granting enforcement and compensation for environmental easement, which may be done if, found necessary for purposes of conserving and enhancing the environment.

This Act requires every development likely to have an impact on the environment to undertake an environmental impact assessment. The second schedule of the Act states that any activity out of character with its surrounding; or any structure of a scale not in keeping with its surrounding; or any activity leading to major changes in land use must undergo an EIA.

The proponent is in compliance with the Act by undertaking this ESIA which has incorporated mitigation measures and the environmental management plan that guides the farm's management in its operations.

3.2.2 Water Act of 2016;

This prohibits the pollution of water. Part II, Section (3) states "every water resource is hereby vested in the State, subject to any rights of user granted by or under the Act or any other law. In addition, the right to use of water from any water resources is vested in the Minister of Water Resources Development and Management, except to the extent that is alienated by or under the Act or any other written Law (Section 5). Consequently, a water permit must be obtained before using any water resource. Section 29 (1), (2) and (3) stipulates the procedure for obtaining a water permit, while Section (4) states "except as provided in Section 33, an application for a permit shall be subject to the public consultation and, where applicable, of environmental Impact Assessment in accordance with the requirements of the Environmental Management and Coordination Act, 2015. Section 73 of the Act allows a person with a license (licensee)to supply water to make regulations for the purposes of protecting against degradation of water resources. Section 75 and sub-section 1 allows the licensee to construct and maintain drains sewers and other works for intercepting, treating or disposing of any foul of arising or flowing upon land for preventing pollution of water sources within his / her jurisdiction.

Section 76 states that no person shall discharge any trade effluent from trade premises into sewers of a licensee without the consent shall be issued on conditions including payment of rates for the discharge as may be provided undersection 77 of the same Act.

The proponent has acquired permits from WRA to abstract water

3.2.3 Land Planning Act (cap 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the local authorities submit any plans to then Minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted. This intended to reduce conflict with the interest such as settlement and other socialand economic activities.

The Proponent; has been granted land use rights by the relevant department of the County Government of Laikipia. The NEMA office will evaluate this report and, if satisfied by its content, grant the Proponent the right to continue with their operations.

3.2.4 Penal Code Act (Cap 63)

Section 191 of the penal code states that if any person or institution that voluntary corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same act says persons / institution is dwelling or business premises in the neighbourhood or those passing along public way, commit an offence

3.2.5 Food, Drugs, and Chemicals Substances Act (Cap 254)

The Food, Drugs and Chemicals Substances Act (Cap 254) whose purpose is to make provision for the prevention of adulteration of food, drugs and chemical substances. This Act (which has been invoked for the consumption of genetically modified food), requires that food, drugs, cosmetics, devices and chemical substances should not be sold if they are unwholesome, poisonous, or adulterated. It further prohibits deceptive labelling.

3.2.6 Agriculture Act (Cap 318)

The Agricultural Act cap 318 of the laws of Kenya seeks to promote and maintain a stable Agriculture to provide for the conservation of the soil and its fertility and to stimulate the development of Agricultural land in accordance with the accepted practices of good land management and good husbandry.

A significant point of focus was increasing food production and securing national food security through a variety of regulatory measures such as the administration of Guaranteed Minimum Returns. The Act also set out rules and regulations on issues such as land ownership; promotion of efficient land use and proper land husbandry even as it create

Various organs and bodies to oversee a range of regulatory functions. Significantly, the Act empowered the Minister to exercise administrative and regulatory authority over the sector through these bodies created under the Act. These functions ranged from fixing pricesfor scheduled crops (section 7), determination of Guaranteed Minimum Returns (Section 8) and market intervention through the Price Equalization Fund amongst others.

The proponent has contracted agronomist and will ensure this act is not contravened

3.2.7 The Work Injury & Benefits Act, 2007

An act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purpose

3.2.8 Occupational Health and Safety Act 2007

The Safety Health and Welfare at Work Act 2007 requires employers "to manageand conduct work activities in such a way as to ensure, so far as is reasonably practicable, safety, health and welfare of his or her employees". As a legalrequirement, all the workers within the facility will be provided with the appropriate personal protective equipment (PPE) and the contractor will ensure proper workmanship.

The issue of health and safety precautions in the workplace will be adhered to in order to ensure that the project takes advantage of the benefits afforded by Occupational Health and Safety (OSHA Act of 2007), which include but not limited to:

- Reduction of incidence of occupational diseases within the project site
- Reduction of incidence of occupational accidents
- Reduction of incidences of occupational injuries and death
- Reduce costs associated with occupational diseases, injuries and deaths
- Reduce insurance related costs
- Improvement of the public image of the project

The most relevant legislations applicable to the project include;

- Occupational Safety and Health Act (OSHA) 2007 which replaced theFactories and Other Places of Work Act Cap. 514.
- Work Injury Benefits Act (WIBA) which replaced the Workmen'sCompensation Act.
- ISO 18001 series on Occupational Health & Safety Assessment Systems(OHSAS)

This is as stipulated in the legal legislations and standards together with best practices in the market. Where gaps are identified mitigation measures will be put in place.

In compliance to the above the proponent will ensure that

- Protective clothing is provided for the workers and any visitors to the site.
- Proper and adequate working environment. Presence of an Emergency response Plan
- Proper workmanship to caution against building collapsing
- Safety of the workers, suppliers and the neighboring community

The proponent will ensure that workers are trained, provided with appropriate PPEs and policies are put in place to safeguard their health.

3.2.9 Public Health Act (Cap 242)

Part IX, section 115 of the act states that no person/institution shall nuisance or condition liable to be injuries or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injuries or dangerous to human health.

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into the public street or into the gutter or side channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin.

On responsibility of the Local Authorities, Part XI, section 129, of the Act states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any

supply of water which the public within its district has a right to use and does use for drinking or domestic purpose…"

Section 130 provides for making and imposing regulations by the authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129. this provision is supplemented by section 126A that requires local authorities to develop by laws for controlling and regulating among others private sewers communication between drains and sewers and between sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc for reception or disposal of foul matter.

Part XII, section 136, states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the matter provided by this Act.

The owner(s) of premises responsible for environmental nuisance such as noise and emissions at levels that can affect human health are liable to prosecution under this Act. An environmental nuisance is one that causes danger, discomfort or annoyance to the local inhabitants or which is hazardous to human health. It also outlines the standards of construction of sanitary facilities of any premises.

The proponent will ensure that no form of nuisance will originate from the farm

3.2.10 The County Government Act 2012

The Act requires that every County shall have powers to establish and maintain sanitary services for the removal and destruction of, or otherwise dealing with, all kinds of refuse and effluent and, where any such service is established, to compel the use of such service by persons to whom the service is available;

Section 201(1) – (4) expands the jurisdiction of county governments to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of the health, safety and well-being of the inhabitants of its area or any part thereof and for the good rule and government of such area or any part thereof and for the prevention and suppression of nuisances. The by- laws so made may control, regulate, prevent, prohibit

or compel certain activities to be undertaken and prescribe offences in case of contraventions.

The proponent will ensure compliance with all the county government regulations e.g acquiring the necessary permits for operations

3.2.11 Constitution of Kenya (2010)

For the purpose of sustainable management of environment, the state is obliged under Article 69, clause (1) to:

- Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources and ensure the equitable sharing of the accruing benefits
- Work to achieve and maintain a tree cover of at least ten per cent ofthe land area of Kenya
- Encourage public participation in the management, protection and conservation of environment
- Protect genetic resources and biological diversity
- Establish systems of environment impact assessment, environmental audit and monitoring of the environment
- Eliminate processes and activities that are likely to endanger the environment
- Utilize the environment and natural resources for the benefit of thepeople of Kenya.

Under clause (2), every person has the duty to cooperate with the state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

3.2.12 Physical Planning Act (Cap 286)

The County Governments are empowered under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderlydevelopment of an area.

Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respect local authority.

Finally, section 36 states that if connection with a development application, local authority is of the opinion that the proposed development activity will have injurious

impact on the environment, the application shall be required to submit together with the application an environment impact assessment EIA report. EMCA, 1999 echoes the same by requiring that such an EIA is approved by the NEMA and should be followed by annual environmental audits.

3.2.13 Environmental Management and Co-ordination (Air Quality) Regulations, 2009

The objective of these Regulations (which were revised in 2014) is to provide for prevention, control and abatement of air pollution, to ensure clean and healthy ambient air. The general prohibitions state that; no person shall cause the emission of air pollutants listed under First Schedule (Priority air pollutants) to exceed the ambient air quality levels as required and stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled

facilities) and Second Schedule (Ambient air quality tolerance limits). The project proponent should observe policy and regulatory requirements and implement the mitigation measures proposed in this document, in an effort to comply with the provisions of these Regulations, on the abatement of air pollution more so as a precautionary measure.

Under the general prohibitions (Part II), section 5 states that no person should act in a way that directly or indirectly causes immediate or subsequent air pollution. Among the prohibitions are priority air pollutants (as listed under schedule 2 of the regulations) that include general pollutants, mobile sources and greenhouse gases. Odours are also prohibited under section 9 of the regulations (offensive emissions). Emissions into controlled areas such as schools, hospitals, residential areas and populated urban centers are also prohibited. By practicing open air waste burning is leading to contravention of this law in that it is leading to production of foul odour as well as polluting the atmosphere. Hence, it is upon the project proponent to ensure that no open waste burning within the farm site at any time.

The proponent will ensure that dust emission is minimized during construction by sprinkling of water. The proponent will adhere will the provisions of this act during operation including but not limited to ensuring that the quality of air from the farm is up to standards, apply for an air quality license, ensure no foul smell at and around the farm.

3.2.14 Fossil Fuel Emission Control Regulations 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement no. 74, October 2006. The regulations include 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. The fossil fuels considered are petrol, diesel, fuel oils and kerosene.

To comply with this regulation, the proponent should make sure that the machinery is functioning optimally as well as avoiding adulated diesel hence the need to source diesel from reputable sources such as Shell, Total, National Oil, Rubis and Kenol Kobil Petrol Stations to mention but a few.

3.2.15 The Occupational Safety and Health Act, (2007)

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. The key areas addressed by the Act include:

i) General duties including duties of occupiers, self-employed persons and employees;
ii) Enforcement of the Act including powers of an occupational safety and health officer
iii) Registration of workplaces (hence the proponent needs to register the workplace of this project)
iv) Health General Provisions including cleanliness, ventilation, lighting and sanitary conveniences;
v) Machinery safety including safe handling of transmission machinery, hand held and portable power tools, self-acting machines, hoists and lifts, chains, ropes & lifting tackle, cranes and other lifting machines, steam boilers, air receivers, refrigeration plants and compressed air receiver
vi) Safety General Provisions including safe storage and handling of dangerous liquids, fire safety, evacuation procedures, precautions with respect to explosives or inflammable dust or gas
vii) Chemical safety including the use of material safety data sheets, control of air pollution, noise and vibration, the handling, transportation and disposal of chemicals and other hazardous substances materials

Under Section 6 of this Act, every occupier is obliged to ensure safety, health and welfare of all persons in his workplace. The occupier shall achieve this objective by preparing and as often as may be appropriate, revising a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy (Section 7). He is also required to establish a safety and health

committee at the workplace in a situation where the number of employees exceeds twenty (section 9) and to cause a thorough safety and health audit of his workplace to be carried out at least once in every period of twelve months by a registered safety and health Advisor (Section 11). In addition, any accident, dangerous occurrence, or occupational poisoning which has occurred at the workplace needs to be reported to the occupational safety and health officer of the respective area by an employer or self-employed person (section 21). According to section 44, potential occupiers or users of any premises as work places are required to apply for registration to the Director for all premises intended for use as workplaces. Such places shall be maintained in a clean state during the operation phase (section 47). In relation to fire safety, section 78 (3) requires spillage or leaks of any flammable liquid to be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe.

Furthermore, a clear and bold notice indicating that smoking is prohibited should be conspicuously displayed in any place in which explosive, highly flammable or highly combustible substances, are manufactured, used, handled or stored- section 78 (5). In addition, necessary precautions for dealing with fire incidents should be implemented including provision of means for extinguishing fire and means for escape, in case of fire, for the persons employed in any workplace or workroom – section 81. As far as disaster preparedness and emergency response program is concerned, section 82 (1) makes it a mandatory requirement for every occupier of a workplace to design evacuation procedures to be used during any emergency situation and to have them tested at regular intervals. To promote health and safety of employees who are at risk of being exposed to chemical substances, section 84 (3) and 85 (4) requires every employer to maintain at the workplace Material Safety Data Sheets (MSDS) and Chemical Safety Data Sheets (CSDS) respectively for all chemicals and other hazardous substances in use and ensure that they are easily available to the employees. The employers' positive contribution towards the welfare of the employees include provision and maintenance of adequate supply of wholesome drinking water - section 91 and a first aid box or cupboard of the prescribed standard – section 95 at suitable point (s) conveniently accessible to all employees.

Other precautionary measures include: issuance of a permit to work to any employee, likely to be exposed to hazardous work processes or hazardous working environment, including such work processes as the maintenance and repair of boilers, dock work, confined spaces, and the maintenance of machinery and equipment, electrical energy installations, indicating the necessary precautions to be taken – section 96 (1); provision and maintenance for the use of employees, adequate, effective and suitable P P E a n d clothing including suitable gloves, footwear goggle and head coverings in any workplace where employees are likely to be exposed to wet, injurious or offensive substance – section 101 (1). In relation to this Act, the project proponent should provide appropriate PPE to the workers as well as provide first aid kits. It will be prudent for the project proponent to develop a fire management means or a health and safety committee be put in place.

The project management should pay attention to the firefighting aspect and put in place the necessary measures needed in firefighting; this will entail but will not be limited to the following:

i. Installing fire suppression system; and
ii. Training workers on firefighting;

3.2.16 Employment Act (2007)

a) General Principal

The Act constitutes minimum terms and conditions of employment of an employee and any agreement to relinquish vary or amend the terms set shall be null and void. The Act stipulates that no person shall use or assist any other person, in using forced labour. Clause 5 of the Act states that its shall be the duty of the Cabinet Secretary/ Minister, Labour officer, the National Labour Court and the subordinate labour courts to; Promote equality of opportunity in employment in order to eliminate discrimination in employment Promote and guarantee equality of opportunity for a person who, is a migrant worker or a member of the family of the migrant worker lawfully within Kenya. No employer shall discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on the following grounds; race, color, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status. An employer should pay his employees equal remuneration for work of equal value.

b) Part IV Rights and Duties of Employment

The provisions of this part and part VI constitute basic minimum and conditions of contract of service. The employer shall regulate the hours of work of each employee in accordance with provisions of this Act and any other written law. Subsection (2) of section 27 states that an employee shall be entitled to at least one rest day in every period of seven days. An employee shall be entitled to not less than twenty-one working days of leave after every twelve consecutive months. The workers should be allowed to be off duty during the weekends where possible.

c) Maternity Leave

Section 29 of the Act stipulates that a female employee shall be entitled to two months' maternity leave with full pay and an employer who has paid a female employee wages for two months during her maternity leave shall be reimbursed by the National Social Security Fund, the equivalent of wages paid by the employer during maternity leave or a lesser amount as may be determined by the minister in rules made by the minister for that purpose. Subsection 8 of section 29 further states that no female employee should forfeit her annual leave entitlement on account of having taken her maternity leave.

