KENYA ELECTRICITY TRANSMISSION COMPANY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR

PROPOSED LOIYANGALANI-MARSABIT 150KM, 400KV TRANSMISSION LINE

ESIA STUDY REPORT

FEBRUARY 2017

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FACT SHEET

Assignment Name	Environmental and Social Impact Assessment (ESIA)
Type of Facility	400Kv Power transmission line
Financier	China International Water & Electric Corp P.O. BOX 38653-00100, NAIROBI
County	Marsabit
Name and address of the Proponent	Kenya electricity transmission company Kawi complex, block B, South C, P. O. Box 34942 – 00100, Nairobi. Email: info@ketraco.co.ke Mobile phone: (+254) 719 018000
Start Date	October, 2016
Completion Date	January 2017
LEAD EXPERT	Vitalis Too Enwag Company Ltd. P.O Box 990-00200, Nairobi Email: vitalistoo@yahoo.co.uk
Lead expert license No.	1871

DECLARATION

This ESIA study report was done in accordance to the requirements of the Environmental (Impact Assessment and Audit) Regulations, 2003, pursuant to The Environmental Management and Coordination Act, (EMCA) 1999 and acceptable international standards.

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Signature: ..... **Date:** 14 February 2017

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(Official stamp)

ACKNOWLEDGEMENT

We wish to appreciate the efforts of Mr. Wang – General manger and Mr. Zhang – Engineering Director of **CHINA INTERNATIONAL WATER & ELECTRIC CORP.** who contributed towards the achievements of environmental impact assessment objectives by providing necessary information and assistance.

Finally, we wish to register special gratitude to all the Chiefs and assistant chiefs for their immense assistance and cooperation in organizing public meetings in their respective areas of jurisdictions.

Lastly, we appreciate the contribution of the local communities and other stakeholders for their cooperation and willingness to give their views and comments concerning the proposed project during our public meetings and interviews as part of the public participation process.

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CBD	Convention on Biological Diversity
DOSH	Directorate of Occupational Safety and Health
DRSRS	Department of Resource Surveys and Remote Sensing
ESAP	Environmental and Social Assessment Procedures
EU	European Union
ERC	Energy Regulatory Commission
EIAs	Environmental Impact Assessments
EA	Environmental Audits
EMCA	Environmental Management and Coordination Act
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
HVAC	High Voltage Alternating Current
HIV	Human Immunodeficiency Virus
JICA	Japan International Cooperation Agency
UNFCCC	Kyoto Protocol to the United Nations Framework Convention on Climate Change
KETRACO	Kenya Electricity Transmission Company Limited
kV	kilo Volts
km	Kilometre
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
MEAs	Multilateral Environmental Agreements
MDGs	Millennium Development Goals
MTP	Medium Term Plans
NEAP	National Environmental Action Plan
NEC	National Environmental Council
NEAPC	National Environment Action Plan Committee
NECC	National Environmental Complaints Committee

NEMA	National Environment Management Authority
NET	National Environmental Tribunal
NGEC	National Gender and Equality Commission
OSHA	Occupational Safety and Health Act
OP	Operational Policies
PES	Payment for Environmental Services
PAPs	Project Affected Persons
PCC	Public Complaints Committee
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RoW	Right of Way
SCADA	Supervisory control and data acquisition
SHE	Safety, Health and Environment
SEAs	Strategic Environmental Assessments
SERC	Standards and Enforcement Review Committee
SDGs	Sustainable Development Goals
UNCCD	United Nations Convention to Combat Desertification
WB	World Bank
WRMA	Water Resource Management Authority

EXECUTIVE SUMMARY

I. Preamble

China International Water & Electric Corp. (CWE) who is financier of this study, on behalf of KETRACO, contracted Enwag Company Ltd to undertake Environmental and Social Impact Assessment (ESIA) for the proposed Loiyangalani-Marsabit 150km, 400kV Transmission Line

This purpose of the assessment was to ensure that the significant environmental and social impacts of the proposed project at the preconstruction, construction, operation and decommissioning stages have been considered and assessed at the project planning phase.

II. Background

The Kenya Electricity Transmission Company Limited (KETRACO) is a state corporation fully owned by the government. It was incorporated in 2008 pursuant to Sessional paper No. 4 of 2004 on Energy. The Company was established to develop new high voltage electricity transmission infrastructure that will form the backbone of the National Transmission Grid, in line with Kenya Vision 2030.

KETRACO's mandate is to plan, design, construct, own, operate and maintain high voltage electricity transmission grid and regional power interconnectors that will form the backbone of the National Transmission Grid. These high voltage lines have capacities of 132kV, 220kV, 400kV and 500kV (HVDC).

The company's vision is "To be a world-class electricity transmission company and the leading interconnector in Africa" and mission is "To provide reliable, efficient and effective electricity transmission and promote power trade for sustainable socio-economic development".

The Vision 2030 has identified energy as a key driver of growth in supporting productive sectors of the economy and a key input to both the social and political pillars. The proposed 400 kV Transmission Lines will increase reliability and improve power quality in the project areas

III. Study Objectives

The principal objective of this assessment was to identify significant potential impacts of the project on environmental and social aspects, and to formulate recommendations to ensure that the proposed project takes into consideration appropriate measures to mitigate any adverse impacts to the environment and people's health through all of its phases (construction, operations and decommissioning phases).

The specific objectives of this ESIA were to:

- Identify and assess all potential environmental and social impacts of the proposed project;
- Identify all potential significant adverse environmental and social impacts of the project and recommend measures for mitigation;
- Verify compliance with the environmental regulations and relevant standards;
- Identify problems (non-conformity) and recommend measures to improve the environmental management system;
- Generate baseline data that will be used to monitor and evaluate the mitigation measures implemented during the project cycle;
- Recommend cost effective measures to be used to mitigate against the anticipated negative impacts;
- Prepare an Environmental Impact Assessment Study Report compliant to the Environmental Management and Coordination Act (1999) and the Environmental (Impact Assessment and Audit) Regulations (2003), detailing findings and recommendations.

IV. Study Methodology

The approach to this exercise was structured such as to cover the requirements under the EMCA, 1999 as well as the Environmental Management and Coordination (Impact Assessment and Audit) Regulations 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan as well as decommissioning. In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, desktop studies, public consultations with members of the community in the project areas, survey, photography, and discussions with key people in KETRACO (the proponent).

The key activities undertaken during the assessment included the following:

- Consultations with the key project stakeholders including the project proponent, community members, county administration, opinion leaders and county departmental heads. The consultations were based on the proposed project, site planning and the project implementation plan;
- Physical inspections of the proposed project area which included observation of available land marks, photography and interviews with the local residents;
- Evaluation of the activities around the project site and the environmental setting of the wider area through physical observations and literature review;

- Review of available project documents; and
- Report writing, review and submissions.

V. Project Description

The Proposed Transmission Line commences at proposed substation in Loiyangalani, Marsabit County. It runs across Chalbi desert and Terminates at a proposed substation in Hula Hula. The line traverses through on two locations namely Hula Hula and Kargi both in Laisamis Sub-county, Marsabit County.

VI. Policy, Legal and Institutional Framework

There are several laws, policies and guidelines that have been put in place in Kenya and Internationally. These laws are meant to help in environmental protection and conservation and also for peaceful co-existence in the ecosystem. We have reviewed a wide range of policy, institutional and legislative framework to address the major causes of environmental degradation and negative impacts on ecosystem emanating from industrial and economic development programmes.

These laws and policies are geared towards mitigating any social and environmental negative impacts that may result from a proposed project. Details are outlined in chapter 3 of this Report.

VII. Potential Project Impacts

Anticipated Project Impacts shall be both positive and negative impacts, this report outlines how the positive impacts will be enhanced while also highlighting how the negative impacts will be mitigated. Project Impacts will include:

Positive Impacts

- Increased electrical capacity, and reliability of supply to project area
- Corporate social responsibility (CSR) benefits
- Creation of employment opportunities enhancement of the socio-cultural and local leadership structures
- Increased economic activity in both the project areas and at the national level
- Benefits of engagement by both genders
- Enhancement of tree species diversity
- Improved road infrastructure
- Contribution to government revenue

Negative Impacts

- Relocation of project affected persons and property
- Impact on existing infrastructure

- Impact on land use patterns
- Alteration of land ownership patterns
- Concerns over occupational safety and health
- Impact on flora and fauna
- Soil erosion
- Interference with water resources and drainage
- Visual and aesthetic impacts
- Impacts on archaeology and cultural heritage
- Vehicular and human traffic impacts
- Impacts from solid and liquid wastes
- Noise and vibration impacts
- Impacts from rock blasting during project construction
- Emissions and air pollution
- Perceived danger of electrostatic and magnetic force
- Impacts on aircraft navigation
- Impacts on wildlife habitats and migratory birds
- Risk of fire outbreaks
- Impacts of decommissioning activities
- Increase in social vices

VIII. Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) has been developed for the proposed project. This plan provides a logical framework within which the negative environmental and social impacts identified during the ESIA study can be mitigated and the positive impacts enhanced. Monitoring and management practices as well as monetary compensation are considered and cost estimates included. Responsibilities and time frames for the implementation of the various aspects of the ESMP have been identified. This plan shall be followed at all times during project implementation.