3.2.17 Work Injuries Benefits Act (2007)

i. Obligations of Employers

Section 7 of the Work Injuries Benefits Act (WIBA) stipulates that every employer shall obtain and maintain an insurance policy, in respect of any liability that the employer may incur under this Act to any of his employees. Hence the project proponent is advised that it obeys the provisions of WIBA in relation to the operation of the farm.

ii. Employer to Keep Records (Section 9)

Section 9 states that an employer shall keep a register or other record of the earnings and other prescribed particulars of all employees and produce the same on demand by the director for inspection. Such records should be retained for at least six years after the date of last entry. Thus all records in relation to the operation of the facility should be well kept and maintained.

iii. Reporting of Accidents

A written or verbal notice of any accident shall be given by or on behalf of the employee concerned to the employer and a copy to the Director of Occupational Health and Safety within twenty-four hours of its occurrence in case of fatal accident. In case of any accidents, the rules should be applied to the latter. And that is why the machinery operators under the supervision of the project manager should keep proper records including those of any incidents.

3.2.18 National Construction Authority Act, 2011

Section 5 of the Act stipulates the mandate of the National Construction Authority (NCA) which is to oversee the construction industry and coordinate its development. Section 5 subsection 2 part (f) states that the authority shall provide consultancy and advisory services with respect to the construction industry; part (g) promote and ensure quality assurance in the construction industry; part (k) accredit and register contractors and regulate their professional undertakings; (l) accredit and certify skilled construction workers and construction site supervisors; (m) develop and publish a code of conduct for the construction industry; and (n) do all other things that may be necessary for the better carrying out of its functions under the Act. Hence it is upon the project proponent to ensure that the construction of the farm especially the dam is registered with NCA and supervised by the NCA during its construction so as adhere to the provisions of the Act.

3.2.19 Pest Control Products (Disposal) Regulations, 2006.

These regulations forbid the indiscriminate disposal of any pest control product or discarding its containers without prior knowledge and approval of the relevant authority.

- Refresher trainings need to be conducted annually and induction training facilitated for new employees handling chemicals.

3.3 Treaties

A treaty is a binding agreement under International Law concluded by subjects of International Law, namely states and international organizations. Treaties can be called by many names including; International Agreements, Protocols, Covenants, Conventions, Exchanges of Letters, Exchanges of Notes, etc. However, all of these are equally treaties and the rules are the same regardless of what the treaty is called. Treaties can be loosely compared to contracts; both are means of willing parties assuming obligations among themselves, and a party to either that fails to live up to their obligations can be held legally liable for that breach. The central principle of treaty law is expressed in the maxim *pacta sunt servanda*, translated as "pacts must be respected." Kenya has ratified the following Project-relevant international conventions:

3.3.1 United Nations Framework Convention on Climate Change

The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 191 countries having ratified. Under the Convention, governments:

I. Gather and share information on greenhouse gas emissions, national policies and best practices;
II. Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and
III. Cooperate in preparing for adaptation to the impacts of climate change.

The Convention entered into force on 21 March 1994. Kenya signed the UNFCCC on 12th July 1992, ratified it on 30th August 1994 and started enforcing it on 28th November 1994. The project proponent should observe the above convention in all its operations throughout the project cycle and especially reducing the releasing of greenhouse gases by avoiding open burning of waste .

3.4 Kyoto Protocol

According to a press release from the United Nations Environment Programme (UNEP):

> *"The Kyoto Protocol is an agreement under which industrialized countries will reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990 (but note that, compared to the emissions levels that were expected by 2010 without the Protocol, this target represents a 29% cut). The goal was to lower overall emissions of six greenhouse gases - carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, HFCs, and PFCs - calculated as an average over the five-year period of 2008- 12." (http://en.wikipedia.org/wiki/kyoto_protocol)*

Compliance with this convention will largely inform the technical and environmental evaluation of the project if any additional funding may be required in future. There is thus a necessity that proper adherence to minimal emission levels of greenhouse gases be ensured during the operational phases of the project.

3.5 World Bank Safeguard Policies Triggered by the Project

The WB's environmental and social safeguard policies are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for Bank and borrower staffs in the identification, preparation, and implementation of programs and projects. The Safeguard policies also provide a platform for the participation of stakeholders in project design and have been an important instrument for building a sense of ownership among local populations. In essence, the safeguards ensure that environmental and social issues are evaluated in decision making, help reduce and manage the risks associated with a project or program, and provide a mechanism for consultation and disclosure of information. The WB has 10 key operational policies although for the Kenya Health Sector Support project only 2 policies were triggered that is OP/BP 4.01 on Environmental assessments and OP/BP 4.10 on Indigenous People.

3.5.1 Environmental Assessment Operational Policy OP 4.01

Environmental Assessment (EA) is used in the WB to identify, avoid, and mitigate the potential and actual negative environmental impacts associated with Bank lending operations. In WB operations, the purpose of EA 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. It helps ensure the environmental and social soundness and sustainability of investment projects as well as support integration of environmental and social aspects of projects in the decision-making process. As indicated at the beginning of this report, the proposed avocado farming project was assigned environmental category B hence implementation of the avocado farming project triggered

the Environmental Assessment Operational Policy OP 4.01. This means that before implementation, the avocado farming project should be subjected to an ESIA as is the case with this report. The ESIA is meant to ensure that due diligence in the application of safeguards during establishment and to plan for mitigating and/or addressing of any potential and actual adverse risks during the operational phase of the avocado farming project. As per the ESIA, the avocado farm has minimal negative impacts to the environment and people, which can be mitigated successfully as **it is categorized under category B under WB Categorization criteria**. But the avocado farming project proponent is adhering to this OP by subjecting the farm project to ESIA, disclosure will be done in due course, that review will be done as per the provisions of EMCA (Amendment) 2015 and that the proponent will implement the ESMP as contained in this ESIA report and as advised by NEMA.

3.5.2 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;

(i) Preventive measures to adverse effects to the indigenous cultures and practices

(ii) Avoiding potential and actual adverse effects on the Indigenous Peoples' communities

(iii) 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. Via consultation of members of the public living around the farm site, it was established that the farm implementation is expected to create various job opportunities to the locals while it's expected that the project proponent will be involved in grading the roads leading the project site regularly.

3.5.3 World Bank's Environmental, Health and Safety Guidelines

Under its "General EHS Guidelines (April 30, 2007)", the WB has several guidelines that include the following:

i) EHS Guidelines - Air Emissions and Ambient Air Quality
ii) EHS Guidelines - Waste Management
iii) EHS Guidelines - Health Care Facilities
iv) EHS Guidelines - Hazardous Materials Management
v) EHS Guidelines - Construction and Decommissioning

The WB EHS "Air Emissions and Ambient Air Quality" guidelines require projects with "significant" sources of air emissions, and potential for significant impacts to ambient air quality to prevent or minimize impacts by ensuring that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards (or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources). Kenya currently has the 2014 national air quality regulations applicable to this project. The WB EHS "Waste Management" guidelines apply to both non-hazardous and hazardous waste. They advocate for waste management planning where waste should be characterized according to: composition, source, types, and generation rates. These guidelines call for implementation of a waste management hierarchy that comprises prevention, recycling/reuse; treatment and disposal. The guidelines require segregation of conventional waste from hazardous waste streams and if generation of hazardous waste cannot be prevented (as is the case in hospitals); its management should focus on prevention of harm to health, safety and environment. The Guidelines recommend monitoring to include:

i) Regular visual inspection of all waste storage, collection and storage areas for evidence of accidental releases and to verify that wastes are properly labelled and stored.
ii) Regular audits of waste segregation and collection practices.
iii) Tracking of waste generation trends by type & amounts, preferably by facility departments.
iv) Keeping manifests or other records that document the amount of waste generated and its origin.

Periodic auditing of third party treatment and disposal services including re-use and recycling facilities/processes when significant quantities of hazardous wastes are managed by third parties. Whenever possible, audits should include site visits to the treatment, storage and disposal location.

3.5.4 Montreal and Kyoto protocols –greenhouse gases & ozone depleting substances

The Montreal Protocol of 1996 deals with the elimination of the production and consumption of ozone-depleting chemicals (namely CFCs and Halons). The substances which are controlled by the Montreal Protocol include the following:

- CFCs (CFC-11,12,13, 112, 113,114,115, 211, 212, 213, 214, 215, 216, 217)
- Solvents (carbon tetrachloride, methyl chloroform) and
- Methyl bromide, HBFCs, HCFCs and Bromochloromethane (BCM)

v)

The UNFCCC (adopted in 1992) is a global legal instrument for the control and management of greenhouse gases (GHG) which are not controlled by the Montreal Protocol. The Kyoto Protocol is an affiliated instrument which commits industrialized countries to achieve quantified targets for decreasing their greenhouse gas emissions.
Greenhouse gases are radiative gases of the atmosphere, both natural and anthropogenic, which absorb and re-emit infrared radiation. They include carbon dioxide (CO2), methane (CH4), nitrous oxide (NO2), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). The importance of each gas is based on its Global Warming Potential (GWP).

3.5.5 Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The plan provides for protection and continuous monitoring of rare and endangered plant species within the forest reserve.

3.5.6 The Stockholm convention (2001) - pesticides

This is a global treaty aiming to protect human health and the environment from persistent organic pollutants (POPs). The convention focuses initially on twelve chemicals that can be grouped into three categories:

- *Pesticides*,Aldri
  Chlordane,DDT,
  Dieldrin, Endrin, Heptachlor, Hexachlorobenzene (industrial chemical and by-product), Mirex and Toxaphene
- *Industrial chemicals*: PCBs (also by-product)
- Unintended by-products: Dioxins and Furans

3.6 The Constitution of Kenya, 2010

The provision for legal and institutional mechanisms is one of the basic conceptual tools for environmental management. Further, considering that the environment supports life, it requires protection that is stable and can only be changed, if necessary, by a special and substantial majority. These Constitutional provisions for environmental management are not new, and already exist in other countries. Environmental provisions were outlined, albeit superficially, in the previous constitution of Kenya. The current constitution's innovation is the presentation, in greater detail, of obligations in respect of specific natural resources, as well as the human aspects of environmental management. Environmental provisions are included in Chapter Four, under 'Rights and Fundamental Freedoms', Chapter Five, under 'Environment and Natural Resources', and Chapter Ten, under 'Judicial Authority and Legal System'. The Fourth Schedule also includes environmental provisions under 'Distribution of functions between National and County Governments' and the Fifth Schedule titled 'Legislation to be enacted by Parliament'.

In relation to the avocado farm project, it can be taken as the right step in establishment and operationalizing it because its operationalization is likely to lead to the conservation of our natural resources such as water bodies and land/soil as well as ensuring a clean environment for all. This is because avocado trees provide cover that improves the climate of the area and prevent soil erosion. Avocado farming has brought in the previous years government revenue and it is also improving the livelihood of the people around the project area as well as providing food.

3.6.1 Compliance with Prudent Environmental Management

An analysis of the various environmental laws in Kenya shows that, at disposal to the project proponent are clear laws providing guidance on the best way to manage the environment and its resources. By not adhering to any cannot be an excuse of causing environmental degradation. It should be noted that, ignorance is no defense in a court of law. Hence, the project proponent is advised to acquaint itself with the provisions of all laws that may touch on its operations and specifically operation of the farm.

3.7 Institutional Framework

Two institutions are in place for the purpose of administration of the Environmental Management and Coordination Act, namely, National Environmental Council (NEC) and National Environmental Management Authority (NEMA)

3.7.1 National Environmental Council (NEC)

The act establishes the NEC chaired by the Minister for Environment and natural resources with membership from all the relevant ministries as well as broad range of other interests. The functions of the council shall be to formulate national policies, goals and objectives and determination of

policies and priorities for the environmental protection. The council also promotes co-operation among all the players engaged in environmental protection programmes.

3.7.2 National Environment Management Authority (NEMA)

NEMA is the organization responsible for the administration of the environmental act. The Director General appointed by the president heads it. Among the functions of NEMA, include;

a. Co-ordination of various environmental management activities.
b. Initiation of legislative proposals and submission of such proposals to Attorney General
c. Research, investigate and carry out surveys in the fields of environment
d. Enhance environmental education and awareness on the need of sound environmental management.
e. Advice the government on regional and international agreement to which the country should be a party and issue an annual report on the state of environment.
f. Charged with the responsibility of the execution of Environmental Impact Assessment (EIA) and Environmental Audit (EA).

3.7.4 Codes of practice relevant to the proposed project

There are several codes / standards which the proposed enterprise could join and subscribe to. These include:

- EUREPGAP Control Points & Compliance Criteria
- BV Non-Food Factory Inspection Technical Standard/Checklist

- **3.6 Other relevant laws**

✓ Article 69 of the Constitution of Kenya on environment protection of environment and biodiversity.

✓ Forest conservation and management Act 2016 under section 22 which mandates KEFRI to be lead agency in forestry research and development.

- ✓ The provisions of Forest conservation and Management Act 2016, provisions of sections 40, 60 and 61.

The mandate of KEPHIS as provided under KEHPIS 2012, the seeds and plant varieties Act (Ca 326) and the plant protection Act (Cap 324

CHAPTER FOUR

4.0 BASELINE INFORMATION

4.1 Introduction

This section describes the major elements of the project area's environment, encompassing the physical, biological and social environment as well as the condition of the proposed project site. The information presented in this section is based on observation of the project area by the consultants as well as information from secondary literature.

4.2 General Location

The proponent has proposed to put up an avocado plantation farm comprising of a dam and supporting amenities on LR 17510 within Limuria area, Laikipia County. The project area lies along Nanyuki- Maralal highway.

4.3 Project Location

The proposed project site is located in Wamuria sub location, Laikipia central Sub-County, in Laikipia County. The proposed avocado plantation will be located on LR .NO.17510,Off Nairobi-Nanyuki Road, past Naromoru. The neighbors adjacent to the proposed site are a few residential dwellings belonging the adjacent neighbors whose main activities are farming and cattle keeping.

Laikipia County is one of the 47 counties of Kenya, located on the Equator in the former Rift Valley Province of the country. Laikipia is a cosmopolitan county and is county number 31. The county has two major urban centres: Nanyuki to the southeast, and Nyahururu to the southwest. Its capital is Rumuruti. The County lies between latitudes 0° 18" South and 0° 51" North and between longitude 36° 11" and 37° 24' East. It borders Samburu County to the North, Isiolo County to the North East, Meru County to the East, Nyeri County to the South East, Nyandarua County to the South, Nakuru County to the South West and Baringo County to the West.

Economic activity in the county consists mainly of tourism and agriculture, chiefly grain crops, ranching and greenhouse horticulture.

The county encompasses the high, dry Laikipia Plateau, and has a cool, temperate climate with both rainy and dry seasons. The county borders Nyandarua, Nyeri, Samburu and Baringo counties

4.4 physical environment

4.4.1 Rainfall

Annual average rainfall over most of the county ranges between 400mm to 750mm (GoK, 2013b). There are areas with rainfall averages below or above these figures. Rainfall totals greater than 1000mm per year are recorded in some south-western areas bordering the Aberdare Ranges and the slopes of Mt. Kenya. The drier Northern pockets around Mukogondo and Rumuruti receive the least rainfall of between 250 and 500mm annually.

4.4.2 Soils

Geologically, Kenya consists of very old underlying metamorphic rocks (rocks which have been fundamentally changed by heat and pressure) which are overlain in much of the Kenya highlands, as well as in extensive low-lying areas of Kenya by younger rock formations and deposits (Ministry of Agriculture, 1983 (8)). These younger formations include large areas of volcanic deposits and lavas. The geology of Laikipia reflects this general pattern. The whole of Laikipia is underlain by metamorphic rocks of Precambrian age. They form part of the extensive African Basement complex which extends south to Mozambique and west to West Africa. The predominant soil types in Laikipia County are loam, sand and clay. Black cotton soil which has inherent fertility spreads in most parts of the plateau. The dark reddish brown to red friable soils and rocky soils are mainly found on the hillsides.