IX. Conclusions

The intensity of impacts will be relatively higher at the tower construction sites within the RoW. These impacts are related to land degradation, noise, waste handling, air quality and vegetation clearance. These potential impacts are easy to mitigate through proper construction planning. However, impacts on vegetation could be locally substantial during construction phase since stringing may necessitate removal of some trees to create access. This impact on vegetation is transient and reversible. Impacts on wildlife during construction are related to possible effects on wildlife movement if tower construction and stringing across animal migration route coincide with their movements. This is easily mitigated by scheduling construction so that it does not coincide with animal migrations.

During construction, potential impacts on local communities and enterprises are largely positive, as the construction activities provide direct job opportunities and indirectly create income from trading through supply contracts, food vendors, accommodation, entertainment etc. However these positive impacts are limited to the duration of the construction activities and would not have a significant sustainable positive impact on the local economy.

X. Recommendations

Clearance of Vegetation: Unnecessary clearing of vegetation should be avoided to in order to reduce soil erosion. However, the company shall ensure re afforestation is done and the cleared areas retain their aesthetic value

Resettlement Action Plan (RAP): A comprehensive Resettlement Action Plan should be conducted by the proponent to identify those who will be affected by the proposed project and compensate them accordingly.

Mitigation Measures: Mitigation measures outlined in this report should be adhered to and the Environmental and Social Management Plan (ESMP) implemented to the letter. The implementation of this ESMP will be key in achieving the appropriate environmental management standards as detailed for this project.

Annual environmental audits: Contractor should undertake annual environmental audits (EA) of the project after completion to confirm the efficiency and adequacy of ESMP.

Monitoring: The impacts of the proposed project should be monitored closely by the Proponent in collaboration with NEMA and Environment and Health & Safety Department at Contractor and KETRACO. The Consultant recommends that an independent consultant will be sourced to oversee environmental management throughout the construction phase and during the operational phase and decommissioning phase. He will provide Environmental audits in line with NEMA's requirement

Design Alteration of Transmission line at critical areas: The proposed transmission line should be redesigned to minimise negative impacts where it crosses the Kenya – Ethiopia Proposed Transmission line.

Licence: All the negative impacts identified can be mitigated, and will restore the ecosystem to near or original state. We thereby recommend that the proponent should be licenced by NEMA to continue with the construction of the proposed project

The proponent should work closely with local people, community leaders, County Government and other stakeholders to ensure smooth implementation of the project.

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CHAPTER ONE: INTRODUCTION

1.1 Preface

China International Water & Electric Corp. (CWE) who is financier of this study, on behalf of KETRACO, contracted Enwag Company Ltd to carry out Environmental and Social Impact Assessment (ESIA) for the proposed Loiyangalani - Marsabit 150km, 400kV Transmission Line.

This purpose of the assessment was to ensure that the significant environmental and social impacts of the proposed project at the preconstruction, construction, operation and decommissioning stages have been considered and assessed at the project planning phase.

1.2 Background

The Kenya Electricity Transmission Company Limited (KETRACO) is a state corporation fully owned by the government. It was incorporated in 2008 pursuant to Sessional paper No. 4 of 2004 on Energy. The Company was established to develop new high voltage electricity transmission infrastructure that will form the backbone of the National Transmission Grid, in line with Kenya Vision 2030.

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The Vision 2030 has identified energy as a key driver of growth in supporting productive sectors of the economy and a key input to both the social and political pillars. The proposed 400 kV Transmission Lines will increase reliability and improve power quality in the project areas

1.3 Proposed project

The proposed project involves the construction of 400kV, 150km Transmission Line

1.4 Objective of the ESIA

The objective of the assignment was to carry out detailed Environmental and Social Impact Assessment for the proposed transmission line

The main objective of the ESIA was to identify significant environmental and social impacts associated with the proposed projects and recommend appropriate mitigation measures for integration in all phases of the projects cycle. The ESIA generated an Environmental and Social Management Plan that described in detail the mitigation measures to be carried out, costing, scheduling and responsibility of such measures, and a detailed monitoring process and its schedule.

1.5 Data Collection Approach

The data collection approach implemented during this exercise utilized the following tools:

1. Key Informant Interviews
2. Public Consultations (Barazas)
3. Focus Group Discussions (FGDs)

Samples of each of the above the tools have been appended in Chapter 12 of this Report.

1.6 ESIA Study Report Format

This report follows the format prescribed in the Legal Notice No. 101 of 13th June 2003 which deals with the Environmental (Impact Assessment and Audit) Regulations.

The ESIA study report looks at the background of the project; nature of the project; activities of the project; project design, materials and equipment to be used; potential environmental impacts; mitigation and enhancement measures; legislative and regulatory framework; prevention and management of possible accidents; health and safety issues; potential economic and social impacts; the budget; and proposes an environmental management plan for the proposed projects.

CHAPTER TWO: PROJECT DESCRIPTION

2.1 Transmission Line Route

The Proposed Transmission Line commences at proposed substation in Loiyangalani, Marsabit County. It runs across Chalbi desert and Terminates at a proposed substation in Hula Hula. The line traverses through on two locations namely Hula Hula and Kargi both in Laisamis Sub-county. Figure 2.1 below shows the proposed transmission line route.

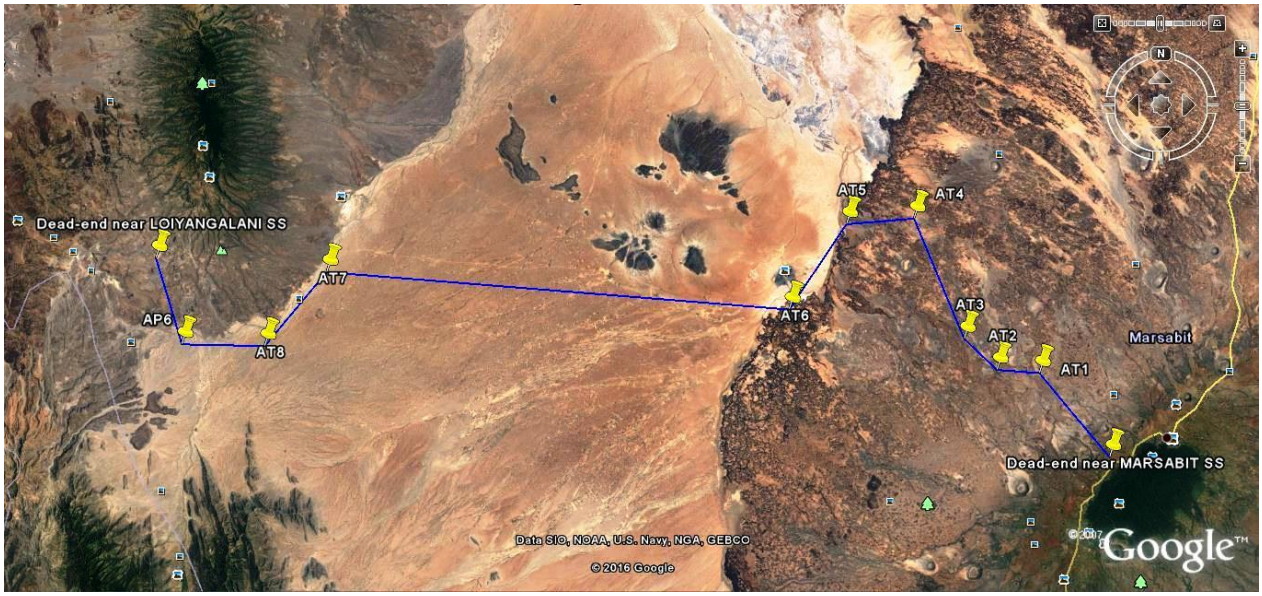

Figure 2.1: Proposed Transmission Line Route.

2.2 Project Area

The proposed Loiyangalani-Marsabit 400kV Power Transmission line covering 150km, will serve the greater Marsabit and beyond. The proposed substation in Loiyangalani is near the Lake Turkana Wind farm.

The information on the project setting below is based on observations made during field surveys:

The proposed line starts at Loiyangalani and heads to Hulahula in Marsabit where a substation will be set up on the outskirts of Marsabit town. The section has very few settlements that include manyatta settlements which rely on pastoralist activities and is characterized by abandoned manyatta settlements as the owners are nomadic pastoralist hence, move in search of green pastures for their livestock.

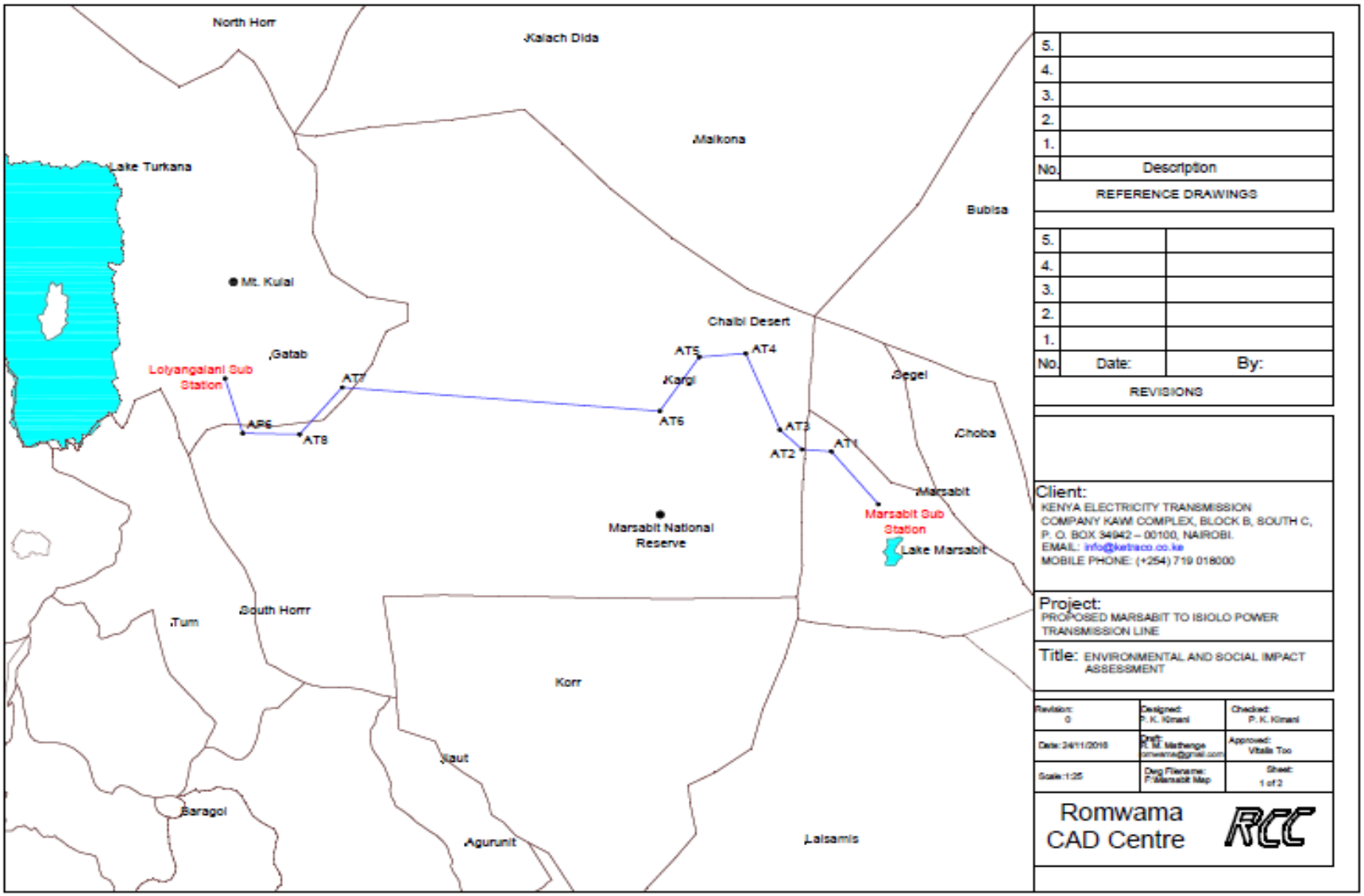

Figure 2.2: Map of the proposed Line route design

The vegetation along where the proposed power transmission line passes through can be described in four categories: woodland, dwarf shrub bush land, shrub land and thickets. Woodland can only develop with subsidiary water supply along channels and permanent rivers. The bush land is characterized by *Acacia tortilisis*, *Commiphora africana*, Grewia species and dwarf shrubs such as *Lippia carviodora* and *Vernonia cinerascens*.

The line passes the foot of Mt. Kulal where a sub-station will be constructed through Kargi location to Hulahula location where another substation will be constructed to step down the high voltage power.

Figure 2.3: Housing and Vegetation Cover in the Project Area

2.3 Project Activities

The proposed projects' activities can generally be divided into four stages, namely: preconstruction/project design; construction; operation; and eventual decommissioning of the transmission line as described below.

2.3.1 Pre-construction/Project Design

KETRACO is currently applying for various permits and licenses necessary for the construction of the proposed transmission line. The procurement of the various goods and services and contracting of the construction firm and other consultants will begin after the completion of the ESIA process and obtaining the license

2.3.2 Construction

The construction of the transmissions line will require the creation of some temporary access roads to the construction sites. The construction will require some localised vegetation clearance. Materials arising from ground excavation will either be spread in appropriate areas surrounding the line or removed to another site as agreed.

2.3.3 Operation

Once constructed, the transmission line will require minimal maintenance which may entail occasional bush clearing and repair of damaged pylons and conductors. After a period of many years, the entire system would need a detailed survey and overhaul. There may be a requirement for occasional visits to ensure nothing goes wrong. Access rights may need to be retained to allow for maintenance works in the future.

2.3.4 Decommissioning

The transmission line is likely to remain in place for many years and therefore any decommissioning works would be a long time in the future. The transmission line would be dismantled and removed and materials recycled/re-used as far as possible. Any areas disturbed would be restored to pre-project conditions and/or to conditions acceptable to NEMA. Environmental impacts associated with the decommissioning process would be minimised through the implementation of an environmental management plan (ESMP).

CHAPTER THREE: LEGISLATIVE, POLICY AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

Recognizing the importance of natural resources and the environment in general, the Kenya Government has put in place a wide range of legislative, policy and institutional framework to address the major causes of environmental degradation and negative impacts on ecosystem emanating from industrial and economic development programmes. These laws and policies are geared towards mitigating any social and environmental negative impacts that may result from a proposed project. As such, this Section presents various legislations, policies and international agreements to which the proposed transmission line project must comply with at all phases of implementation.

Despite having this legislation in place, there are several environmental challenges in Kenya today. These problems have been aggravated by lack of awareness and inadequate information amongst the public on the consequences of their interaction with the environment. In addition, there is limited local communities' involvement in participatory planning and management of environmental and natural resources. The cardinal environmental problems include:

- Loss of biodiversity,
- Land degradation,
- Poor water management
- Environmental pollution.

3.2 Legislative Framework

3.2.1 The Constitution of Kenya, 2010

The Constitution of Kenya, 2010 provides a detailed framework for dealing with environmental issues. Article 42 of the Constitution states that every person has the right to a clean and healthy environment which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. According to Article 69 of the same Constitution, the State shall:

- 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 of the land area of Kenya

- Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities
- Encourage public participation in the management, protection and conservation of the environment
- Protect genetic resources and biological diversity
- Establish systems of environmental 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 the people of Kenya

The Constitution of Kenya is applicable to this project as every person living in the country is entitled to a clean and health environment and the principle of public participation is a bill of right

3.2.2 Environmental Management & Coordination Act, 1999 (Amended 2015)

The Environmental Management and Coordination Act of 1999, (principle Act) together with the Environmental Management and Coordination (amendment) act of 2015 provides for the establishment of an appropriate legal and institutional framework for the management of the environment. EMCA was established as a framework law and this is due to the fact that so far this is the only single piece of legislation that contains the most comprehensive system of environmental management in the country.

The act establishes an appropriate institutional framework for environmental management in Kenya and for matters connected therewith and incidental hereto.

The act is based on the fact that improved environmental management structures is necessary in order to improve national capacity for the management of the environment and accepts the basic principle that the environment constitutes the foundation of our national, social and cultural advancement.

Section 1-3 of part two of the EMCA Cap 387 underscores the general principles which entitle every Kenyan to a clean and healthy environment. Section forty-three takes cognizance of the traditional interests of local communities customarily resident within or around the subject resource. These sections of the act make environmental monitoring a universal responsibility of every citizen in Kenya.

Part VII, section 68 of the same Act requires operators of projects or undertakings to carry out environmental audits in order to determine level of conformance with statements made during the EIA. The audit report should be submitted to NEMA.

Part VIII section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing mailer, radioactive or any other' pollutants into aquatic environment. Section 73 requires that operators of projects which discharges effluent or other pollutants to submit to NEMA accurate information about the quantity and quality of the effluent. Section 74 requires that all effluent generated from point sources are discharged only into the existing sewerage system upon issuance of prescribed permit from the local authorities.

Section 87 sub-section 1 states that no person shall discharge or dispose off any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person, while section 88 provides for acquiring of a license for generation, transporting or operating waste disposal facility.

According to section 89, any person who, at the commencement of this Act, owns or operates a waste disposal site or plant or generate hazardous waste, shall apply to the NEMA for a license.

Sections 90 through 100 outline more regulations on management of hazardous and toxic substances including oils, chemicals and pesticides.

Section 102 states that subject to provisions of the civil aviation Act, any person who emits noise in excess of the noise emission standards established under this Act commit an offence.