Soils Dominant soils covering the project area are the well-drained red luvisols which cover much of the farm with poorly drained 'black cotton' vertisols, occurring in the extensive open plains in the west. On the flat to very gentle slopes, soils are moderately well drained to imperfectly drained,

very deep, dark greyish brown to very dark grey, firm, cracking clay. On gently undulating to undulating areas, the soils are well drained, deep to very deep, reddish brown to dark brown, firm clay with high humus content topsoil. There are also scattered patches of planosols and organic soils along the Ewaso Nyiro.

4.4.3 Geology

Geology is mainly occupied by Basement, Tertiary volcanic sediments and recent formations.

4.4.3.1 Basement System Rocks

These are the oldest rocks in the area and comprise various types of sediments, which were transformed by regional metamorphism into gneisses, schists and quartzite. The eastern, lower part of Wamurai is occupied by a range of metamorphic rocks and intrusive bodies of the Basement System. These Basement rocks underlie the entire region at depth, though they are covered by a much younger volcanic series towards the west. They consist of gneisses with a broad banded structure and of migmatites and granites, which are more homogenous.

4.4.3.2 Tertiary Volcanic and Sediments

These deposits overlie the metamorphic rocks of the Basement System. They underlie Lower Uaso Narok Phonolites, which cover the project area. The lower layers of the volcanic rocks are basaltic while the upper ones are more phonolitic and trachytic.

4.4.3.3 Structures

During the Tertiary, two phases of faulting occurred. The earlier grid-type faulting is in the western part of Laikipia while the later phase produced enormous west-facing escarpments. The central area is flat and is covered by phonolitic lavas probably due to an eastward tilt after their deposition. This has probably contributed to the swamps along the rivers.

4.4.4 Hydrology

The main water catchment in Laikipia County is the Ewaso Nyiro North basin with its tributaries having their sources in the slopes of the Aberdares and Mt. Kenya. These tributaries include Nanyuki (the main river that drains the Project area), Timau, Rongai, Burguret, Segera, Naromoru, Engare, Moyok, Ewaso Narok, Pesi and Ngobit rivers. The flow of these rivers matches the County's topography, which slopes gently from the highlands in the South to the lowlands in the North.

4.4.5 Vegetation types

Laikipia is in a transition zone for three major vegetation types; 'Somalia-Masai Semi-desert Grassland and Shrubland', 'Somalia-Masai Acacia-Commiphora Bushland and Thicket', and 'Afromontane Undifferentiated Montane Vegetation'. Here, the savannas of eastern Africa grade both into the semi-arid lands of the Horn of Africa and the montane elements of Mount Kenya and the Aberdares Range. The resultant great diversity of vegetation types, ecotones, and mosaics accounts, in part, for the high biological diversity of Laikipia.

Vegetation distribution in Laikipia in general is strongly influenced by altitudinal diversity, with dry forest occurring on the highest elevation and a gradient of Acacia-Themeda bush on the plains Exceptions to the overall regional ecological gradient are edaphic communities of Acacia drepanolobium in the central plains south of Mukogodo, escarpment vegetation and secondary communities induced by historical management factors. Human factors largely influence the natural vegetation in terms of distribution (vegetation communities) and diversity (species composition). The gazetted forests in the County cover 580 Km2 comprising of both indigenous and plantation forests. The indigenous forests include Mukogodo and Rumuruti while the plantation forests include Marmanet, Ng'arua, Rumuruti and Shamaneik. Parts of Ng'arua and Rumuruti Forests have been excised for agricultural and settlement purposes. Unsustainable exploitation of forest resources through deforestation and grazing over the years have combined with erratic forest fires to gradually deplete the forest cover in these forests.

In Laikipia North sub-county six vegetation communities are apparent. These include: Closed grassland; sparsely shrubbed grassland; Open woodland; Open grassland; Open shrubbed grassland; and dense woodland

4.4.6 Fauna

Laikipia County has some of Kenya's richest ecosystems in terms of number of endangered wildlife species and supports high densities of large mammals. However, the area contains no formally protected wildlife areas but still has the second highest concentration of wildlife in the country (second only to the Masai Mara), and more endangered wildlife species than anywhere else in Kenya (Laikipia Wildlife Forum, 2007). Half the numbers of endangered black rhinos in Kenya are found in Laikipia. The history of wildlife in Laikipia dates to the pre-colonial period. The pastoralist Laikipia Maasai community were then few in number, sparse in settlement and non-sedentary. These dynamics meant that there was insignificant competition for resources between wildlife and the community as opposed to the current situation. Prior to 1970s, game population, especially elephants, was low. Only seasonal movements south from Samburu along the major drainage systems of Ewaso Ngiro, Ewaso Narok and Mutara rivers would occur seasonally. Wildlife in Laikipia exists within a mosaic of different forms of land-uses. In the wetter, more productive parts of south and West Laikipia (project area), land use is dominated by smallholder farms, typically ranging from 0.5 to 2 ha in size, and covering 37% of Laikipia. These were created through the sub-division of large-scale ranches after independence in 1963 as part of government and private settlement

schemes. In the more arid central and northern parts of Laikipia, subdivision of ranches has been limited, and settlement is sparse. However, wildlife populations have declined substantially in the past 20 years largely attributed to increase of immigrant farming communities considerably reducing wildlife habitat and inevitably resource competition. However, from the country context, wildlife in the county has been growing significantly with surveys showing an increase of 15% over the last 30 years, in contrast to 50% or more declines in other parts of Kenya. The project area is prone to human wildlife conflict, which is on the increase especially in the recent past as a result of human population growth and remains as one of the single most important challenge to socio-economic development of the local population.

4.4.7 Topography

The physiography of the area is generally flat, but gently slopes towards the eastward direction. The site lies at an altitude of 570m ASL and is covered by grey sandy soils underlain by reddish soils. Vegetation cover is planted trees and savannah land type of grass. The area is drained by Athi River and its tributaries.

4.4.8 Climate

Laikipia has a cool climate having mean annual temperatures largely below 21°C in most parts of the county, with the western and southern parts of the county having cooler temperatures which only rise moderately in the eastern corner to between 22°C and 24°C.

4.5 Biodiversity

Laikipia County has gazetted forest areas totaling 580 Km2, comprising of both indigenous and planted exotic forests. The indigenous forests include Mukogodo and Rumuruti while plantations include Marmanet and Shamaneik. The County is richly endowed with wildlife, widely distributed in most parts of the County, extending to Aberdare, Samburu, Meru and Mount Kenya wildlife corridors. Most of the wildlife is found in the large scale private ranches, which occupy over 50% of the total area of the County. The rest is found in group/ community owned ranches predominantly owned by the Maasai, in the gazetted forests of Mukogodo, Rumuruti and Marmanet and other uninhabited tracts of land in the County. Primarily grassland, bushland, woodland, and dry forest. Riparian forest is scarce, in decline, but critical to the maintenance of Laikipia's biodiversity. Forest covers <600 km² (c. 6%) of Laikipia.

Soil

'Black cotton' is most widespread, followed by 'red sand'.

Ranches

The 10 largest ranches are >200 km² (largest = 375 km²). Most encourage wildlife, tourism, and ecological/conservation research, and several have training programs/research centers. Some are managed primarily for conserving biodiversity and water catchments, and hold 'Conservancy' status. The same is true for many of the smaller ranches.

Protected areas: There are eight forest reserves (Figure 2), the largest of which is Mukogodo (c. 295 km²), one small national park, and one national reserve. Total area of forest reserves is c. 552 km² (c. 6% of Laikipia's land area).

Note: Proposed project area has less sensitive to ecological and biodiversity being that the natural habitat in terms of tree cover not much and mainly acacia/shrubs with few living organisms and avocado plantation will increase the population of birds and insects

See attached Ecological/biodiversity survey report.

4.6 Demographic Pattern, Projections and Public Consultation

4.6.1 Demographic Pattern, Projections

According to the 2019 Kenya's National Housing and Population Census, the population of Laikipia is 518,560 persons split into 259,440 males, 259,102 females and 18 intersex. This population rose from 399,227 people of which 198,625 were males and 200,602 were females as recorded in the 2009 Census. The average household size according to the 2019 census is 3.4 persons per household while the population density 54 persons per square kilometre. Nyahururu Sub-county is the most highly populated with a population of 154,704; followed by Laikipia West Sub-county with a population of 129,263 and in third place is Laikipia East Sub-county with a population of 102,815. Laikipia Central and Laikipia North (within which the project area falls in- highlighted in yellow colour) sub counties are the least populated with a population of 95,594 and 36,184 persons respectively. The main reason of low population density is due to the type of the land use and land ownership which is largely livestock production and wildlife conservation. The land ownership is either private ranches or pastoral community group ranches.

Table 1: Population Pattern in Laikipia County

County	District	Male	Female	Intersex	Total	No. Of HHS	Av.Size	Land Size	Population Density(No. Per Sq. Km
LAIKIPIA COUNTY		259,440	259,102	18	518,560	149,271	3.4	9,532.20	54
Laikipia Central		47,888	47,705	1	95,593	30,372	3.1	1,232.6	78
Laikipia East		52,078	50,732	5	102,810	33,505	3.0	1,539.0	67

Laikipia West	65,158	64,102	3	129,260	33,025	3.9	3,372.2	38
Laikipia North	18,067	18,116	1	36,183	7,752	4.6	2,575.0	14
Nyahururu	76,249	78,447	8	154,696	44,617	3.4	813.4	190

Source: CBS's (Kenya's National Housing and Population Census, 2019)

CHAPTER FIVE

5.0 PROJECT ALTERNATIVES

5.1 No Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to the landowner and the community as a whole. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following

- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain under-utilized.
- Reduced interaction both at local, national and international levels.
- No employment opportunities will be created for thousands of Kenyans who will work in the proposed fruits and vegetables farm.
- Increased urban poverty and crime in Kenya.
- The ecological gains expected from the project would not be realized

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

5.2 Relocation Alternative

Relocation option to a different site is an option for the project implementation. At the moment, the proponent has no alternative sites for relocation. Looking for land to accommodate the scale, type and size of the project and completing official transaction on it may take a long period. Besides, the proponent has already invested in purchasing the land and is looking for more land for further expansion.

The proposed project does not have any other land apart from the one they are holding. Therefore, the relocation alternative does not best suet the project.

5.3 Alternative design and Technology

a) Species grown

b) This would involve raising other types of crops other than avocado plantation. The proponent may consider planting other crop species which will be friendlier to the environment. In consideration of other species, due consideration must be given to biodiversity, the climate as well as the usefulness of the species for the proponent needs. In arriving at the proposed option, the proponent had given d Mode of Growth

The seedlings will be grown in the soil media, other mediums are not suitable, for the growth of this seedlings. The need firm, solid medium for their growth.

c) Technology Alternative

It is envisaged the project will basically be labor based and we don't anticipate the use of heavy machinery during planting, weeding and opening of access roads. The purpose is to ensure that many locals in the area are employed in planting, nursery bed, and weeding and food provision. Heavy machinery is often associated with noise, accidents, vices which the project wants to control such as carbon emission from vehicle exhaust pipes.

5.4 The Comparison of Alternatives

i) Under the relocation alternative, the proponent would have to look for another piece of land in a favorable area. Land is nowadays a scarce commodity. This would not be a preferred option as the proponent has already procured this land and it would not be wise to leave it bare.

ii) Under alternative design and technology, the proponent would be required to plant other types of crops. The proponent has considered this option in line with the suitability of the area and the demand factors and settled for the hardwood tree species.

iii) Current action: - having assessed all the options, the proponent settled for the current action. There are however associated environmental degradation with the project implementation but provided the recommended Environmental Impact mitigation measures are adopted and implemented, negative impacts will be avoided /minimized.

CHAPTER SIX

6.0 CONSULTATION AND PUBLIC PARTICIPATION

6.1 Overview

Public participation is a major factor during the ESIA reporting. A consultative meeting was held at the farms premises where the chief invited the neighbors at the project. A copy of the invitation letter is attached as well as the attendance sheet and the minutes for the consultative meeting.

Public participation is basically concerned with involving, informing and consulting the public, planning, management and other decision-making activities which can be considered part of the project process. It offers and encourages the public to express their views. Public participation tries to ensure that due consideration will be given to public values, concerns and preferences when decisions are made. Methods of public participation applied included:

- Informing the public about the proposed project;
- Participation in the scoping exercise;
- Public meeting or hearings about the project
- Written comments
- Use of community representatives
- Making relevant documents and ESIA report available and invitation to comment.

Community participation and consultation has been done and views and opinions analyzed. A synopsis of the views of the forest beneficiaries, project affected people, as well as national and local district representatives, who have been interviewed, are presented. Sector specific information solicited during these discussions has been included in the identification of impacts and mitigation measures. There will be continuous community awareness throughout the project cycle.

6.2 Issues Considered for Determination of Extent of the Impacts

The following are the issues considered for determining the extent of the impacts:

a) Cutting of tree in a sensitive ecological system such as wildlife areas Opening of access road within the project area.

b) weather seasonal/permanent), type of vegetation, flood characteristics if any.

c) Soil structures, stability, susceptibility to erosion.

d) Matching of species to soil suitability.

e) Social/cultural acceptance of the project.

f) Water sources such as catchment areas, rivers and streams.

g) Cattle route/ access to water.

h) Occupation, safety and health of workers.

i) likely general and specific impacts (positive and negative)

j) Tree cutting may eliminate food and shelter of some species of animals. Some of the most common methods used to consult stakeholders included:

- Phone /email
- One-on-one interviews
- Workshop/focus group discussions
- Public meetings
- Newspaper/magazines/radio.

6.3 Summary of the Baraza Meeting Held at the farms premises

A public engagement meeting was held at the farm's premises to assess the possible impacts of the project to the local community. The meeting that was attended by village representatives, representatives of different stakeholders and area chief sought to inform the members of public of the proposed project as well as collect their input on the same.

The attendance list, minutes and questionnaires are annexed

6.3.2 Analysis of public views from Stakeholders

Views were collected from 17 persons drawn from the local community using semi-structured questionnaires and baraza meeting (Minutes Annexed to the report). The respondents were persons aged 18 years and above and residing in the project area. The respondents cited the following as the anticipated environmental and social impacts;

6.4 Grievance Handling and Feedback

The Developer will implement a Grievance Mechanism to ensure that it is responsive to any concerns and complaints particularly from affected stakeholders and communities. The following timeframe will be used:

- Written acknowledgement of receipt of the grievance: within 5 days of receiving the grievance

Proposed resolution: within 30 days of receiving the grievance

Initially, liaison officer assigned on behalf of the Developer(s) will handle all grievances received from the community during the life time of the Project. The Developer and their Contractor(s) will accept all comments and complaints associated with the Project.

The grievances shall be submitted to: Mutara Orchards Ltd.

P.O Box 12503-00100, Nairobi Tel: +254 (20) 204 8483

A sample of the Projects Public Grievance Form is provided at the end of this document.

Results of consultation processes are provided back to Affected Communities and other stakeholders in order to explain:

- How the Affected Communities' inputs have been accommodated in the design of the project, Pre- Development and/or planned Development phase activities;
- Where impact mitigation measures have been incorporated;
- How development benefits and opportunities will benefit the community
- Where required, the reasons why comments and recommendations suggested by Affected Communities have not been accommodated.

The Grievance Procedure will be free, open and accessible to all and comments and grievances will be addressed in a fair and transparent manner.

CHAPTER SEVEN

7.0 PROJECT IMPACTS AND MITIGATION MEASURES

7.1 Introduction

The ESIA sought to find out the environmental compatibility and performance of the proposed avocado farm. In assessing the facility in relation to the environment and socio-economic aspects, the ESIA delved into various parameters that define environmental performance of such a facility in the face of delicate environmental resources use. The parameters were divided into *hard* and *soft* issues based on the effect of implementing and operating such a facility to the environment.

Through the EIA, the experts endeavored to ensure that applying the aims and objectives incorporated in the following statements optimizes the development potential of the proposed project. These statements include: -

1) To maximize the social, economic and ecological benefits of the project,

2) To minimize the social economic and ecological costs of the project,

3) To ensure that the functioning of vital ecosystems or critical habitats is not irreversibly disrupted,

4) To ensure that where damages or costs occur, every reasonable measure is taken to ameliorate or compensate for such damages or costs.

To achieve the aims and objectives, the environmental experts applied the principles of integrated environmental management. The overall evaluation of the impacts associated with the project has been carried out using the principals of efficiency, equality, safety and sustainability.

7.2 Positive Social-Environmental impacts

1. Creation of employment

The proposed project will create employment opportunities for both skilled and unskilled labour. Much of the work will be manual and will not require any specialized training. This will thus open opportunities for the rural women and youths who comprise the largest proportion of the rural population. Priority will be given to persons from the local community to ensure

that the project uplifts their living standards. Unemployment is rampant in rural areas and especially in areas that have low agricultural potential.

1. Boost local economy

The proposed project will boost the local economy through payment of loyalties, taxes, levies and other charges to the County and central governments. The project will also open up the area for similar and other varied investments. The net effect will be improved infrastructure in the area and better living standards.

2. Impact on culture

Movement of new comers into the area will expose the local culture to integration with cultures of other people leading to gradual cultural change as has happened in other areas. The loss of culture not only eliminates the harmful practices in a community but may also interfere with the norms and value systems that helps sustain peace and harmony within a community. There may be changes in traditional livelihood strategies, conflict resolution mechanisms e.g. that may have a significant impact on development of the community (either negative of positive).

4. Exposure to new technologies

The development of the proposed avocado farm will expose the local community to new agricultural technologies that could help boost agricultural production in the area. Also a potential for research activities especially on hardwood forest ecology

Other benefits that will come with the project are namely: -

- Improvement on climate change and the environment in general
- Increased acreage of planted tree species country wide
- Reduced soil erosion and sedimentation
- Increased groundwater recharge with related increase in spring discharges and base flow, or at least more even year round flow
- Improved people's livelihood especially for the private plantations
- The proposed tree planting will lead to growth in the local economy and wealth creation
- Increased income from the sale of good quality trees
- May improve the appearance of the landscape

- Restoration of degraded areas
- Will increase on supply of improved charcoal, construction materials and other forest products, even while protecting soil and water resources

7.3 Negative Social-Environmental Impacts

1. Loss of vegetation and bio-diversity

The land on which the proposed project is to be constructed currently has natural trees and shrubs as it has never been cultivated before. The change in land use will lead to a significant loss of vegetation biodiversity. There is likely to be loss of natural vegetation, which will take place on previously vegetated land. There is possibility of habitat fragmentation, interruption of ecological corridors and migration paths, loss of some natural species, erosion and stream sedimentation. The costs associated with disturbance of vegetation and biodiversity are considered negligible

Proposed Mitigation Measures

It is proposed that unnecessary clearing of vegetation should not be encouraged or done. It is advisable that there should be replanting of vegetation with appropriate species wherever the gaps occur.

1. Noise

Predicted noise source at this proposed farm is that emanating from the construction equipment and

vehicles. Also, noise and vibration nuisance may arise from traffic during both site preparation and construction phases. This noise is predicted to be intermittent in nature and will most likely not exceed the statutory limit of 90dBA. This means that both the magnitude and the time of exposure of both the personnel and the people in the neighborhood will be limited. As such, occurrence of noise induced hearing loss is unlikely. Rather, the noise will in fact lie well below 90 Dba and hence will be a disturbance or distraction.

2. Human health and occupational safety

Human health and occupational safety may be threatened where adequate facilities and equipment do not exist to support the population within an area, project or locality. However, the locality of the proposed project has a number of nearby health facilities that can adequately cater for the anticipated labor force.

Proposed Mitigation Measures

The company will engage the services of qualified and licensed consultants to develop an up-to-date occupational health and safety policy.

Workers should be provided with adequate protection gear such as hard hats, boots, gloves, overalls, pangas and safety latches to workers working higher than 2 meters off ground level.

Workers involved in herbicides application should be trained and provided with adequate protective gears such as; eye protection, breathing protection (masks), gloves, protective clothing during spraying or handling and rubber boots.

The workers should be sensitized on the use and importance of PPE's. And there should be equally punitive measures for those who disregard their use such as warnings for first time offenders; suspensions for second time offenders and expulsion for those who make it a habit not to use the PPE's.

There should be a first aid kit on site during work. The workers should also be trained on how to use the first AID kit.

3. Water pollution

Surface water hydrology can be affected during all phases of the farm operations. During site preparation, road-building and vehicle movements on the proposed site can result in compaction of soils and an increase in impermeable (or slowly permeable) surfaces.

The subsequent increase in surface runoff may, in turn, increase the risk of flooding and soil erosion. Surface drains, installed chiefly to prevent water- logging of the soil, may also increase flood risk.

Following deforestation, a return to bare ground conditions will cause increased runoff and a more rapid response to rainfall events within nearby streams, possibly increasing flood risk.

Water pollution may also arise during the operational phase of the project. Water pollutants may arise mainly from fertigation effluents, chemical residue slurry and wash off from spray equipment and chemical containers. This may be a threat to both surface and groundwater.

The possibility of water pollution has however been eliminated through carefully considered management system for chemical policy on rational use of fertilizers has been considered to ensure that only amounts, which are deemed necessary to substitute for soil nutrients, are utilized. This will be done by ensuring that soil sampling is carried out prior to the implementation or fertilizer application regimes

4. Land/Soil

Forestry projects will have implications for the physical characteristics and land use of the site. By their nature, such projects have the potential to change the site significantly. Activities such as cultivation, planting and felling can cause

soil disturbance, compaction and increased erosion, while the character of the landscape will vary depending on whether the area is newly planted, comprises mature trees, or has recently been felled.

The physical planting of a prepared site usually involves manual spadework and therefore causes little disturbance to the site.

However, impacts on soils do not necessarily result in long-term soil degradation as long as compaction, nutrient removal and erosion rates are less than, or of a similar magnitude to, the recovery capacity (soil formation, nutrient input, etc.) of the soils.

5. Surface water quality and hydrogen

The threat of siltation and sedimentation of the adjacent rivers is reduced by the project idea of beginning an afforestation programme, maintaining the riparian vegetation and soil and water conservation measures. This project will completely eliminate erosion and siltation problem.

6. Moral decadence

The presence of large workforce in an area, some of whom will move away from their families in order to reside near the place of work may ultimately lead to vices such as prostitution, drug

abuse, increased incidence of HIV/AIDS among the workers and neighbouring community. Cases of insecurity may also increase targeting the working class.

7. Water Quality

The overall potential impact of the project will be improvement of water supply for the proponent and the community within the project area. This is a major positive move that will also have negative impacts associated with implementation activities. The disturbance of soil by excavation for the dam will make it loose and can easily be eroded and transported into the nearby rivers and streams, thereby negatively affecting the water quality.

While it is expected that this will be mitigated effectively during implementation, if not properly managed, silting could also cause significant rise in the water level of the rivers and streams in the project area with ultimate flooding downstream

Mitigation Measures

- Provide adequate provision for aeration of releases within the project design
- Provide proper containerized storage of fuels, lubricants and chemicals
- Create vegetated buffer within riparian area

8. Air Quality

During the establishment of the proposed dam, there will be increased gas emissions from the machinery and Lorries ferrying construction materials to the site. Some of the hazardous exhaust fumes released by the lorries/trucks include carbon oxides (COx), Sulphur Oxides (SOx) and Nitrogen Oxides (NOx). Dust i.e. sand and soil particles will be caused by construction works and vehicle movement during transportation of materials to the construction site. Such dust and gases have direct negative impact on the air quality.

Afforestation and deforestation have the potential to affect local air quality and climate, and to contribute to global climate change. During ground preparation, planting and harvesting, local air quality may decline as a result of dust from vehicle movements on and off site. However, the principal impacts of forestry works can be described as net-positive during growth and maturation of the crop, and net-negative following deforestation.

During growth, there is an uptake of carbon dioxide (CO2), a major "greenhouse gas." This provides some compensation for CO2 emissions from activities using fossil fuels. Deforestation, while not contributing directly to global warming, does remove this beneficial effect until the next cycle is initiated with replanting.

Mitigation Measures

- Construction materials shall be obtained from NEMA compliant quarries
- Material transporting trucks/machinery shall be well maintained with minimal exhaust fumes • Supply and construction vehicles will only use the designated transport routes
- Drivers will also be advised to stick to prescribed speed limits
- Sensitize truck drivers to avoid unnecessary revving and hooting of vehicles at loading /offloading and parking areas
- Ensure appropriate vehicle speeds in road sections that will be used by construction vehicles on a needs basis to eliminate the creation of dusts
- Ensure proper repair and maintenance of vehicles and equipment to minimize exhaust fumes
- Provide Personal Protective Equipment (PPE) to the workers

9. Noise Pollution

Noise is any loud unreasonable or unusual sound that annoys, disturbs, injures or endangers the comfort, health or safety of others and the environment. Excess noise is dangerous to workers, neighbours and passers-by. Sources of noise include; Mechanical earth working excavators, manual compressed air excavators and hand tools, vehicles delivering construction materials and workers at the site.

Mitigation Measures

- Maintain the levels of noise pollution from the machinery in accordance to the manufacturer's specification
- Workers shall be provided with PPE/materials such as earmuffs and earplugs when operating noisy machinery and when in a noisy environment

- Drivers/operators shall be sensitized to switch off vehicles and machinery engines when not in use
- Drivers shall avoid unnecessary hooting and revving of vehicles
- Transport vehicles shall be well maintained with minimum noise
- Have only the essential workers at any construction site
- Construction works to be done during day time only
- Use machines that are less vibrating and those that are well serviced to prevent excessive vibration
- Where vibration due to compacting is very high, we propose the compaction to be done during the day

9. Destruction of Indigenous Vegetation, Loss of Soils & Habitats

During excavation of the dam it will be inevitable to avoid destruction of any existing indigenous vegetation at the proposed sites. Therefore, it will be important to formulate ways of mitigating the impacts caused at the end of construction phase. Lower class animals and variety of insects' family are common and will inevitably be affected during the construction stage of the dam. Clearing of vegetation during the construction and excavation works for the dam could also result in an increase in runoff along the line and thus encourage erosion. Soil will accumulate and may pose significant negative environmental effects. If left unattended over a long period, the soil may be swept into the nearby rivers resulting in excessive flooding and silting during the rainy seasons.

Mitigation Measures

- Avoid as much as possible destruction of indigenous tree during construction activities
- Replace/ plant vegetation cover and trees soon after completion of the dam
- Encourage growth of indigenous tree nurseries for increasing vegetative cover and replacing those destroyed during project implementation activities
- Restrict clearing to immediate requirements i.e. minimize unnecessary clearing
- Restrict clearing for fuel wood

- Stock pile soil for re-use
- Re-vegetate site after construction wherever possible (borrow areas, riparian area, etc.) using adequate stockpiled top soil
- Rare flora species to be identified and relocated'
- Ensure reserve flow
- Incorporating soil conservation measures during construction to mitigate damage caused by erosion
- Only the areas to be utilized will be excavated
- Carry out inspection of each of the sites soil stability before excavation
- Transportation of construction materials is done through the existing local roads
- The construction work-force will be sensitized on the importance of environmental conservation and ecological protection to prevent the exploitation of natural resources around the project area and destruction of ecosystems
- On completion of the construction work, the project areas will be allowed to revegetate with fibrous rooted vegetation species

10. Increased Human Activities

The construction activities of the dam and other infrastructures associated with the project will have an increase in human activities around the area. There are people who will be actively involved in construction activities while others will be idlers. As a result, this increase in human activities will lead to an increase in accidental risk to the people and generation of wastes

Mitigation Measures

- Warning tapes shall be put along the trench line to alert people of the dangers
- Ascertain that only the vital workers are hired at different stages of establishment
- Restrict the entrance to the site
- Ensure that there is a work breakdown structure in place for each phase
- Each phase will take the minimum time possible

11. Soil and Other Solid Waste

During dam construction, soils and other solid waste including; wasted mortar, ballast, cement and other packaging materials, sand, metals, plastics and parts of PVC pipes, and garbage will be generated. These wastes generated during construction may impact negatively on the environment if not properly handled and managed. Ascertain that there is proper waste disposal management

Mitigation Measures

- The proponent shall work hand in hand with the County Government of Laikipia to facilitate sound waste management
- All the solid waste generated during construction activities should be collected and sorted into non-recyclable and recyclable
- Hardcore materials could be re-used on site for construction and filling the voids along the road
- Provision of bins, one for bio-degradable and another for non-degradable matters.
- These bins shall be of appropriate type, size and color for effective waste separation and disposal
- Train/educate all stakeholders involved in the proposed project on the importance and means of a site waste management plan should be prepared by the proponent prior to commencement of the farming exercise. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring waste management and handling especially during establishment and operational phases

12. Oil Leaks and Spills

Oil leaks and spills are common in construction sites resulting from construction machinery and material transporting trucks. These oils and greases are of petroleum products which contain hard/hazardous elements that are detrimental to the environment

Mitigation Measures

- Use of well serviced machinery with minimal or no grease/oil leakages
- Maintenance of trucks and machinery shall be carried out in designated areas i.e. petrol stations, owners' service yards and garages where oils/greases are completely restrained from reaching the ground and not at the site
- Fuel products should be keep far away from water sources

13. Occupational Health and Safety (OHS)

During the proposed construction of the dam and other facilities associated with the project, there will be increased dust, noise, air pollution as well as possibility of accidents within and around the project site. The workforce, neighbours and passersby will be subjected to these environmental hazards and disturbances. Food for the workforce at the construction sites will probably be provided by mobile individuals. Accidents may occur by slipping into the dug trenches or stumbling into heaps of trenched out materials within the dam area.

Mitigation Measures

- Pre warn the residents of the possible accidents
- Erect an appropriate project signboard as directed by the proponent
- Erect appropriate safety signage along the construction route cautioning against various health and safety risks and prescribing particular mandatory actions
- Fence the construction site to prevent neighbours and passers-by from trespassing and exposing them to health hazards
- A fully equipped First Aid Kit shall be provided at the construction site always and manned by trained/qualified persons
- Depending on OHS hazards anticipated while performing assigned jobs/task(s), workers may require proper fitting PPE to avoid injuries and illnesses.
- Provided workers with protective gear which should include working boots, overalls, helmets, goggles, earmuffs, dust masks, and gloves among others

- All workers will be required to produce their National identification cards, NHIF and NSSF registration numbers
- Child labour will not be used in project
- Persons providing food for workers at the site must have the necessary public health licenses
- Warning tapes should be put along the trench line to alert pedestrians on the dangers
- Construction workers will be sensitized on effects of negative anti- social behaviour and their consequences
- Workers shall be provided with emergency telephone numbers to request for assistance in case of an accident
- In case of an accident, the injured person should be given first aid and immediately taken to the nearby hospital
- An investigation should be initiated immediately to ascertain the cause of the accident and preliminary findings released within 12 hours

14. Emergency Response Plans (ERP)

Emergencies and disasters are a reality of everyday life. Workers/people must therefore be sensitized and prepared on how to react to either emergencies or disasters during the establishment and operational phases. Absence of such plans may be risky since there would be no guidelines on how to handle or control emergencies if they occur.