KETRACO carried out an Environmental Impact Assessment (EIA) as per the second schedule of the Environmental Management and Co-ordination Act, 1999, the legislation that governs Environmental Impact Assessment (EIA) studies. This schedule lists the projects required to undergo EIA studies in accordance with section 58 (1-4) of the Act. Electrical infrastructure is covered in part 10 of this schedule and this includes electrical transmission lines. The proposed Loiyangalani-Marsabit 150km, 400kV Transmission Line falls in this category of projects which ESIA is mandatory. The Act provides for the National Environmental Management Authority (NEMA) whose objective and purpose is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the Government in the implementation of all policies relating to the environment.

After the introduction of Environmental Impact Assessment and Audit Regulations, (2003) through Kenya Gazette Supplement No. 56 of 13 June 2003, the submission of environmental reports became mandatory. According to these regulations no proponent shall implement a project likely to have a negative environmental impact

or for which an Environmental Impact Assessment has not been concluded and approved in accordance with these regulation.

The authority (NEMA) has gazetted several regulations aimed at achieving the above mandate. Some of the relevant regulations with respect to the proposed transmission line project are:

1. **Environmental (Impact Assessment) and Audit Regulations, 2003**

These regulations provide for conducting Environmental Impact Assessment and Environmental Audits.

Part 6 of the EMCA (1999) under the Second Schedule provides a list of projects that must undergo screening for EIA. ESIA for the proposed Loiyangalani - Marsabit 150km, 400kV Transmission Line was conducted in accordance with the relevant provisions of these regulations and requirements.

2. **Environmental Management and Co-ordination (Water Quality) Regulations 2006**

The Water Quality Regulations provide for the protection of lakes, rivers, streams, springs, wells, and other water sources. The regulations also stipulate that all industries should refrain from any actions, which may directly or indirectly cause water pollution. All industries are therefore required to refrain from discharging effluent into water bodies. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.

This regulation gives a minimum distance from a water body for which any development may be undertaken. These regulations will apply to the proposed project during the construction and operational phases. Each contractor will be required to ensure that all effluent from construction activities is treated in accordance with the above regulations prior to discharge into the environment.

3. **Environmental Management and Co-ordination (Waste Management) Regulations 2006**

The Waste Management Regulations sets out standards for handling, transportation and disposal of various types of wastes. The regulations stipulate the need for facilities to undertake, in order of preference, waste minimization or cleaner production, waste segregation, recycling or composting.

These regulations provide guidelines on how to store, transport and dispose any wastes generated during the construction and maintenance phases of the transmission

lines. Some of these wastes may fall under the hazardous wastes category and thus require particular disposal arrangements.

The Proponent shall observe the guidelines as set out in the environmental management plan laid out in this report as well as the recommendation provided for mitigation /minimization /avoidance of adverse impacts arising from the Project activities.

4. **Environmental Management and Coordination Controlled Substances Regulations, 2007 (Legal Notice No.73 of 2007)**

The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. This regulation mandates NEMA to monitor the activities of persons handling controlled substances, in consultation with relevant line ministries and departments, to ensure compliance with the set requirements.

Under these regulations, NEMA will be publishing a list of controlled substances and the quantities of all controlled substances imported or exported within a particular. The list will also indicate all persons holding licenses to import or export controlled substances, with their annual permitted allocations.

The regulations stipulate that controlled substances must be clearly labelled with among other words, "Controlled Substance-Not ozone friendly'') to indicate that the substance or product is harmful to the ozone layer. Advertisement of such substances must carry the words, "Warning: Contains chemical materials or substances that deplete or have the potential to deplete the ozone layer."

Producers and/or importers of controlled substances are required to include a material safety data sheet. Persons are prohibited from storing, distributing, transporting or otherwise handling a controlled substance unless the controlled substance is accompanied by a material safety data sheet. Manufacturers, exporters or importers of controlled substances must be licensed by NEMA. Further, any person wishing to dispose of a controlled substance must be authorized by NEMA. The licensee should ensure that the controlled substance is disposed of in an environmentally sound manner. These regulations also apply to any person transporting such controlled substances through Kenya. Such a person is required to obtain a Prior Informed Consent (PIC) permit from NEMA.

5. **Environmental Management and Coordination (Conservation of Biodiversity regulations 2006)**

Kenya has a large diversity of ecological zones and habitats including lowland and mountain forests, wooded and open grasslands, semi-arid scrubland, dry woodlands, and inland aquatic, and coastal and marine ecosystems. In addition, a total of 467 lake and wetland habitats are estimated to cover 2.5% of the territory. In order to

preserve the country's wildlife, about 8% of Kenya's land area is currently under protection.

The country has established numerous goals, as well as general and specific objectives that relate to these issues, among others: environmental policies and legislations; involvement of communities; documentation of national biological resources; sustainable management and conservation of biodiversity; fair and equitable sharing of benefits; technical and scientific cooperation; biodiversity assessment; dissemination of information; institutional and community capacity building; and integration of biodiversity concerns into development planning

The Proponent has commissioned this environmental assessment study and seeks to obtain an EIA License from the Authority (NEMA) in compliance with the Act; the environmental management plan included in this report provides guidelines for the mitigation of potentially adverse impacts on natural resources.

6. Environmental Management and Coordination (Air Quality) Regulations, 2008)

The objective of this regulation is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources, including as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas. The following operations (provided they are not used for disposal of refuse), are exempt from these regulations:

- Back-burning to control or suppress wildfires;
- Firefighting rehearsals or drills conducted by the Fire Service Agencies
- Traditional and cultural burning of savanna grasslands;
- Burning for purposes of public health protection;

The Proponent shall 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 abatement of air pollution.

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

These Regulations determine that no person or activity shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the

environment. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

- Time of the day
- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

These regulations also relate noise to its vibrational effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Any person(s) intending to undertake activities in which noise suspected to be injurious or endangers the comfort, repose, health or safety of others and the environment must make an application to NEMA and acquire a license subject to payment of requisite fees and meeting the license conditions.

Rules 13 and 14 of the regulations define the permissible noise levels for construction sites and are reproduced below. These noise limits will be applicable to the proposed project.

Table 3.1: Permissible Noise Levels during Construction Phase of the Project

Facility		Maximum noise level permitted (Leq) in dB(A)	
		Day	Night
i).	Health facilities, educational institutions, homes for the disabled	60	35
ii).	Residential	60	35
iii).	Areas other than those in (i) and(ii) above	75	65

Time frame: *Day: 6.01 am – 8:00 pm (Leq, 14 hours) Night: 8:01 pm – 6:00 am (Leq, 10 hours)*

Failure to comply with these regulations attracts a fine of KES 350,000 or 18 months jail term or both.

The Proponent shall observe policy and regulatory requirements and will comply with the provisions of the Regulations.

8. Environmental Management and Coordination (Conservation of Biodiversity, Access to Genetic Resources and Benefit Sharing) Regulations 2006

The Conservation of Biodiversity Act Sections 5-9 provides for the protection of endangered species, creation of an inventory, and monitoring of their status, protection of environmentally significant areas, provision of access permits, material transfer agreements and benefit sharing. These regulations will guide the routing of the transmission line citing with a view to avoiding areas of environmental significance and protection of endangered species.

9. **Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations 2006**

The Fossil Fuel Emission Control Regulations provide for acceptable emission standards in Kenya. Section 4 of the regulations states that any internal combustion engine for motor vehicles and generators must comply with the emission standards provided for in the First Schedule of those regulations. Hence anyone who operates such engines whether on the road, street, public highway or any premises, which emits smoke in excess of the emissions standard in the First Schedule, contravenes the regulations and is liable to prosecution. Section 8 provides that any person intending to use any fuel catalysts other than those permitted by the authority to disclose it and seek prior approval.

Establishments (including construction sites and operational sites) that use generators as alternative sources of energy must take account of the regulation on the emission standards.

3.2.3 The Energy Act, 2006

The Energy Act 2006 was enacted to amend and consolidate the laws relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority, and for connected purposes. The Act provides the regulatory framework for the energy sector and, among other things, stresses the need for energy players in general and electrical energy players in particular to adopt environmentally friendly and sustainable practices in power generation, distribution and consumption. It sets standards for proper environmental management in the sector. Section 27 of the Act requires a license for generation, importation, transmission and distribution of electrical energy. Subsection (2) under this Section specifies that permits are required for installation with a generating plant exceeding 1000 kW. Section 30 (1) part (b) of the Act states compliance with the EMCA, 1999 as an important criterion to be considered by the ERC during the registration and supervision of sector players.

Under Section 164 of the Energy Bill, 2015, a person issued with a transmission license should build, maintain and operate an efficient, co-ordinated and economical transmission system. It further requires that the transmission system is operated with

enough capacity to provide network services to persons authorized to connect to the power grid.

The ESIA Study has partly been undertaken in fulfilment of requirements of the Energy Act. This Act is relevant to the project since permit for power transmission will be issued upon receipt of a NEMA license

3.2.4 The Forests Act, 2005

The Forests Act, 2005 provides for the establishment, control and regulation of Forests. The Act created a new semi-autonomous body, the Kenya Forest Service (KFS) and supportive institutions for management and conservation of all types of forests. This Act mandates the KFS to conserve and manage all forests. It also sets out the roles and responsibilities of communities in managing forests. KFS is also responsible for formulating policies regarding the management, conservation and use of all types of forest areas in the country. The Act embraces the concept of participatory forest management and gives particular consideration to formation of forest community associations, which are recognized as partners in management. It enables members of forest communities to enter into partnership with KFS through registered Community Forest Associations. It also allows lease arrangements by interested groups to supplement government efforts in plantation forest.

The Act is important for the line routing where it may touch on forests of any type (not just protected forests). KFS will need to be kept informed of the impact on trees along the transmission line route, particularly at the construction stage.

The Forest Conservation and Management Bill, 2015 was enacted to give effect to Article 69 of the Constitution with regard to forest resources to make provision for the conservation and management of forests. The Kenya Forest Service may recommend acquisition of forest land if the proposed project has been subjected to an independent EIA and public consultations in accordance with the Second Schedule has been undertaken and completed.

Even though the proposed transmission line does not pass through any gazetted forest, the Proponent will enhance conservation efforts in the area by planting indigenous trees to compensate for lost vegetation during construction phase.

3.2.5 The Land Act, 2012 (Revised 2015)

The lands Act was enacted in May 2012 and revised in 2015 to provide for the review, consolidation and rationalization of land laws and to provide a framework for sustainable management and utilization of all categories of land. It provides a legal framework for administration and management of public and private land, leases, charges, compulsory acquisition, easements and related rights.

Section 61 of Kenyan constitution recognizes three classification of land; public, community or private.

- **Public land***:* It includes all un-alienated government land held and occupied by government agencies, territorial sea and sea bed, all public roads whether gazetted or not and any land not classified as private or community land under the Constitution; and any other land declared to be public land by an Act of Parliament.

- **Community land***:* This is all land vested in and held by communities identified on the basis of ethnicity, culture or similar community of interest. Any unregistered community land shall be held in trust by county governments on behalf of the communities.

- **Private land:** This is land which is registered and held by any person under freehold tenure; or land held by any person under leasehold tenure; and any other land declared private land under an Act of Parliament.

The Act is triggered since there are several land tenure systems along the proposed transmission line. The Act provides for compensation for any damage or loss resulting from the entry onto the land.

Section 17 of the Act states that to acquire public land for development, the Proponent shall submit a plan to the Land Commission and that the plan should have considered any conservation, environment or heritage issues relevant to the development. The Proponent should have submitted an EIA in line with EMCA.

The Community Land Bill, 2014 was enacted to provide for the recognition, protection, management and administration of community land. Under Section 10 of the Bill, community land is liable to prompt payment of just compensation upon acquisition by the State for public purposes. Acquisition of the land is made through application to the Community Land Committee. The Committee deliberates the application including consultations with its members then they offer a certificate of occupancy.

The Proponent will commission a RAP study to identify land whether public, community or private that may be affected by the construction of the transmission line. The Proponent shall comply with the provisions of the Act and the Land Bill in acquiring land from the community.

3.2.6 The Agriculture, Fisheries and Food Authority Act, 2013

The Agriculture, Fisheries and Food Authority Act is the principle land use statute covering, among others, soil conservation and general land use. Two major parts of the acts deal with general conservation issues i.e. preservation of soil fertility and prevention or control of soil erosion.

The Agriculture (Basic Land Use) rules issued in 1965 prohibit certain land use practices likely to enhance soil erosion. It prohibits cutting down or destroying vegetation or de-pasturing of livestock on any land of which the slope is 0.35, except if the activity is done within the conditions sanctioned by an Agricultural officer.

The rules stipulate strict regulation on the cultivation of any land whose slope is between 0.12 and 0.35 when the soil is not properly protected from soil erosion.

Watercourse and land abutting on these are also protected under the rules. Cultivation, destruction of soil cutting down of vegetation, or de-pasturing livestock land on land within two metres of a watercourse are permissible only if done with a written consent of an authorized officer. The transmission line will necessitate destruction of agricultural plants during construction. Provisions of this Act need to be followed during that process.

3.2.7 Wildlife Conservation and Management Act 2013

This Act was enacted to consolidate and amend the law relating to the protection, conservation and management of wildlife in Kenya, and for purposes connected therewith and thereto. Section 9 of the Act states that 'the Director of Wildlife Conservation shall, through the officers of the service, control, manage and maintain all national parks'. It also states that within the National Park, the Director may:

- Reserve or set aside any portion of the park as a breeding place for animals or as nurseries for vegetation;
- Authorize the construction of such roads, bridges, airfields, buildings and fences, the provision of such water supplies, and the carrying out of such other works, as may be necessary for the purposes of the park;
- With the approval of the Minister, let sites for the erection of hotels, or other accommodation for the visitors to the park provided that nothing in any document connected with the letting shall be construed as in any manner abridging the overall control of the Park by the Service, or as preventing the Director from giving directions as to the manner in which the premises concerned shall be managed.

Figure 3.1: *Ostrich in the project area*

The proposed transmission Line does not traverses through any National Park but through Group Ranches and Next to a National Park and there will be likelihood of presence of the wildlife. The Kenya Wildlife Service shall approve and give consent for development if need be

3.2.8 The Water Act, 2002

The Water Act, 2002 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, requirement for permits, state schemes and community projects. Part IV of the Act addresses the issues of water supply and sewerage. Specifically, section 5 (4) of the Act states that the national water services strategy shall contain details of:

- Existing water services
- The number and location of persons who are not being provided with basic water supply and basic sewerage
- Plans for the extension of water services to underserved areas
- The time frame for the plan; and
- An investment programme

Part II section 18 of this Act provides for national monitoring and information systems on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority to demand from any person or institution, specified

information, documents, samples or materials on water resources. Under these circumstances unless, specific records may require to be kept by a site operator and the information thereof furnished the authority on demand.

Section 73 of the Act allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. Section 75 and sub-section 1 allows the licensee to construct and maintain drains, sewers and works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

Section 76 states that no person shall discharge any bad effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including payment of rates for the discharge as may be provided under section 77 of the same Act.

Water Act, 2002, Part 4 Section 94 also states that:-

1) No person shall, without authority under this act:

a) Willfully obstruct, interfere with, divert or abstract water from any water course or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or

b) Through or convey, or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to any water resource in such a manner as to cause, or be likely to cause, pollution or the water resource,

2) A person who contravenes this section shall be guilty of an offence.

The proposed projects shall have no adverse impact on the local water supply during operations as there are no requirements for the installation of water supply and sanitation facilities on-site.

Proponent should observe the requirements of the act especially during the construction phase

3.2.9 The Physical Planning Act (Cap 286)

An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes enacted by the Parliament of Kenya Under this Act, no person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33. The local authority concerned shall require the developer to restore the

land on which such development has taken place to its original condition within a period of not more than ninety days. If on the expiry of the ninety days notice given to the developer such restoration has not been affected the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer.

The Proponent shall secure all mandatory approvals and permits as required by the law.

3.2.10 the Occupational Safety and Health Act, 2007

Occupational safety and health Act, 2007 is an act of parliament that provides for safety, health and welfare of workers and all people who are present at workplaces.

Part II of the act provides several duties of occupiers as far as the safety and health of workers is concerned. The following are the obligations of occupier according to this Act:

- The provision and maintenance of plant and systems and procedures of work that are safe and without risks to health.
- Arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
- The provision of necessary information, instruction, training and supervision as is necessary to ensure the safety and health at work of every person employed
- maintenance of any workplace under the occupier's control, in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks to health
- provision and maintenance of a working environment for every person employed that is, safe, without risks to health, and adequate as regards facilities and arrangements for the employee's welfare

Section 9 of the act requires occupiers to establish committees consisting of about twenty people in order to discuss safety and health issues of the workers

Section 11 of the Act requires occupiers to ensure a thorough safety and health audit of workplace to be carried out by a safety health officer on annual basis. The health and safety officer is supposed to write a report and send it to the director place The Occupational Safety and health officer

In Section 13 of the act, employees are required to abide by the safety procedures that have been put in place. Each employee is supposed to wear the protective gear that is provided by the employer. This section also requires employee to be responsible for

safety of fellow employees and report incidences of that could lead to accidents to their supervisor.

This report advices the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost, as a basic guideline for the management of Health and Safety issues in the proposed project.

3.2.11 Public Health Act, 1986 (Revised 2012)

The Public Health Act regulates activities detrimental to human Health. An environmental nuisance is one that causes danger, discomfort or annoyance to the local inhabitants or which is hazardous to human health. Although the Act is primarily concerned with domestic water supplies and sources of water used for human consumption, its regime may be extended to cover rivers, streams, lakes and underground water resources since these are the basic water sources for the majority of Kenya's population.

It also outlines the standards of construction of various facilities of any place. In terms of air pollution thermal plants are said to emit a variety of gases, volatile organic compounds and particulate matter depending on the amount and type of fuel used and method used for burning. It is therefore necessary to monitor the air pollution. The Act prohibits activities (nuisances) that may be injurious to health. The primary purpose of the Act is to secure and maintain public health. It defines nuisances on land and premises and empowers public health authorities to deal with such conditions.

Part IX, section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local.