Mitigation Measures

- The contractor/proponent shall initiate and develop effective ERP to cater for various eventualities such as fire outbreaks, and other accidents/incidents that are likely to occur
- ERP must be properly documented and made available to all
- Regular drills shall be conducted on possible incidences

Possible Impacts during Operational Phase

1. Dam Operation and Maintenance

The following aspects should be monitored to ensure the safe and sustainable operation of the dam. Routine checks should be carried out monthly during the initial year of operation and then according to a fixed schedule in future years.

Mitigation Measures

a. Embankment

- Monitor the crest to ensure that the edges do not erode and the crest width does not deteriorate. If required, additional material should be placed on the crest and a good grass cover maintained
- Monitor the crest and slopes for cracks. The location, alignment and depth of crack should be reported and cracks should be in-filled by compacting similar soil into the cracks
- Resurvey the crest every 5 years to check for slumping and low spots
- Maintain the downstream slope with a thick grass cover.
- Give attention to spots were vegetation does not take off, these areas should be dressed with top soil and planted with grass starters
- Check the up-stream face for signs of wave or wind erosion
- Any erosion of the slope should be addressed by improving the rip rap cover
- Trees and bushes should NOT be allowed to grow on the embankment
- Monitor the embankment for burrowing animals; in the event they are found they should be removed and their burrows excavated and back filled with compacted material
- Monitor the downstream slope for seepage or leaks. Wet patches, excessive vegetation growth in one patch, depressions or slumping should be noted and reported
- Monitor the normal seepage flows
- The outflow from the filter/seepage blanket should be monitored and the discharge recorded
- Record the water levels and at the same time as measure the filter blanket discharge

b. Spillway

- Maintain the spillway in good condition and repair it immediately if required
- Trees and bushes should NOT be allowed to grow in the spillway channel
- Monitor the spillway channel for signs of erosion; any areas that are eroded should be treated by grassing the channel or construction of a concrete sill
- Ensure the spillway channel is free of debris

2. Water Logging and Soil Salinity

Water-logging and salinization of soils are common problems associated with irrigation. Water-logging results primarily from inadequate drainage and over-irrigation and to a lesser extent from seepage from canals and ditches. It concentrates salts drawn up from lower in the soil profile in the plants' rooting zone. Alkalization which is the buildup of sodium in soils is a particularly detrimental form of salinization which is difficult to rectify. On irrigated land, salinization and alter of soil structure are the major cause of loss of land productivity which is one of the most prolific adverse environmental impacts associated with irrigation. During the operation of the dam to serve irrigation projects it is expected that soil erosion might occur from the tilled land (agriculturally induced erosion), the canals, dykes, drains etc. The method of irrigation profoundly affects the vulnerability of the land to erosion. Because irrigated land is wetter, it is less able to absorb rainfall and runoff will therefore be higher.

Mitigation Measures

- Regular soil test which will help ensure the soils are not destroyed in the long
- Proper choice of the irrigation method
- Strictly follow irrigation schedule to prevent an increase in the irrigation hours in one section

3. Water Table

In the long-term; frequent problems of irrigation projects is the rise in the local water table (water logging). Low irrigation efficiencies are one of the main causes of rise in water table. Poor water distribution systems, poor main system management and old in-field irrigation practices are the main reason. High water table also makes working on soil difficult.

Mitigation Measures

- Use of good irrigation management
- closely matching irrigation demands and supply
- Installation and maintenance of adequate drainage system

4. Solid Waste

During operation period of the dam which will have direct linkage to the irrigation projects, solid waste (biodegradable and non-biodegradable) will be generated which will include but not limited to waste farm produce empty agrochemical containers, cans, paper bags and cartons.

Mitigation Measurers

- Provision of bins, one for bio-degradable and another for non-degradable matter
- These bins shall be of appropriate type, size and color for effective waste separation and disposal and shall be strategically placed
- Waste shall be properly segregated to encourage re-cycling and re-use
- All the wastes shall be disposed appropriately as per the Laikipia County government by-laws and Environmental Management and Co-ordination, (Waste Management) Regulations, 2006

Impacts during Decommissioning Phase

3. Environmental Aspects

In case the dam is to be decommissioned, there will be effects on the environment resulting from the

process of removal and disposal of the waste materials resulting from the demolition. These will include building materials piping and equipment.

Mitigation Measures

- Remove all the underground water pipes, underground storage tanks,
- Backfill any surface openings
- Restore/rehabilitate the site to acceptable standards

- All the wastes to be disposed by NEMA authorized waste handlers and to NEMA approved sites
- Develop a decommissioning plan and present it to NEMA for approval

7.4 Proposed Management practices

7.4.1 Pesticides Management

The overall aim of the proposed plantation forest with respect to pesticides is to reduce the pesticide load on the environment year after year whilst ensuring that pesticides application is safe. This takes place within set guidelines laid down by Codes of Practice and Statutory regulations subscribed to. The company will maintain a continuous improvement strategy based upon audit and risk analysis using the following guidelines: -

7.4.1.1 A system of ordering, transporting, receiving, storing and applying pesticides

7.4.1.2 Methyl Bromide and other banned/restricted pesticides will not be used by (Methyl bromide has been replaced with Methane Sodium).

7.4.1.3 Efficient and economical use of pesticides and fertilizers. These will be monitored daily, monthly, yearly, crop by crop and on a square meter basis.

7.4.1.4 Prophylactic use of all pesticides is discouraged. Scouting will be done to ensure that prophylactic use and blanket spraying arc avoided whenever possible.

7.4.1.5 Pesticides with least impact on mammalian avian and aquatic life are of first choice.

7.4.1.6 The spray programme will be a supervised exercise that links the levels of pest and disease monitoring and control through scouting and spot spraying. Once spraying has been done adequate warning signs on country will be displayed.

7.4.1.7 Efforts to develop and implement an alternative pest and disease control strategy through the use biological, physical and cultural

control will be continually pursued. Integrated Pest Management (ICM) and Integrated Chemical Management (ICM) will also be: encouraged.

7.4.1.8 Over- or under-application of pesticides will be avoided and confirmation of this will be done through analytical examination of tissue samples.

7.4.1.9 Knowledge of the various pesticides and their toxicity by the Technical Manager which ensures that the right pesticide is applied.

7.4.1.10 A report of pesticides usage is submitted to the Horticultural Crops Directorate (HCD) after every 4-wcek period (28 days). The aim is to achieve continuous annual reduction of pesticide usage.

7.4.1.11 Ensuring that the technical personnel with overall responsibility for spray programmes and decisions on their application arc suitably qualified and trained.

7.4.1.12 Policy on professional development of senior and supervisory staff relating to pest and disease control and the minimizing of pesticide usage.

7.4.1.13 To continually improve production practices so as to be more socially responsive and environmentally friendly.

7.4.1.14 On-going research and development.

7.4.1.15 Worker training on pesticide toxicity/classification and first aid measures.

7.4.1.16 Empty pesticide containers will be triple-rinsed, punctured and flattened and then sent to the incinerator. The company will investigate the possibility of' suppliers taking back the containers for disposal. Dilute pesticide residue (rinsate) from the containers will safely be disposed of by flushing it into the soak pit and constructed waste water ponds.

The company will follow the guidelines by the Pest Control Products Board on-farm disposal of pesticide wastes and containers.

The provisional guidelines are annexed

7.4.2 Fertilizers Management

The Proponent will promote the rational use of fertilizers so as to minimize negative environmental impacts while consistently attaining production or high quality crops. The following guidelines will be used: -

7.4.2.1 Utilization or fertilizers and Compost in line with Code or Good Agricultural Practices.

7.4.2.2 Applying fertilizers based on sound principles, leaf tissue: analysis and soil analysis to provide a guideline to the soil nutrient levels and in particular nitrates, phosphates, potash and magnesium levels.

Leaf samples and soils are tested on a 2 monthly rotational schedule to check on any compound build-ups or depletions in the soil fertilizers will then be applied based strictly upon these results.

7.4.2.3 Only qualified personnel will have responsibility for fertilizer programmes and decisions on their application

7.4.2.4 Training of all personnel involved in and the rational use of these fertilizers.

7.4.2.5 Fertilizers will not be applied to conservation areas, wildlife corridors or within 25 meters or watercourses.

7.4.2.6 All of the organic waste will be composted to maximize nutrient recycling and maintain soil fertility.

7.4.2.7 Fertilization will be tied to soil. tissue and water analysis from the laboratory results

7.4.2.8 The Farm will recycle waste water.

7.4.2.9 Any increases in fertilizer usage for the same period over the previous year must be justified.

7.4.2.10 The composition of each fertilizer materials used will be determined. All fertilizer applications will be monitored and audited. Storage facilities will be constructed to contain any possible spills that could contaminate soil or water.

7.4.3 Water Resources Management

The proponent will foster efficient use of water through a range or conservation techniques. To ensure continual improvement, the following guidelines will be observed: -

7.4.3.1 Record the total water consumption, per production unit, in m3/ha/day.

7.4.3.2 Application of water to the soil will be based on sound agronomic principles of soil-water relations (using tensiomenter readings) to provide a guide to the soil water status.

7.4.3.3 All water utilized will be metered and recorded

7.4.3.4 Water will be harvested from greenhouse roofs and stored in a lined reservoir.

7.4.3.5 Drip irrigation will be used to supply water to the crop to avoid water wastage.

7.4.4 Soil Resource Management

The objective where is to ensure that all land use pesticides are carried out in an environmentally responsible manner in line with the Code or Good Agricultural Practice. As indicated above, fertilizers will be applied based on sound principles, leaf tissue and soil analysis to provide a guide to the soil nutrient levels and in particular nitrates phosphates, potash and magnesium levels.

The following "best practice" methods for soil conservation will be applied:

7.4.4.1 Grassing: all earth areas not specifically required to be tilled will be grassed and terraced to minimize erosion.
7.4.4.2 Drainage: all drainage will be in concrete or precast culverts to avoid
7.4.4.3 soil erosion and siltation of the Athi River.
7.4.4.4 Maintenance or indigenous vegetation along the river bank.

7.4.4.5 No cultivation will be carried out on land with a slope or more than 35% in accordance with the Agriculture Act.

7.4.5 Waste Management

Polythene

To minimize environment pollution caused by polythene, the proponent will ensure:

- That all used polythene is collected, bailed and transported to a recycling facility
- That all used polythene is returned to the storage facility.
- That no polythene is incinerated.
- That drivers and turn-boys are trained on polythene disposal.

Paints and thinners

- Training of painters on safe disposal of thinners and paints Implementing a system for collecting waste material and incineration.
- Implementing a system for safe disposal paint Containers.

Inorganic waste

- Fertilizer sweepings will be re-used.
- Chemical spillage will be soaked in sawdust and disposed in approved disposal sites.
- Waste oil/grease from the garage will be returned to Kenya Shell for incineration.

Organic waste

- Plant refuse, the result of pruned, discarded or broken in the field and grading halls will be composed to provide organic manure.
- Biodegradable materials like cartons and other packing materials will be re-used or shredded and composted.

Toilet & Septic Tanks

Toilets and sewage water treatment units will be constructed in accordance with MOH Standards.

7.4.5 Biological Resources Management

To protect and conserve wildlife, natural habitats, respecting and enhancing the landscape character, the company will emphasize efficient use of resources including energy, water, land use practices, use of pesticides, fertilizers, compost, prevention of pollution and conservation of natural flora and fauna and the landscape. To ensure no damage is done to these resources, the company will strictly follow guidelines regarding avoidance of use of pesticides and has a full understanding of:-

Mammalian Toxicity Aquatic Toxicity Avian Toxicity

WHO Classification Red List and Green List

7.4.6 Air Pollution Management

To reduce negative impacts on the air, the following measures will be observed:

7.4.6.1 Non-use of methyl bromide for fumigation due to its ozone depleting effects.

7.4.6.2 Incineration of materials will be minimized and all organic waste will be composted and polythene wastes recycled.

7.4.6.3 Use of unleaded petrol and regular servicing of the company vehicles to reduce emissions.

7.4.6.4 Use of products with chlorofluorocarbons (CFCs) will be avoided as much as possible.

To minimize air pollution when spraying, the following measures are observed:-

- Minimizing and monitoring use of all pesticide products.
- Effective scouting will be done to minimize blanket spraying
- Use of Integrated Pest Management (IPM) methods.
- Ensuring all greenhouse sides are closed during spraying.

7.5 Environmental monitoring

The company will formulate a comprehensive environmental monitoring programme. This will among others include;

- Regular environmental audits
- Health and safety audits
- Water quality monitoring
- Soil analysis on regular basis
- Internal inspections by EHS team
- Maintain waste tracking records at the farm
- Monitor water and power consumption
- Air quality monitoring
- Apply for effluent discharge license

CHAPTER EIGHT

8.0 ENVIRONMENTAL MANAGEMENT PLAN

This section describes the proposed measures to be implemented by the project management to mitigate the negative impacts identified. It forms the Environmental Management Plan document for use in Monitoring and Evaluation as well.

After identifying environmental effects, mitigation measures to lessen or compensate for potential adverse impacts are identified. An EMP for development projects provide a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, the EMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. EIA is an environmental management tool and EMP is its vital output providing a checklist for project monitoring and evaluation.

The EMP outlined herein addresses the identified potential negative impacts and mitigation measures of the proposed project and serves as a guide for enforcement and compliance to environmental management. The Environment Management Plan therefore endeavors to achieve the following:

- Compliance with legal requirements and voluntary commitments.
- Minimizing or preventing pollution.
- Continual improvement in environmental performance, including areas not subject to regulations.

It is recommended that the Project Proponent incorporates these measures gradually; prioritizing mitigation of impacts considered most significant (adverse impacts) and progress to the less severe ones in the project planning phases for the proposed project.

8.1 EMP-Pre-Plantation/ Construction Phase

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase the proposed project are outlined in the table below.