Authorities to take all lawful, necessary and reasonably practicable measures to maintain areas under their jurisdiction clean, to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health.

On the responsibility of local authorities, Part XI section 129 of the Act states in part "It shall be the duty of every County government to lake 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 purposes...". Section 130 provides for making and imposing regulations by the local 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 17(9)

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

The Proponent shall observe policy and regulatory requirements and implement measures to safeguard public health and safety.

3.2.12 County Government Act 2012

The Act empowers county governments to control or prohibit all businesses, factories and workshops that, by reason of smoke, fumes, chemical gases, dust, smell, noise or vibration or other cause may be a source of danger, discomfort or annoyance to the neighbourhood and to prescribe the conditions subject to which business, factories and workshops shall be carried on.

3.2.13 The Employment Act, 2007

The Act is enacted to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations and federations. Its purpose is to promote sound labour relations through freedom of association, the encouragement of effective collective bargaining and promotion of orderly and expeditious dispute for the protection and promotion of settlement conducive to social justice and economic development for connected purposes. This Act is important since it provides for employer –employee relationship that is important for the activities that would promote management of the environment within the project area.

3.2.14 The Traffic Act Cap 403 of 2013

This Act specifies that motor vehicles use proper fuel. The Traffic regulations promulgated under the Act specifies that every vehicle is required to be so constructed, maintained and used so as not to emit any smoke or visible vapour. This Act will apply to the project during the construction and operation phases. The Proponent will adhere to the provisions of this Act.

3.2.15 The Penal Code (Cap 63)

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water from public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commit an offence. Section 193 states that any person who, for the purposes of trade or otherwise, makes loud noises or offensive or unwholesome smells in such places and circumstances as to annoy any considerable number of persons in the exercise of their common rights commits an offence and is liable to be punished as for a common nuisance.

The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/ minimization/ avoidance of adverse impacts arising from the project activities.

3.2.16 The Valuers Act, 1985 (Cap 532) (Revised 2012)

It is an Act of Parliament to provide for the registration of valuers and for connected purposes. The Act established the Valuers Registration Board, which have the responsibility of regulating the activities and conduct of registered valuers. Section 21 of the Act states that valuation of property shall be performed by registered valuers only.

The project will affect land, structures and vegetation that will need to be valued for compensation. The Proponent will therefore adhere to the provisions of this Act to engage a valuer.

3.2.17 The Work Injury Benefits Act (2007

The Work Injury Benefits Act (2007) provides for compensation to employees for work related injuries and diseases contracted in the course of employment. Section 7 directs all employers to obtain and maintain an insurance policy in respect of any liability that the employer may incur under this Act to any of his employees. Section 10 gives direction on compensation for work related injuries. Part (1) of the Section states that an employee who is involved in an accident resulting in the employee's disablement or death is entitled to compensation. The Proponent will need to observe the provisions of this Act during the course of the project.

3.2.18 The Environment and Land Court Act, 2011

This is an Act of Parliament to give effect to Article 162(2)(b) of the Constitution; to establish disputes relating to the environment and the use and occupation of, and title to, land, and to make provision for its jurisdiction functions and powers, and for connected purposes. All land disputes encountered in the course of the Project will be handled in adherence to this Act.

3.2.19 The National Land Commission Act, 2012

It is an Act of Parliament to make further provision as to the functions and powers of the National Land Commission, qualifications and procedures for appointments to the Commission; to give effect to the objects and principles of devolved government in land management and administration. Section 5 (2) of the Act mandates the National Land Commission to:

i. On behalf of, and with the consent of the national and county governments, alienate public land

ii. Monitor the registration of all rights and interests in land

iii. Ensure that public land and land under the management of designated state agencies are sustainably managed for their intended purpose and for future generations

iv. Develop and maintain an effective land information management system at national and county levels

v. Manage and administer all unregistered trust land and unregistered community land on behalf of the county government

vi. Develop and encourage alternative dispute resolution mechanisms in land dispute handling and management.

The Proponent will therefore consult with the Commission when necessary in all matters of land acquisition.

3.2.20 The HIV and AIDS Prevention and Control Act, 2006

This Act prohibits discrimination in all its forms and subtleties against persons with or persons perceived or suspected of having HIV and AIDS. Without prejudice to the generality of subsection (1), no person shall compel another to undergo an HIV test as a precondition to, or for continued enjoyment of employment. All employees during this project will therefore be treated fairly and in accordance to the provisions of this Act.

3.2.21 The National Gender and Equality Commission Act, 2011

The National Gender and Equality Commission Act, 2011 established the National Gender and Equality Commission (NGEC). The functions of the commission are stipulated in Section 8 of the Act which include, inter alia, promoting gender equality and freedom from discrimination. It inherits the status and powers of its parent Commission (the Kenya National Human Rights and Equality Commission) as outlined in Chapter 15 –Commissions and Independent Offices of the 2010 Constitution, Article 59 of Chapter 4. The NGEC is empowered by Article 252 to initiate investigations based on suspicions or claims of discrimination, and have the authority of a Court to summon a witness in the course of such investigations. The Proponent is therefore advised to refrain from discrimination on ground of gender and equality in the course of this project. Should such matters arise, provisions of this Act should be adhered to.

3.3 Policy Framework

Some of the policies that are likely to be triggered by the proposed transmission line project shall include:

3.3.1 Vision 2030

Kenya aims to be an industrialized country by the year 2030. The Vision 2030 describes three pillars that are crucial for industrialization, they include Economic, Social and Political pillar. Proposed development projects under Vision 2030 will increase demand on Kenya's energy supply. The Kenyan Government is committed to continue institutional reforms in the energy sector including a strong regulatory framework to encourage public-private partnerships that will help generate more energy at a lower cost and increase efficiency in energy consumption.

Environment has to be considered in the development projects in order to achieve sustainable development. The country aims to be a state that has clean secure and sustainable environment by the year 2030. The short term goals are to decrease diseases that are environmentally related and to increase the percentage of forest cover over the entire period. Strategies have been put in place to ensure environmental conservation in order to enhance sustainable economic development. Environmental & Social Impact Assessment (ESIA) entails identifying the actual and probable impacts of projects on the environment and recommending alternative and mitigating measures. The assessment is required at all stages of project development. The main purpose of ESIA is to ensure that both existing and proposed public and private sector development projects are environmentally sustainable.

3.3.2 National Environment Policy, 2013

The National Environmental Policy, 2013 sets out important provisions relating to the management of ecosystems and the sustainable use of natural resources, and recognizes that natural systems are under intense pressure from human activities particularly for critical ecosystems including forests, grasslands and arid and semi-arid lands. Section 5.9.1 of the Policy identifies energy as essential for socio-economic development. The Government has made deliberate efforts to provide power to remote areas in Kenya in order to spur development and improve livelihoods. Energy policies in the Country must ensure a robust and efficient system that is secure and efficient. The Policy has given the following provisions for environmental management of projects in the energy sector:

- Provide a framework for an integrated approach to planning and sustainable management of Kenya's environment and natural resources
- Strengthen the legal and institutional framework for good governance, effective coordination and management of the environment and natural resources

- Ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems, for national economic growth and improved livelihoods

- Promote and support research and capacity development as well as use of innovative environmental management tools such as incentives, disincentives, total economic valuation, indicators of sustainable development, Strategic Environmental Assessments (SEAs), Environmental Impact Assessments (EIAs), Environmental Audits (EA) and Payment for Environmental Services (PES)

- Promote and enhance cooperation, collaboration, synergy, partnerships and participation in the protection, conservation, sustainable management of the environment and natural resources

- Promote domestication, coordination and maximisation of benefit from Strategic Multilateral Environmental Agreements (MEAs)

3.3.3 National Environmental Action Plan (NEAP), 1994 (Revised 2007)

The National Environmental Action Plan provides the framework for implementation of the Environment Policy and realisation of Development Goals and Vision 2030. The integration process involves a multi-sectoral approach in developing a comprehensive framework for environmental management and conservation of natural resources. The main objectives of NEAP are:

- Identifying environmental problems and issues;
- Raising environmental awareness;
- Building national consensus;
- Defining policies, legislation and institutional needs;
- Planning environmental projects.

3.3.4 Environment and Development Policy (Sessional Paper No.6 of 1999)

Environment and Development Policy aims to harmonize environmental and developmental goals for sustainability. Furthermore, it provides comprehensive guidelines and strategies for government action on the environment and development. With regard to wildlife, it re-emphasizes the goals of the Wildlife Policy of 1976 and especially the government's commitment towards involving local communities and other stakeholders in wildlife conservation and management. It also provides mechanisms that allow them to benefit from the resources. The policy advocates for the establishment of zones that allow for the multiple use and management of wildlife.

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government action on the environment and development. With regard to wildlife, it reemphasizes the goals of the Wildlife Policy of 1976 and especially the government's commitment towards involving local communities and other stakeholders in wildlife conservation and management. It also provides mechanisms that allow them to benefit from the resource. The policy advocates for the establishment of zones that allow for the multiple use and management of wildlife.

The paper derives its authority from the World Commission on Environment (The Brundtland Commission of 1987) and The United Nation conference on Environment (The Earth Summit, 1990). The Brundtland Commission recommends sustainable development which is defined as development that meets the needs of today's generation without compromising those of future generations.

The Earth Summit, on the other hand, established a number of international agreements, declarations and commitments. The four cornerstones of the Earth Summit are:

- The Rio declaration on Environment and Development;
- Framework Convention on Climate Change
- Convention on Biological Diversity
- Agenda 21: Agenda 21 is a "comprehensive" blueprint for the global actions to affect transition to sustainable development to which Kenya is a signatory. Twenty-seven principles were outlined in the Agenda 21 document during the United Nations conference for Environment and Development (UNCED) held in June 1992. Those relevant to this project to which Kenya is obligated to follow are outlined below:

- Principle 1 – Human beings are at the centre of sustainable development. They are entitled to a healthy and productive life in harmony with nature.

- Principle 3 – The right to development must be fulfilled to equitably meet developmental and environmental needs of present and future generations (intergenerational equity)

- Principle 10 – Environmental issues are best handled with the participation of all concerned citizens, at the relevant level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in the decision making process.

- Principle 11 – States shall enact effective environmental legislation, environmental standards, management objectives and priorities should reflect the environmental and developmental concepts to which they apply.

- Principle 15 – In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious damage or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation

3.3.5 The National Bio-Diversity Strategy, 2000

The overall objective of the National Bio-diversity Strategy and Action Plan (NBSAP) is to address the national and international undertakings with elaborated upon in Article 6 of the Convention on Biological Diversity (CBD). It is a national framework of action to ensure that the present rate of biodiversity loss is reversed, and the present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve the Kenya's biodiversity: to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biodiversity resources among the stakeholders; and to enhance the technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.

3.3.6 KETRACOs' Environmental, Health and Safety Policy

Kenya Electricity Transmission Company Limited (KETRACO), through their Environmental, Health and Safety Policy is committed to implement and maintain a sound Safety, Health and Environment (SHE) Management System to ensure that SHE concerns are managed in a comprehensive and effective manner. The SHE Management System was prepared with the specific aim of complying with Occupational Safety and Health Act (OSHA), 2007; Environmental Management & Coordination Act, 1999; Energy Regulatory Board's Environment, Health and Safety Policy Framework for the Electric Power sub-sector, 2005; its internal SHE Policy and donor requirements.

It shall be the mandate of the contractor to conduct all its operations in a healthy and safe manner and in Compliance with OSHA, 2007 and other relevant legislations

3.4 Institutional Framework

The EMCA Act established a number of institutions for the management of the environment in Kenya. The Apex is the parent ministry which is currently the ministry of Environment, Water and Natural Resources. Below the ministry is the National Environment Council. These key institutions and government departments are responsible for the environmental protection and natural resource management in Kenya forms the key stakeholders in the project implementation.

3.4.1 Ministry of Environment and Natural Resources

The mandate of the ministry is to monitor, protect, conserve and manage the environment and natural resources through sustainable exploitation for socio-economic development aimed at eradication of poverty, improving living standards and ensuring that a clean environment is sustained now and in the future. The ministry comprises of various divisions at the headquarters and the following parastatals and departments.

- National Environment Management Authority
- Kenya Meteorological Department
- Mines and Geology Department
- Department of Resource Surveys and Remote Sensing (DRSRS)

The functions of the ministry include but not limited to the following:

- Environment and Natural Resources Policy formulation, analysis and review
- Sustainable management of Mineral resources and conservation of environment
- Continuous development of geo-database for integrated natural resources and environmental management systems
- Promote, monitor and coordinate environmental activities and enforce compliance of environmental regulations and guidelines

3.4.2 National Environment Management Authority (NEMA)

National Environment Management Authority (NEMA) is the institution with the legal authority to exercise general supervision and coordination over all matters relating to the environment. It is the principal instrument of the government charged with the implementation of all policies relating to the environment. NEMA's functions are more particularly set out in section 9(2) of the EMCA act, 1999.

According to section 68 of the environmental management and coordination Act (EMCA) 1999, The Authority shall be responsible for carrying out environmental audits on all activities that are likely to have a significant effect on the environment.

Environmental Auditing (EA) is a tool for environmental conservation and has been identified as a key requirement for existing facilities to ensure sustainable operations with respect to environmental resources and socio-economic activities in the neighbourhood of the facilities.

The government has established regulations to facilitate the process on Environmental Impact Assessments and Audits. The regulations are contained in the Kenya Gazette Supplement No. 56, legislative supplement No. 31; legal notice No. 101 of 13th June 2003.

The authority core functions are:

- Coordinating the various environmental management activities being undertaken by the lead agencies
- Promote the integration of environmental considerations into development policies, plans, programmes and projects, with a view to ensuring the proper management and rational utilization of environmental resources, on sustainable yield basis, for the improvement of the quality of human life in Kenya.
- To take stock of the natural resources in Kenya and their utilization and conservation.
- Carry out surveys, which will assist in the proper management and conservation of the environment.
- Advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements.
- Undertake and coordinate research, investigation and surveys, collect, collate and disseminate information on the findings of such research, investigations or surveys.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes for which environmental audit or environmental monitoring must be conducted under this Act.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur e.g. floods, landslides and oil spills.
- Monitor and assess activities, including activities being carried out by relevant lead agencies, in order to ensure that the environment is not degraded by such activities. Management objectives must be adhered to and adequate early warning on impending environmental emergencies is given.

3.4.3 National Environmental Council (NEC)

The National Environment Council established under section 4 of part 3 of the EMCA act consists a board which comprises the Chairman (Minister), PS of the relevant ministry, representatives from public universities, representatives from research institutions, NGO representatives, Director General (Secretary) and such number of

members as may, from time to time, be co-opted by the minister to be members of the council.

3.4.4 The National Environmental Action Plan Committee

The National Environment Action Plan Committee (NEAPC) is established under Section 37 of EMCA. This cross-sectoral committee is responsible inter alia, for the development of a five-year national environment action plan. The national environment action plan shall contain among other aspects analysis of the natural resources of Kenya and their distribution, quantity and various uses. It shall also recommend legal and fiscal incentives for business that incorporate environmental requirements into their planning and operational processes as well set out guidelines for the planning and management of the environment and natural resources. The national environment action plan shall upon adoption by Parliament be binding on all organs of government. Provincial and district environmental committees are also required to develop their own

3.4.5 National Environmental Complaints Committee

The National Environmental Complaints Committee (NECC) is the body charged with the task of investigating complaints or allegations regarding the condition of the environment in Kenya and suspected cases of environmental degradation. The NECC also undertakes public interest litigation on behalf of the citizens in environmental matters. It is composed of seven members appointed by the Cabinet Secretary for Environment and Natural Resources headed by a chairman who is a person qualified to be appointed as a judge of the High Court of Kenya and members nominated by the Attorney-General, the Council of County Governors (Secretary), the Law Society of Kenya and the business community.

3.4.6 Standards and Enforcement Review Committee

The Standards and Enforcement Review Committee (SERC) is a committee of NEMA and is established under Section 70 of EMCA. This is a technical Committee responsible for formulation of environmental standards, methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures. The Permanent Secretary under the Minister is the Chairman of the Standard and Enforcement Review Committee.

The members of the SERC are set out in the third schedule to EMCA. They consist of representatives of various relevant government ministries and parastatals that are Lead Agencies as well as those responsible for matters such as economic planning and national development, finance, labour, public works, law and law enforcement.

3.4.7 National Environmental Tribunal (NET)

The NET is established under Section 125 of EMCA for the purpose of hearing appeals from administrative decisions by organs responsible for enforcement of environmental standards. An appeal may be lodged by a project proponent upon denial of an EIA licence or by a local community upon the grant of an EIA licence to a project proponent. NEMA may also refer any matter that involves a point of law or is of unusual importance or complexity to NET for direction. The proceedings of NET are not as stringent as those in a court of law and NET shall not be bound by the rules of evidence as set out in the Evidence Act. Upon the making of an award, NET's mandate ends there as it does not have the power to enforce its awards. EMCA provides that any person aggrieved by a decision or award of NET may within 30 days appeal to the High Court.

3.4.8 County Environment Committees

Under section 29 (1) of EMCA, the Cabinet Secretary shall by notice in the gazette appoint County Environment Committees of NEMA in respect of every County. These committees assist NEMA in effectively carrying out its function of proper management of the environment at this level. It is instructive to note that the membership of these committees include inter alia representatives of farmers or pastoralists, business community, women and youth.

3.5 International Environmental Policies

International environmental policies have been established to coordinate environmental practices in the world. They are geared towards protecting the environment.

3.5.1 African Development Bank Environmental Guidelines

The Bank has Integrated Environmental and Social Impact Assessment Guidelines and Environmental and Social Assessment Procedures (ESAP). The guidelines integrate environmental and social concerns into the life cycle of a project and also stipulate requirements for specific projects. Built upon the three previous safeguard policies on the Involuntary Resettlement Policy (1995), the Policy on Indigenous Peoples (1998) and the Environment Policy (2002), the Safeguard Policy Statement was approved in 2009. The safeguard policies are operational policies that seek to avoid, minimize or mitigate adverse environmental and social impacts including protecting the rights of those likely to be affected or marginalized by the developmental process. ADB's safeguard policy framework consists of three operational policies on the environment, indigenous peoples and involuntary resettlement.