Impact	Mitigation measure	Responsible	Budget (Ksh)	Time frame
Noise pollution	• Maintain the levels of noise pollution from the machinery in accordance to the manufacturer's specification • Workers shall be provided with PPE/materials such as earmuffs and earplugs when operating noisy machinery and when in a noisy environment • Drivers/operators shall be sensitized to switch off vehicles and machinery engines when not in use • Drivers shall avoid unnecessary hooting and revving of vehicles • Transport vehicles shall be well maintained with minimum noise • Have only the essential workers at any construction site • Construction works to be done during day time only • Use machines that are less vibrating and those that are well serviced to prevent excessive vibration • Where vibration due to compacting is very high, we propose the compaction to be done during the day	Project manager, farm manager	100,000	Throughout the establishment/ construction period
Air Pollution/ dust emissions	• Use of unleaded petrol and regular servicing of the company vehicles to reduce emissions. • water spray the construction area to reduce dust emission • Construction materials shall be obtained from NEMA compliant quarries • Material transporting trucks/machinery shall be well maintained with minimal exhaust fumes • Drivers will also be advised to stick to prescribed speed limits	Farm Manager/ project manager	80,000	Throughout project construction

	• Sensitize truck drivers to avoid unnecessary revving and hooting of vehicles at loading /offloading and parking areas • Ensure appropriate vehicle speeds in road sections that will be used by construction vehicles on a needs basis to eliminate the creation of dusts • Ensure proper repair and maintenance of vehicles and equipment to minimize exhaust fumes • Provide Personal Protective Equipment (PPE) to the workers			
Increased water use	• Get permit from water resource authority to harvest water • Record the total water consumption, per production unit, in m3/ha/day. • Application of water to the soil will be based on sound agronomic principles of soil-water relations (using tensionmeter readings) to provide a guide to the soil water status. • All water utilized will be metered and recorded • Installation of a bio digester to help recycle water for use in the farm	Farm Manager/ project manager	160,000	Throughout project construction
Oil Leaks and Spills	• Use of well serviced machinery with minimal or no grease/oil leakages • Maintenance of trucks and machinery shall be carried out in designated areas i.e. petrol stations, owners' service yards and garages where oils/greases are completely restrained from reaching the ground and not at the site • Fuel products should be keep far away from water sources	Project/ farm manager	30,000	throughout the project cycle

Solid waste	• The proponent shall work hand in hand with the County Government of Laikipia to facilitate sound waste management • All the solid waste generated during construction activities should be collected and sorted into non-recyclable and recyclable • Hardcore materials could be re-used on site for construction and filling the voids along the road • Provision of bins, one for bio-degradable and another for non-degradable matters. • These bins shall be of appropriate type, size and color for effective waste separation and disposal • Train/educate all stakeholders involved in the proposed project on the importance and means of waste management and handling especially during establishment and operational phases	Farm Manager/project manager	50,000	Throughout the operation phase
Health and safety	• Pre warn the residents of the possible accidents • Erect an appropriate project signboard as directed by the proponent • Erect appropriate safety signage along the construction route cautioning against various health and safety risks and prescribing particular mandatory actions • Fence the construction site to prevent neighbors and passers-by from trespassing and exposing them to health hazards • A fully equipped First Aid Kit shall be provided at the construction site always and manned by trained/qualified persons	Farm Manager/project manager	40,000	During project operation

	• Depending on OHS hazards anticipated while performing assigned jobs/task(s), workers may require proper fitting PPE to avoid injuries and illnesses. • Provided workers with protective gear which should include working boots, overalls, helmets, goggles, earmuffs, dust masks, and gloves among others • All workers will be required to produce their National identification cards, NHIF and NSSF registration numbers • Child labour will not be used in project • Persons providing food for workers at the site must have the necessary public health licenses • Warning tapes should be put along the trench line to alert pedestrians on the dangers • Construction workers will be sensitized on effects of negative anti- social behaviour and their consequences • Workers shall be provided with emergency telephone numbers to request for assistance in case of an accident • In case of an accident, the injured person should be given first aid and immediately taken to the nearby hospital • An investigation should be initiated immediately to ascertain the cause of the accident and preliminary findings released within 12 hours			

Destruction of Indigenous Vegetation, Loss of Soils & Habitats	• Avoid as much as possible destruction of indigenous tree during construction activities • Replace/ plant vegetation covers and trees soon after completion of the dam • Encourage growth of indigenous tree nurseries for increasing vegetative cover and replacing those destroyed during project implementation activities • Restrict clearing to immediate requirements i.e. minimize unnecessary clearing • Restrict clearing for fuel wood • Stock pile soil for re-use • Re-vegetate site after construction wherever possible (borrow areas, riparian area, etc.) using adequate stockpiled top soil • Rare flora species to be identified and relocated' • Ensure reserve flow • Incorporating soil conservation measures during construction to mitigate damage caused by erosion • Only the areas to be utilized will be excavated • Carry out inspection of each of the sites soil stability before excavation • Transportation of construction materials is done through the existing local roads • The construction work-force will be sensitized on the importance of environmental conservation and ecological protection to prevent the	Farm Manager/project manager	80,000	

	exploitation of natural resources around the project area and destruction of ecosystems • On completion of the construction work, the project areas will be allowed to revegetate with fibrous rooted vegetation species			
Soil erosion/ surface runoff	• Adequate drainage should be designed and engineered to prevent excessive runoff of sediments into the environment; • No cultivation of slopes of more than 35%; construct water velocity checks; safe water disposal to discharge points • Plant grass strips and construct terraces and safe disposal drainage lines, increase the ground plant cover in areas that are prone to erosion	Project/Farm Manager	50,000	Throughout construction/ establishment
Ergonomics	• Minimization of hazards due to heavy manual lifting/ handling of tools, materials • Provide fork lifts and/or handling machinery	Project/Farm Manager	10,000	All phases of the project
Social conflicts	• Minimize infiltration of foreign cultures • Recruiting employees from the surrounding communities, promote awareness and education amongst the different communities in the area	Project/Farm Manager	Nil	At the operational phase of the project
Water pollution	• Site the bio digester at a safe distance from water sources determined by soil hydraulic conditions and slope • Safe disposal of wastewater through constructed bio digester septic tanks	Project/Farm Manager	70,000/-	During construction and operation

During operation phase

Impact	Mitigation measure	Responsible	Budget (Ksh)	Time frame
Air Pollution	•Non-use of methyl bromide for fumigation due to its ozone depleting effects. •Incineration of materials will be minimized and all organic waste will be composted and polythene wastes recycled. •Use of unleaded petrol and regular servicing of the company vehicles to reduce emissions. •Use of products with chlorofluorocarbons (CFCs) will be avoided as much as possible. •Minimizing and monitoring use of all pesticide products. •Effective scouting will be done to minimize blanket spraying •Use of Integrated Pest Management (IPM) methods. •Carry out air quality analysis quarterly	Farm Manager	200,000	Throughout project operation

Dam Operation and Maintenance	• Monitor the crest to ensure that the edges do not erode and the crest width does not deteriorate. If required, additional material should be placed on the crest and a good grass cover maintained • Monitor the crest and slopes for cracks. The location, alignment and depth of crack should be reported and cracks should be in-filled by compacting similar soil into the cracks • Resurvey the crest every 5 years to check for slumping and low spots • Maintain the downstream slope with a thick grass cover. • Give attention to spots were vegetation does not take off, these areas should be dressed with top soil and planted with grass starters • Check the up-stream face for signs of wave or wind erosion • Any erosion of the slope should be addressed by improving the rip rap cover • Trees and bushes should NOT be allowed to grow on the embankment • Monitor the embankment for burrowing animals; in the event they are found they should be removed and their burrows excavated and back filled with compacted material	Farm Manager		Throughout project operation

	• Monitor the downstream slope for seepage or leaks. Wet patches, excessive vegetation growth in one patch, depressions or slumping should be noted and reported • Monitor the normal seepage flows • The outflow from the filter/seepage blanket should be monitored and the discharge recorded • Record the water levels and at the same time as measure the filter blanket discharge • Maintain the spillway in good condition and repair it immediately if required • Trees and bushes should NOT be allowed to grow in the spillway channel • Monitor the spillway channel for signs of erosion; any areas that are eroded should be treated by grassing the channel or construction of a concrete sill • Ensure the spillway channel is free of debris			
Increased water use	•Record the total water consumption, per production unit, in m3/ha/day. • Application of water to the soil will be based on sound agronomic principles of soil-water relations (using tensionmeter readings) to provide a guide to the soil water status.	Farm Manager	50,000	Throughout project operation

	• All water utilized will be metered and recorded • Water will be harvested from roofs and stored in the dam reservoir. • Drip irrigation will be used to supply water to the crop to avoid water wastage. •Installation of a bio digester will help recycle water for use in the farm			
Health and safety	•Ensure the structural integrity of the dam is at a maximum to avoid disaster i.e. by monitoring leakages and spills. •Prevention and management of foreseeable accidents •Personal Protective Equipment (PPE) will have to be supplied to the workers. •Workers involved in applying and handling herbicides will be provided with training and PPEs such as eye protection, breathing protection (masks), gloves, protective clothing during spraying or handling and rubber boots. •Training and sensitization of workers on the importance of using PPE'S •Presence of First Aid Kits at planting, weeding and cutting points;	Farm Manager	40,000	Throughout project operation
Water Logging and Soil Salinity	• Regular soil test which will help ensure the soils are not destroyed in the long • Proper choice of the irrigation method • Strictly follow irrigation schedule to prevent an increase in the irrigation hours in one section	Farm Manager	50,000	Throughout project operation

	• Use of good irrigation management • closely matching irrigation demands and supply • Installation and maintenance of adequate drainage system			
Soil erosion/ surface runoff	•Adequate drainage should be designed and engineered to prevent excessive runoff of sediments into the environment; •No cultivation of slopes of more than 35%; construct water velocity checks; safe water disposal to discharge points •Plant grass strips and construct terraces and safe disposal drainage lines, increase the ground plant cover in areas that are prone to erosion	Farm Manager	50,000	At operation and project cycle
Increased incidence of HIV/AIDS	• Create awareness; educate workers and surrounding communities • Convene barazas; provide counseling services, provide HIV testing services;	Farm Manager	30,000	During the operational phase of the project
Ergonomics	• Minimization of hazards due to heavy manual lifting/ handling of tools, materials • Provide fork lifts and/or handling machinery	Farm Manager	10,000	All phases of the project
Water pollution	•Site the bio digester at a safe distance from water sources determined by soil hydraulic conditions and slope •Minimizing and monitoring use of all pesticide products.	Farm Manager	20,000/-	Project cycle

	•Safe disposal of wastewater through constructed bio digester septic tanks •Carry out water quality analysis quarterly and submit results to NEMA •Carry out soil analysis to avoid over application of fertilizers that may lead to groundwater pollution			
Pollution from empty pesticide containers and paper cartons	•All empty chemical containers to be disposed as hazardous waste by a NEMA licensed waste handler	Farm Manager	70,000	Operational phase of the project
Solid Waste	• Provision of bins, one for bio-degradable and another for non-degradable matter • Waste shall be properly segregated to encourage re-cycling and re-use • All the wastes shall be disposed appropriately as per the Laikipia County government by-laws and Environmental Management and Co-ordination, (Waste Management) Regulations, 2006 • Ensure the workers follow the guidelines provided by pest control production board for on-farm disposal of pesticides wastes and containers	Farm Manager	50,000	Operational phase of the project

8.3 Project Decommissioning

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It is anticipated that however long it takes, a time will come when the project lifespan will come to an end, the projects facilities removed and the site restored.

The main purpose of decommissioning is to restore /rehabilitate the site to acceptable standards. In this study, the decommissioning process is aptly dealt with under the chapter on EMP. During this stage, the proponent should ensure that all waste materials resulting from the decommissioning activities is cleared from the site.

Basically, the following should be undertaken as part of efforts to restore the environment:

a) Fence and install sign posts with clear warnings on unsafe areas until natural stabilization occurs;

b) Backfill surface openings, where possible;

c) All re-usable waste materials should be used in other applications; and,

d) Waste materials which cannot be reused should be collected by a licensed waste transporter for appropriate disposal.

Impact	Mitigation measure	Responsible	Budget (Ksh)	Time frame
Danger of explosions from methane release from septic tanks	• Provide for a closure plan for the septic tanks • Exhaust the septic tanks and discharge into sewage works	Farm Manager	40,000	Nil
Increase in Poverty due to loss of employment	• Provide safety nets • Provide counseling to workers for post closure of the business • Payment of compensation and terminal benefits to workers • Provide information to workers on project termination and create awareness to workers who are losing employment about alternative income generating activities (includes giving notes of termination of contracts).	Farm Manager	50,000	Nil
Environmental aspects	• Obtain all licenses necessary for demolition to kick off from NEMA and other relevant authorities.	Farm Manager	100,000	Nil

	• Remove all the underground water pipes, underground storage tanks, • Backfill any surface openings • Restore/rehabilitate the site to acceptable standards • All the wastes to be disposed by NEMA authorized waste handlers and to NEMA approved sites • Develop a decommissioning plan and present it to NEMA for approval			

CHAPTER 9

9.1 Cost-Benefit Analysis

A cost benefit analysis has been performed in order to weigh the advantages associated with the proposed project against the disadvantages. In this way the viability of the project can be reasonably determined through comparing the positive effects against the negative effects.

The positive effects are reflected as benefits while the negative effects are ref1ected as costs. The cost-benefit analysis (CBA) technique used in this report assigns arbitrary values of I to 5 on the total benefits and costs for each anticipated parameter in the project. An overall evaluation of the costs and benefits is done to determine the projects' feasibility. A ratio of benefits to costs is computed, if the ratio is more than one (I), the project benefits (both environmental and socio-economic) are more than the total costs and hence suitable. The larger the Benefit-cost ratio, the more suitable the project is, in environment, social and economic terms. The scores are assigned as follows:

1 =Very low benefit/cost
2 =Low benefit/cost
3 =Moderate benefit/cost
4 =High benefit/cost
5 =Very high benefit/cost

Where:

Very high: the impact is considered as constituting a major and permanent change to the natural and social-economic environment and affecting large area or large number of people.

High: the impact constitutes long-term change affecting wide area and large number of people.

Moderate: constitute major change but limited, do not affect large number of people. They are of medium term benefits or costs.

Low: Results in short-term benefits or costs on the natural and socio-economic environment. Affects small number of people directly.

Very low: No benefit or cost can be directly related to the parameter under consideration.

POTENTIAL IMPACT		BENEFITS	COSTS
I. Soil conservation		4	1
2	Loss or vegetation and biodiversity	1	2
3.	Soil erosion	1	2
4.	Human health and occupational safety	2	3
5.Water pollution		1	2
6.	Waste disposal	4	1
7.	Infrastructure development	4	1
8. Economic empowerment		4	1
9.	Employment opportunities	4	1
10.Governmet revenue		5	1
11	Improved livelihood	4	1
12 Increased land use values		4	1
13	National economy	4	1
14	Aesthetics	3	1
I5 Surface water quality and hydrology		3	1
16	Ground water	3	1
17	Noise	1	3
18	Air quality	1	3

19	Accident	3	1
Totals		54	33

Table 5: Cost-Benefit analysis

Calculations:

Benefits - Cost ratio: = Total benefits/Total costs

=54/33

= 1.64

Total benefit expressed as a percentage of total costs = 164%

Inference:

The Benefit-Cost ratio was to be 1.6 which is above 1, signifying that the project is feasibility

CHAPTER TEN

10.0 CONCLUSION AND RECOMMENDATIONS

The project has clear social and economic benefits and will contribute to the improvement of the quality of life for the people associated with it and the neighbors and the society in general. The project will not be ill any serious conflict with any major national physical or environmental protection policies. The on-site or off-site anticipated impacts identified are of varying significance and these could be adequately mitigated to reduce any threat to the environment. When the environmental management plan developed in the assessment is fully implemented and the health and safety and environment policy is set up. Then this will result in an overall improvement in the environmental quality or the project area and its surrounding.

From the foregoing discussions, it is recommended that;

1. The proponent shall ensure that the development camouflages within the setting and offers a serene environment to allay concerns. All activities concerning the plantation farm shall be strictly monitored by a contractor or a designated official who shall be trained and experienced enough to judge the appropriateness of the works being carried out.
2. Implementation of an environmental management plan is an integral part of growth and development of any company and makes employees and contractors aware of the need to take a responsible approach to the management of the environment in their operations. This overall objective is to achieve continual improvement through monitoring and measuring performance.
3. Waste management strategy is critical to such operations. Application of 7Rs- refuse, return, refill, reduce, reuse, recycle and recover- are good practices for the operational activities.
4. The proponent shall comply with the relevant principle laws, by-laws and guidelines issued for the development of such projects.
5. Annual environmental audits should be carried out on the project in order to ensure the compliance of the project with mitigation measures outlined in the Environmental Management Plan (EMP).

Pictures from the public consultation meeting

The chief addressing the locals

The lead expert explaining about the project

REFERENCES

i. G0K 1992: Environmental Action Plans for Arid and semi-Arid lands in Kenya
ii. G0K 2002: water Act Law of Kenya. Kenya Gazette supplements no. 107 (Acts No 9) Nairobi 0ctober 2002
iii. GoK (1984). Radiation Protection Act; Government printers; Nairobi, Kenya.
iv. GoK (1994). National Environment Action Plan (NEAP); Nairobi, Kenya
v. GoK (2002). Kenya Gazette Supplement Factories and other Places of Work (Fire Risk Reduction) Rules (2007). Government printers; Nairobi, Kenya.
vi. GoK (2002). Kenya Gazette Supplement Radiation Protection Act (Cap.243). Government printers; Nairobi, Kenya.
vii. GoK (2002). Kenya Gazette Supplement Land Planning Act (Cap.303). Government printers Nairobi, Kenya.
viii. GoK (2002). Kenya Gazette Supplement Local Government Act (Cap.265). Government printers; Nairobi, Kenya.
ix. GoK (2002). Kenya Gazette Supplement Physical Planning Act (Cap.286). Government printers; Nairobi, Kenya.
x. GoK (2002). Kenya Gazette Supplement Water Act 2002. Government printers; Nairobi, Kenya.
xi. GoK (2003). Kenya Gazette Supplement No. 56; Legislative Supplement No. 31- Legal Notice No. 101. The Environmental Impact Assessment and Audit Regulation 2003. Government Printers; Nairobi, Kenya.
xii. GoK (2007). Employment Act; Government printers; Nairobi, Kenya.
xiii. GoK 1968. Land Planning Act Cap 303. Government Printer
xiv. GoK, Environmental Management and Coordination Act 1999
xv. GoK. 1997. Public Health Act
xvi. GoK. Physical Planning Act. Government printer
xvii. GoK. Water Act, Cap 372. Government Printer
xviii. Health Care Waste Management Training Guide, 2015, MoH (K)
xix. International Commission on Non-Ionizing Radiation Protection (1998). Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). Health Phys. 74, 494-522.
xx. Ministry of Health Kenya, 2007, National Policy on Injection Safety and Health Care Waste Management
xxi. Ministry of Health website, accessed march 2017, www.health.go.ke
xxii. MoH, 2001, Kenya National Guidelines on Safe Disposal of Pharmaceutical Waste.
xxiii. MoH, Kenya, 2007, National Standards and Guidelines on Injection safety and Medical Waste management.
xxiv. Munishinge Mohan1993: Environmental Economics and Sustainable development. The World Bank washing DC

xxv. National Guidelines for Safe Management of Health Care Waste, 2011, MOH (K)
xxvi. National Health Care Waste Management Strategic Plan (2016 – 2021), MOH (K)
xxvii. National Infection Prevention and Control Guidelines for Health Care Services in Kenya, 2014, MOH (K)
xxviii. United Nations (1987). The Rio Declaration on Environment and Development.

Annexes

1. Stakeholder Engagement Methodology
2. Guidelines for on farm disposal of pesticides waste and containers
3. Code of conduct
4. Labour management Plan
5. Grievance Redress Mechanism Framework
6. Land Ownership documents
7. Approved architectural and structural designs
8. Minutes of Public Participation
9. List of Attendance
10. NEMA practicing Licenses for experts

Annex 1

STAKEHOLDER ENGAGEMENT METHODOLOGY

1.0 Introduction

This brief contains the framework for undertaking stakeholder's engagement for the mutara Orchards avocado farm Project. It highlights the following:

1. Rationale for stakeholder's engagement
2. Process to be followed in stakeholder engagement and information disclosure processes
3. Communication plan

1.1 Rationale

Stakeholders consultations and disclosure forms is one of the core chapters under the Environmental and Social Management Framework. The World Bank Safeguards Operational Policy /Bank Procedures (OP/BP 4.01 Environmental Assessment) requires stakeholders' consultation about the project environmental/social impacts and consider their view. The Constitution of Kenya, EMCA - 2015 and other statutes also require public consultations in the development process and implementation of any project.

Objectives of the stakeholder engagement was: -

1. To share information on the progress of the project
2. Develop recommendations/mitigation measures on how best to address the actual environmental and social implications
3. Develop a monitoring mechanism, to ensure Environmental, Health and Social safety
4. To clarify roles and responsibilities for engagement and consultations

1.2 Stakeholder Engagement Plan

The stakeholder engagement plan was formulated with the main purpose to;

i. To engage the stakeholders through consultative forums to verify their interests, concerns and recommendations regarding the project implementation so as to monitor Environmental and Social safeguards
ii. Secure and sustain support for the project among key stakeholders.
iii. Creating awareness and minimize hostility towards the project implementation.
iv. Tap into the local values and include them in the social and environmental safeguards.
v. Verify that the needs of the stakeholders were met in the proposed project.

The stakeholder engagements were carried out through the following channels:

- Face-to-face
- Round-table discussions,
- Consultative workshops/ Focused group discussions
- Telephone interviews to ensure wide coverage of the relevant stakeholders.

- Public Meetings/ Baraza

The key Outputs from Stakeholder consultation process will be: -

1. List of actual environmental and social implications of the proposed project
2. List of recommendations on alternative mitigation measures and areas of improvement
3. Recorded minutes of the meetings and list of attendees.

1.3 Communication Strategy

Communications Plan will be used as a tool to involve stakeholders on different levels as the project implementation goes on. Communications plan objectives are: -

1. To build a monitoring and evaluation program in the project implementation.
2. To capture the feedbacks of the stakeholders on the need's implementation.

The communication channels to be used include -

1. The Mutara Orchards project Management unit
2. Memorandums/ Written comments from the stakeholders

Invitations to the forums/ meetings was done through multiple means using official letters sent at least two days in advance, emails, physical deliveries and telephone calls to targeted stakeholders. Reminders were also sent out to ensure full participation in the process.

Given the resource constraint (time and finances), it was prudent to choose a venue on the basis of centrality and ease of access by the participants. The venue of preference was at the farm premises.

Some of the key stakeholders to be consulted include the following:

1. Mutara Orchards management
2. Mutara Orchards project implementation representative
3. Local leadership e.g. DCC,ACC, Area Chief
4. Nearby village representative e.g. Wamura residents
5. County officer representative from Environment and agriculture
6. Established Women Group representatives
7. Community based organization representatives
8. Youth group representative

Table 1: Stakeholders engagement methods

STAKEHOLDERS	METHOD OF ENGAGEMENT	FREQUENCY
Mutara Orchards management Mutara Orchards project implementation representative Local leadership e.g., Area Chief	Official Memo Letters Telephone interviews Written comments Email	Monthly
County officer representative from Environment	Official memorandum Letters Email	Weekly
Supervising consultant	Official Memo Letters Telephone interviews Written comments Email	Weekly
Community leaders Established Women Group representatives Community based organization representatives	Public meeting "*baraza*"	Need basis
Employees/Workers	One on one Discussion "Toolbox talks"	Daily

Annex 2:

CODE OF CONDUCT

ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY (ESHS) BACKGROUND

The Mutara Orchards Code of Conduct on Environmental, Social, Health and Safety (ESHS) is enshrined in the World Bank Environmental and Social Framework. It spells out commitment of all members of the contractor's team and ownership to improving environmental performance in all its operations and protect and promote the health and safety of all its stakeholders. This code of conduct comprises of Environmental and Social Policy, Safety and Health Policy and, other relevant guidelines.

The main purpose of this Code of Conduct is to help in preventing occurrence of any cases of Sexual Exploitation and Abuse (SEA) and other forms of Gender Based Violence (GBV) and Violence against Children (VAC) resulting from the anticipated influx of laborers to the project area.

The project proponent (Mutara Orchards) is committed to creating a conducive environment during construction and operation which will prevent gender-based violence (GBV), Sexual Exploitation and Abuse (SEA) and Violence issues. GBV, SEA and VAC are unacceptable and this shall be clearly communicated to all those engaged on the project

SOCIAL POLICY

We are committed to protect and promote all stakeholders against any social risk bound to arise as a result of the proposed project. On the other hand, during construction and operation stages, Mutara Orchards commits to create and maintain an environment which discourages SEA, other forms of GBV and VAC, and where the unacceptability of any involvement in such actions are clearly communicated to all those engaged on the project including subcontractors, suppliers and other service providers. In order to prevent GBV and VAC, the following core principles and minimum standards of behaviors will apply to all employees without exception:

1. SEA and other forms of GBV and/or VAC constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. Contracts of people caught, reported or suspected to be engaged in such acts shall be suspended and if proven guilty summarily terminated.
2. All forms of GBV, SE and VAC including grooming are unacceptable be it on the work site, the Project Area of Influences, or at workers' camps and/or communities along the road corridor. Investigation and prosecution of those who commit SEA

and other forms of GBV or VAC will be pursued and actively supported by the contractor and TKNP.

3. Women and children (persons under the age of 18) shall be treated with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
4. Language or behavior towards women and/or girls that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate shall not be used.
5. Sexual activity with children under 18—including through digital media—is prohibited and any incidents or suspension need to be reported immediately to the police and/or through mutara orchard Grievance Redress Mechanism. Mistaken belief regarding the age of a child and consent from the child is not a defense. Delayed reporting or concealing incidents are not tolerated and may trigger the termination of the involved employees and consequences against the contractor, as further stipulated in the Contract.
6. Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
7. Sexual interactions between employees at any level and member of the communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited (see definition of consent above). This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non- monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.
8. Where an employee develops concerns or suspicions regarding acts of SEA, other forms of GBV and VAC by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with the GRM.
9. All employees shall attend an induction training course/workshop prior to commencing work on site to ensure they are familiar with the Company's Code of Business Conduct, Anti-corruption policy including this Code of Conduct to prevent GBV and VAC.
10. All employees shall attend other trainings internally organized by the project management unit including regular updates to reinforce the understanding of the Code of Conduct.
11. All employees will be required to sign an individual Code of Conduct confirming their agreement with the Code of Conduct and all its provisions.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities to prevent SEA and other forms of GBV and VAC and report any incidents or suspicions

immediately. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in disciplinary action.

Signed by _____

Title: _____Date: _____

SAFETY AND HEALTH POLICY

Mutara Orchards project is committed to protect and promote the health and safety of all our stakeholders. We endeavor to develop a positive safety and health culture in accordance with all occupational health and safety legislation, regulations and appropriate codes of practice relating to our operations.

We are committed to:

1. Having a high-quality occupational health and safety management system (OHSAS), with an aim to lessening the risk to employees and members of the public from processes and activities associated with our activities.
2. Comply with all applicable safety & health standards
3. Effectively communicate the policy to staff and other interested parties
4. Review our safety & health objectives regularly for continual improvement
5. Provide information and assistance to public on occupational health and safety issues arising from our operations.

OTHER RELEVANT GUIDELINES

1. Confidentiality
    a. The contractor's/sub-contractor's employees and agents will treat the client information as confidential and will neither take personal advantage of privileged information gathered during the given assignment not enable others to do so.
    b. The contractor's/sub-contractor's employees and agents shall share non-public information only on a need to know basis, and only with pre-approval.
    c. Follow procedures if disclosing confidential information to any third party.
    d. Never use non-public information to advance personal interests or the interests of any other party.
2. Assignments
    a. The contractor's/sub-contractor's employees and agents will only accept work that the member is qualified to perform and in which the client can be served effectively.
    b. The contractor's/sub-contractor's employees and agents will not make any misleading claims and will provide references from other clients if requested.

3. Commissions / financial interests
    a. The contractor's/sub-contractor's employees and agents will neither accept commissions, remuneration nor other benefits from a third party in connection with recommendations to the client without the client's consent nor fail to disclose any financial interest in goods or services which form part of such recommendations.
4. Unrealistic expectations
    a. The contractor's/sub-contractor's employees and agents will refrain from encouraging unrealistic expectations or promising clients that benefits are certain from specific management consulting and advisory services.
    b. The contractor's/sub-contractor's employees and agents will ensure that before accepting any engagements has been established with the client.
    c. The contractor's/sub-contractor's employees and agents will advise the client of any significant reservations the members may have about the client's expectation of benefits from the engagement.
5. Disclosure and conflict of interest
    a. The contractor's/sub-contractor's employees and agents will disclose at the earliest opportunity any special relationships, circumstances or business interests which might influence or impair the member's judgement or objectivity on a particular assignment. This required prior disclosure of all relevant personal, financial or other business interests that could not be inferred from the description of the services offered.
    b. The contractor's/sub-contractor's employees and agents will not serve the client under circumstances which are inconsistent with the contractor's professional obligations or which in any way might be seen to impair the contractor's integrity, wherever a conflict of interest arises, the contractor will, as the circumstances require, either withdraw from the assignment, remove the source of conflict or disclose and obtain the agreement of the parties concerned to the performance or continuance of the engagement.
6. Recruiting
    a. The contractor will not make offers of employment to or engage any member of the client's staff nor use the services of any such person either independently or via a third party unless they have first obtained the client's written consent.
    b. The contractor will prevent the use of all forms of forced labor and child labor and promote the fair treatment, nondiscrimination and equal opportunity of project workers.
7. Standards of Service
    a. The contractor's/sub-contractor's employees and agents will carry out the duties which has been assigned for the clients diligently, conscientiously and with due regard to the client's interest. The contractor will maintain a fully

professional approach in all dealings with clients, the general public and fellow members.

8. Maintaining integrity in financial transactions
    a. The contractor's/sub-contractor's employees and agents will ensure all payments and transfers are properly documented, check for compliance with applicable World Bank/GoK rules, policies, and procedures, seek guidance if s/he has any concerns about the legality, destination, or rationale for payments or other transfer of property or information.
9. Ethics

The contractor's/sub-contractor's employees and agents shall:

(a) Comply with all laws and regulations in the country of Assignment.
(b) Fully subscribe the Occupational Health and Safety Act 2007, World Bank Environmental and Social Safeguards and observe those rights in our daily work. S/he shall have a commitment to actively promote the respect for human rights in all their assignments.
(c) Respect ILO conventions on employment and prohibit employment or outright employ persons below the age of 18.
(d) Not allow any form of discrimination or harassment, be it with regard to race, age, gender, nationality, ethnicity, religion or political belonging or other affiliation.
(e) Not allow or get involved in sexual harassment, defined as: behaviour based on gender differences or un-welcome behaviour of sexual nature that offends the integrity of other persons.
(f) Never give any undue payment or other consideration to any person or entity for the purpose of inducing that person or entity to act in favour of the contractor's/sub-contractor's employees and agents. Never accepts any undue payment or other consideration from any person or entity for the purpose of acting in favour of that person or any entity or other person s/he may represent. Avoids all types of activities that may lead to a conflict of interest in the professional behaviour.
(g) Abide to any type of anti-corruption policy in the country of work. Pro-actively works to prevent corrupt practices, even when it is not part of the duties or assignment of the individual. Reports suspicion of corrupt practices to relevant Authority.
(h) Respect and always follows available National policies on corruption in Kenya. On his/her own initiative interprets the intention of the policies into practical personal rules.
(i) Plan ahead to analyze what effect his/her work will have on the environment, and takes action to minimize environmental and social risks.
(j) Not exploit business relationships for his/her own personal gain.

(k) Respect, and act respectful of cultural practices in the community in the region of assignment, even when these do not exist in any written form.

10. Pro-active Statement

The contractor's/sub-contractor's employees and agents shall:

a) Actively search for information on all issues in the Ethics section and realizes that it is his/her responsibility to act according to those Ethics.
b) Be aware that any deliberate breach of the above – or serious breach out of negligence- will lead to corrective actions from the client and may lead to immediate termination of contract.
c) Actively promote the issues in the ethics section above
d) Conduct their private or other external activities in a manner that does not conflict or appear to conflict with the Ethics.

RELEVANT REFERENCE DOCUMENTS

We will refer and apply relevant technical documents in executing the project in accordance with for instance:

1. Requirements of the World Bank Group Environmental, Health and Safety Guidelines (EHSGs).
2. World Bank Group Strategy 2013 on corporate goals of ending extreme poverty and promoting shared prosperity in all its partner countries.
3. The Kenya Constitution 2010.
4. The Kenya Vision 2030 Blue Print.
5. Other relevant Environmental Health and Safety subsidiary legislation

REVIEW

The policy shall be reviewed as and when necessary for its relevance and appropriateness to the Mutara Orchards project

Signed:

…….. ……Main Contractor

Annex 3: LABOR MANAGEMENT PLAN

The contractor/sub-contractor shall provide his/her labor management procedures in the form provide here below.

1. OVERVIEW OF LABOR USE ON THE PROJECT

1.1 Provide number of project workers.

i. The total number of workers to be employed on the sub-project site: ……

ii. Number of direct workers: ……

iii. Number of contracted workers: ……

1.2 State the characteristics of project workers.

i. Number of local workers: ……

ii. Number of national workers: ……

iii. Number of international migrants: ……

iv. Number of female workers: ……

v. No of male workers: ……

vi. No of PLWD workers: ……

1.3 Provide information on timing of labor requirements.

i. Site preparation stage/Mobilization (site holding, erection of site temporary structures):

Number of skilled workers: ……

Number of unskilled workers: ……

ii. Excavation stage

Number of skilled workers: ……

Number of unskilled workers: ……

iii. Sub-structure stages:

Number of skilled workers: ……

Number of unskilled workers: ……

iv. Super structure walling and concreting stage:

Number of skilled workers: ……

Number of unskilled workers: ……

v. Roofing stage:

Number of skilled workers: ……

Number of unskilled workers: ……

vi. Finishing stage (window/door installations, plaster/screed, painting, etc.):

Number of skilled workers: ……..

Number of unskilled workers: ……

vii. Project close-up/demobilization:

Number of skilled workers: ……..

Number of unskilled workers: ……

1.4 State number of workers hired by:

i. Main contractor. …… No.
ii. Sub- contractors. …… No.
iii. Contracted services (e.g. suppliers of materials). …… No.

1.5 Do you have migrant workers? Yes [ ] No [ ]

If Yes

- How many are? Domestic ……No, International…….. No.
- In a separate paper provide details of the migrant works including their region/country origin/ working permits the case of international workers

2. ASSESSMENT OF KEY POTENTIAL LABOR RISKS

The key labor risks which may be associated with the project include the following:

a) **Labor influx and related impacts:** The employees will be hired from within the locality hence limited movement or very short distances from their homes. The skilled labour force from elsewhere will reside in hotels in the closest proximity to the project area
b) **Human rights and gender inclusivity**: During recruitment of workers there could be discrimination against one gender either by design or oversight. Lack of compensation for excess working hours. Contractors may overlook provision of sanitary, health and safety facilities such as Personal Protective Equipment (PPE).
c) **Child protection:** Exposing the students to strangers is likely to result in sexual violence and exploitation which involves unwanted sexual touching, attempted unwanted sex, physical forced sex, receiving money in exchange for sex among others. Children are likely to be subjected to labor during construction works such as fetching water and carrying building materials.
d) **Increased transmission of communicable diseases:** Construction activities could create opportunities for transmission of communicable diseases such as water borne and airborne diseases.
e) **Sexual exploitation and abuse:** Interaction between construction workers and other project stakeholders such as students, staff and community could lead to

sexual exploitation.

f) **Occupational health and safety:** Sexual harassment may occur between workers during the construction phase. The possible mitigative measure should include but not limited to Ensuring clear human resources policy against sexual harassment that is aligned with national law; Integrate provisions related to sexual harassment in the employee Code of Conduct and ensuring appointed human resources personnel to manage reports of sexual harassment according to policy

g) **Drug and substance abuse:** The presence of construction workers is likely to increase the student's exposure and access to drugs and alcohol.

h) **Social Evils/crime** – influx of workers near the school, may introduce criminal activities especially people with bad behaviors like stealing at the construction site or in the school.

3. BRIEF OVERVIEW OF LABOR LEGISLATION, POLICIES AND PROCEDURES

The contractor to refer to the following key aspects of Government of Kenya national labor legislation with regards to term and conditions of work, and how national legislation applies to different categories of workers identified in Section 1.

a) The Constitution of Kenya, 2010
b) EMCA Act, 2015
c) Employment Act, 2007
d) Labor Relations Act, 2012
e) National Gender and Equality Commission Act, 2011
f) Child Rights Act (Amendment Bill), 2014
g) Occupational Safety and Health Act, 2007
h) Work Injury Benefits Act, 2007
i) Sexual Offenses Act, 2006
j) Public Participation Bill, 2016
k) HIV & AIDS Prevention and Control Act, 2011
l) Public Health Act (Cap 242)

4. RESPONSIBLE STAFF

Provide information of individuals within the project responsible for the following:

i. Engagement and management of project workers

Name .....

Title .....

Answerable to: Main contractor [ ] OR Sub-contractor [ ]

ii. Engagement and management of subcontractors

Name .....

Title .....

iii. Occupational health and safety (OHS)

Name .....

Title .....

Answerable to: Main contractor [ ] OR Sub-contractor [ ]

iv. Training of workers

Name .....

Title .....

Answerable to: Main contractor [ ] OR Sub-contractor [ ]

v. Addressing worker grievances

Name .....

Title .....

Answerable to: Main contractor [ ] OR Sub-contractor [ ]

5. AGE OF EMPLOYMENT

The contractor, his sub-contractors and agents shall comply with **Employment Act, 2007** which provides the age limits and mechanism of labour management to ensure underage persons are not engaged in the project.

6. TERMS AND CONDITIONS

State specific wages of the workers in operation.

i. Skilled workers (pp/day) Ksh.

0-200	
201-400	
401-600	
601-800	
801-1000	

ii. Unskilled workers (pp/day) Ksh.

0-200	
201-400	
401-600	
601-800	
801-1000	

iii. State working hours
- Monday Friday: From …… to …….
- Saturday: From …… to …….
- Sunday: From …… to …….
- Public Holiday: From …… to …….

iv. Is there any collective agreements signed between contractor and workers?

v. Yes [ ] No [ ]. If YES in separate paper, provide a list of agreements and describe its key features and provisions

vi. Provide any other specific terms and conditions of the labor engagement.

7. GRIEVANCE MECHANISM

The contractor, his sub-contractors and agents shall comply with the procedures laid out in the Grievance Redress Mechanism (GRM) Plan.

8. SOURCE OF WORKERS

The contractor will strive to ensure that the employees are from close proximity to the project site. The contractor will make necessary movement arrangement for workers to and from site on daily basis using designated public roads. The employees will be hired from within the locality hence limited movement or very short distances from their homes. Non skilled and semi-skilled labor can be sourced locally, skilled labor on the other hand can be sourced nationally this is if local labor cannot meet these demands. Considering that the project areas are schools, there will be no labour camps, the skilled labour force from elsewhere will reside far away from the project area.

Annex 4: GRIEVANCE REDRESS MECHANISM FRAMEWORK

INTRODUCTION

Grievance Redress Mechanism (GRM) – is a management system through which grievances will be resolved following a standard operating procedure (SOP) aligned to other management systems (communication, resourcing, reporting). A grievance is concern or complaint raised by an individual or a group of stakeholders affected by real or perceived impacts of a company's / project's operations". ***This GRM not for the entire project but for the contractor workers.***

A grievance mechanism provides a way to reduce social and environmental risk for the proposed projects, offers stakeholders an effective avenue for expressing concerns and achieving remedies, and promotes a mutually constructive relationship.

A grievance mechanism will be provided for all direct workers and contracted workers (and, where relevant, their organizations) to raise workplace concerns. Such workers will be informed of the grievance mechanism at the time of recruitment and the measures put in place to protect them against reprisal for its use. Measure will be put in place to make the grievance mechanism easily accessible to all such project workers

A well-functioning grievance mechanism does the following,

- Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting;
- Builds trust as an integral component of broader stakeholder's relations activities; and
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and positive engagement.

GRIEVANCE REDRESS MECHANISM PRINCIPLES

Within the project the following principles need to be established to ensure the effectiveness of the GRM:

- Commitment to fairness in both process and outcomes.

- Freedom from retaliation for all involved parties within the project area.
- Dedication to building broad internal support across project lines.
- Mainstreaming responsibility for addressing grievances throughout the project, rather than isolating it within a single department.
- Willingness by Client, Contractor and Consultant to visibly and sincerely champion the grievance system.

In addition to this; The contractor informs direct and contracted workers, respectively, about the available grievance mechanisms, and how they work. The relevant information should be made available throughout project duration in a manner that is clear, understandable, and accessible to workers, for example, by including it in workers' handbooks, on notice boards, or through similar communication mechanisms

The design of this Grievance Mechanism framework is aligned to international best practices and guidelines and has taken the following factors into consideration:

- Proportionality: Scaled to reduce risks and adverse impacts on affected communities, stakeholders and beneficiaries.
- Cultural appropriateness: Taking into account culturally appropriate ways of handling community, stakeholders and project beneficiary concerns.
- Accessibility: Clear and understandable mechanism that is accessible to all segments of the affected stakeholders at no cost.
- Transparency and accountability to affected stakeholders at every project implementation level.
- Appropriate protection; Prevent retribution and not impede access to other remedies.

Grievance Categories

A grievance or complaint includes any communication that expresses dissatisfaction, in respect of the conduct or any act of omission or commission or deficiency of service and in the nature of seeking a remedial action but do not include the following:

- Complaints that are incomplete or not specific in nature
- Communications in the nature of offering suggestions
- Communications seeking guidance or explanation.

Based on the understanding of the project areas and the stakeholders, an indicative list of the types of grievances have been identified for the project, as can be seen below;

Internal Grievances: Grievances from Employees (including both direct and indirect employees, including local workers and migrant workers through contractors)

- ✓ Complaints pertaining to amount of wage, salary, other remuneration or benefits as per Contract Policy and legal framework
- ✓ Timely disbursement of remuneration
- ✓ Gender discrimination
- ✓ Issues related to workers organization
- ✓ Labour Accommodation, transportation
- ✓ Health and Safety issues
- ✓ Extended working hours

Guiding principles in preparation of a Grievance REDRESS CHECKLIST

The guiding principles to be considered while developing a checklist will entail the following:

- An inventory of any reliable conflict mediation organizations or procedures in the project area and an assessment to determine if any can be used instead of having to create new ones.
- Communication Mechanisms such as use of oral means and in the local and national languages should be prioritized and proposals on ways to impose clear time limits for addressing grievances.
- Specific appeal procedure, suggestion and recommendation mechanism shall be provided and suggestions made on how information needs to be shared with the stakeholders or beneficiaries.
- GRM committee (to be site specific) to be created to address grievances and authority to resolve complaints. This GRM proposes that such a committee to include stakeholder's representatives and the project beneficiaries.
- A Grievance Acknowledgement Form and Grievance Resolution Form should be introduced dully filled by the involved parties.

This GRM mainly focusses on;

- Measures relating to OHS and are aimed at protecting project workers from injury, illness, or impacts associated with exposure to hazards encountered in the workplace or while working. Such measures take into account the requirements of the WB OHS and national law requirements on OHS
- Labour related issues-terms of employment, wages, working hours, allowances, overtime etc

Receiving Grievances

There shall be two levels of handling the grievances. These should be fully utilized before one goes to the courts. These levels are:

- ✓ The Contractor/ Mutara Orchard management
- ✓ Project Management Unit

The channels of receiving grievances are summarized in the following table:

Table 2: Procedures for Addressing Complaints

Process	Description	Time frame	Other Information
grievance Identification	Face to face; phone; letter, e-mail; recorded during public/community interaction; others to the Principal	1 day	The contractor to provide an Email address; and a hotline number for reporting purpose
Grievance assessment and recording	Significance assessed and grievance recorded (i.e. in a log book) by the EHS officer hired by the contractor	1-2 days	Significance criteria: Level 1 –one off event; Level 2 – complaint is widespread or repeated; Level 3- any complaint (one off or repeated) that indicates breach of law or policy or this ESMF provisions
Grievance acknowledgment	Acknowledgement of grievance through appropriate medium	1 day	
Development of response	Grievance assigned to appropriate party for resolution. Response development with input from institutional management/ relevant stakeholders	1-7 days	
Response signed off	Redress action approved at appropriate levels	1-2 days	Project staff to sign off
Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	1-4 days	

Complaints Response	Redress action recorded in grievance log book Confirm with complainant that grievance can be closed or determine what follow up is necessary	1-2 days	
Close grievance	Record final sign off of grievance If grievance cannot be closed, return to step 2 or refer to EHS officer in consultation with the consultant or recommend third-party arbitration or resort to court of law/ National Environment Tribunal.	1-4 days	Final sign off on by the Project Coordination

General Steps in Dealing with Grievances

(i) Formal complaint received in writing (letter/email) or at the grievance desk within the site office.

(ii) Recording of complaint in standard form or grievance register (as shown on Table below) and log. This grievance register shall be updated at each stage of the grievance redress. Once the grievance is recorded in the register, a preliminary analysis shall be undertaken by the EHS officer to ensure that the grievance is within the scope of the GRM.

Table 3: Sample of Grievance Register

Case No.	Name of Complainant	Phone & ID No. of the Complaint	Gender	Brief Description of the Grievance	Date of Receipt	Grievance Status and Description of	Date of Response	Remarks
1.								
2.								
3.								

(iii) EHS officer receives the complaint, upon the completion of the recording of the grievance, the stakeholder /complainant will be provided with an acknowledgment of the receipt, along with a summary of the grievance and later assigned to respective grievance committee if the grievance cannot be addressed at the Registration stage.

Sample of Acknowledgement Receipt for Claimant

This receipt is acknowledgement of grievance registration by_____ _____, resident of _____ on date _____. His/her case number is _____ and the date for response is _____ Full name & signature of recording person ----------

In case the grievance is assessed to be out of the scope of the GRC, a communication towards the same shall be made to the complainant, and an alternative mode of redressal shall be suggested.

(iv) Grievance committee reviews the complaint, verifies, investigates and takes action (if complaint is valid, resolves or passes it on to the Project Implementation Committee).

(v) Project Implementation Committee/ GRC resolves and closes the complaint.

(vi) Feedback to complainant within the stipulated timeframe.

Grievance Redress Committee and its Procedures

The main role of the committee will be arbitration through mediation and negotiation when complaints arise to ensure that cases are resolved quickly and fairly. The committee shall meet on need basis.

The project committee will constitute the following:

- ✓ Client Mutara Orchard Representative
- ✓ Mutara Orchard project coordinator
- ✓ Contractor EHS officer
- ✓ Design and Construction and Supervision consultants who will include the Environmental and Social Experts, Senior Resident Engineer or Site Engineer
- ✓ Local Leadership representative

A sub–committee Grievance Redress Committee (GRC) will be established from project stakeholders involved in the implementation of various activities. The subproject GRC will constitute the

- ✓ EHS officer,
- ✓ The foreman,

- ✓ Mutara Orchard rep,
- ✓ The chief (ex-officio)

Mutara Orchards shall facilitate the operations of the above committees by providing venue for meetings, secretarial services and any expenses or allowances directly related to the proposed project where the GRM meetings cannot be conducted within the vicinity of the site.

If at any stage, if the complaint is not satisfied with the solution, s/he may choose to ask for an escalation of the grievance to the next level.

Updating of GRM Records

The records of the grievance register, book, forms shall be updated every working week with the current status of the grievance. Once the grievance is resolved, and the same has been communicated to the complaint, the grievance shall be closed in the grievance register. The grievance register shall also provide an understanding of the manner in which the grievance was resolved. These instances shall then serve as references for any future grievances of similar nature.