1. **Environmental Safeguard**

This safeguard is meant to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision making process.

2. Involuntary Resettlement Safeguard

This safeguard has been placed in order to avoid involuntary resettlement whenever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre- project levels; and to improve the standards of living of the displaced poor and other vulnerable groups.

3. Indigenous Peoples Safeguard

This safeguard looks at designing and implementing projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems and cultural uniqueness as defined by the Indigenous Peoples themselves so that they receive culturally appropriate social and economic benefits; do not suffer adverse impacts as a result of projects; and participate actively in projects that affect them.

Under the ESAP, the Borrower is responsible for integrating environmental and social considerations sponsored projects according to the Bank's requirements.

3.5.2 EU Environmental Policy

The European Union has an elaborate policy statement on environmental management covering a wide range of issues. EU-supported projects and programmes worldwide are expected to observe the relevant policy issues. These policy statements also apply to projects/programmes supported by member states of the EU.

3.5.3 Environmental protection policies of China funded development projects

The Ministry of Commerce of the People's Republic of China and Ministry of Environmental Protection of the People's Republic of China issued policies on environmental protection in February 2013 for foreign investment and cooperation. These policies were formulated to regulate environmental protection considerations in foreign investment and cooperation, provide guidance to actively perform social responsibilities of environmental protection, and promote the sustainable development of foreign investment and cooperation by Chinese institutions domestically and abroad. These Guidelines are applicable to all Chinese enterprises engaged in foreign investment and cooperation activities.

The Guidelines for Environmental Protection in Foreign Investment and Cooperation are to:

- Regularize the environment related behaviours of Chinese companies in foreign investment and cooperation activities (Article 1)
- Guide for the performance in social responsibilities for environment protection (Article 1)
- Advocate to respect religious belief, cultural traditions, local customs of the community, safeguard legitimate rights and interest of labours (Article 3)
- Understand and observe host country's provisions of law and regulations related to environment protection. (Article 5)
- Conduct environmental impact assessment, take measures to reduce possible adverse impacts based on impact assessment (Article 8)
- Develop environmental monitoring and evaluation based on the background situation of project surrounding areas (Article 11)
- Formulate contingency plans for environmental accidents and other emergencies and set up reporting and communication system for local government, environmental regulatory authority, general public and company headquarters. (Article 14)
- Post their environmental information on a regular basis, and publish their plans on implementation of laws and regulations on environmental protection, measures taken, and environmental performance achieved (Article 18)
- Establish communication and dialogue mechanism to strengthen their communications with their communities and relevant social groups, take opinions and suggestions with respect to environmental impacts of their construction projects according to requirements of laws and regulations of the host country. (Article 20)
- Encourage enterprises to research and learn from the environment protection related principles, standards and practices adopted by international organizations and multilateral financial institutions. (Article 22)

The proponent shall perform its mandate in the proposed project adhering to the above guidelines.

3.5.4 World Bank Safeguard Policies

This group of Operational Policies have been identified by World Bank management as being particularly important in ensuring that World Bank funded projects do not cause harm to people and the environment. These safeguard policies triggered by the proposed Project are presented in Table 3.1 and discussed below.

Table 3.2: Safeguard policies triggered by the Project

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP 4.01)	[X]	[ ]
Natural Habitats (OP 4.04)	[X]	[ ]
Cultural Property (OP 4.11)	[X]	[ ]
Involuntary Resettlement (OP 4.12)	[X]	[ ]
Indigenous Peoples (OP 4.10)	[ ]	[X]
Forests (OP 4.36)	[ ]	[X]
Safety of Dams (OP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP 7.60)	[ ]	[X]
Projects on International Waterways (OP 7.50)	[ ]	[X]

1. Environmental Assessment (OP 4.01)

The environmental assessment process provides insights to ascertain the applicability of other WB safeguard policies to specific projects. This is especially the case for the policies on natural habitats, pest management, and physical cultural resources that are typically considered within the EA process. The policy describes an environmental assessment (EA) process for the proposed project. The breadth, depth, and type of analysis of the EA process depend on the nature, scale, and potential environmental impact of the proposed project. The policy favours preventive measures over mitigatory or compensatory measures whenever feasible.

The operational principles of the policy require the environmental assessment process to undertake the following:

- Evaluate adequacy of existing legal and institution framework including applicable international environmental agreements. This policy aims to ensure that projects contravening the agreements are not financed.
- Stakeholder consultation before and during project implementation
- Engage service of independent experts to undertake the environmental assessment
- Provide measures to link the environmental process and findings with studies of economics, financial, institutional, social and technical analysis of the proposed project
- Develop programmes for strengthening of institutional capacity in environmental management

The requirements of the policy are similar to those of EMCA which aims to ensure sustainable project implementation. Most of the requirements of this safeguard policy

have been responded to in this report by evaluating the impact of the project, its alternatives, existing legislative framework and public consultation.

2. Natural Habitats (OP 4.04)

This safeguard policy seeks to ensure that Projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Project can damage natural habitats. The erection of the proposed transmission line is likely to interfere with biodiversity at construction phase but measures to ensure minimal interference have been proposed in the ESMP provided. The negative impact of the transmission line on flora and fauna is however limited since as indicated in Section 8.1.4 of this Report, the way leave will be cleared of vegetation manually and as such, the use of herbicides is not envisaged. At construction phase, selective clearance by removing tall woody species leaving samplings for quick regeneration of vegetation along the way leave is recommended. Reseeding degraded areas with local species common in the area at decommissioning phase will improve vegetation degeneration.

3. Involuntary Resettlement (OP 4.12)

This policy was designed to mitigate against impoverishment risks associated with Involuntary Resettlement and the restoration or improvement of income earning capacity of the Project Affected People (PAP). Implementation of the proposed project will cause displacements of people and the Proponent, the Contractor will adhere to the requirements of this policy by commissioning a Resettlement Action Plan (RAP) to identify all Project Affected Persons (PAPs) upon which they will be adequately compensated prior to project implementation.

4. Public Disclosure (OP 17.50)

This policy encourages Public Disclosure or Involvement as a means of improving the planning and implementation process of projects. This procedure gives governmental agencies responsibility of monitoring and managing the environmental and social impacts of development projects particularly those impacting on natural resources and local communities. The policy provides information that ensures that effective public disclosure is carried out by project proponents and their representatives. The BP requires that Public Involvement should be integrated with resettlement and compensation. Monitoring and grievances address mechanism should also be incorporated in the project plan.

The proposed project incorporated public participation and stakeholders' consultation as part of the ESIA study in order to collect the views of the local communities and their leaders for incorporation in the project mitigation plan. The consultation was

successful and the community members gave their views that have been considered in the mitigation plan.

3.6 United Nations Treaties

Kenya subscribes to some of the international laws and agreements on environmental management. As such, the consultant reviewed the following relevant international conventions and treaties which must be complied with during project implementation.

3.6.1 United Nations Convention to Combat Desertification

The objective of the United Nations Convention to Combat Desertification (UNCCD) is to combat desertification and to mitigate the effects of drought in seriously affected countries, especially those in Africa. It seeks to achieve this objective through integrated approaches to development, supported by international cooperation and partnership arrangements, in the affected areas. It lays emphasis on long-term strategies that focus on improved productivity of land and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level. The proposed project will adhere to the requirements of the UNCCD.

3.6.2 Convention on Biological Diversity

The Convention on Biological Diversity adopts a broad approach to conservation. It requires Parties to the Convention to adopt national strategies, plans and programs for the conservation of biological diversity, and to integrate the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies. The proposed project is expected to interfere with biodiversity in the project area during construction phase. Adequate measures have been recommended to conserve biodiversity.

3.6.3 Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals also referred to as Bonn Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. This Convention strive towards strictly protecting migratory species categorized as being in danger of extinction, conserving or restoring the habitats in which they live, mitigating obstacles to migration and controlling other factors that might endanger them.

The wild animals likely to be found in the project area include bird species, baboons, velvet monkeys, Elephants, Wild beasts, snakes, giraffes, zebras, lions and cheetahs.

Even though, these species are not threatened with extinction, it's highly unlikely that construction of the transmission line will lead to interference of wildlife in the area. However, relevant mitigation measures including design of proper height of towers to reduce instances of electrocution and use of noise abatement measures in wildlife sensitive areas have been recommended in this report.

3.6.4 United Nations Framework Convention on Climate Change (UNFCCC)

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets.

Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

The Convention on Climate Change 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.

Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change

The Convention entered into force on 21 March 1994.

CHAPTER FOUR: BASELINE INFORMATION

This chapter presents the environmental characteristics for the bio-physical and socio-economic information for the project area. These main features for this chapter are as follows:

4.1 Socio-Economic Features

4.1.1 Administration

Administratively, the county is divided into four administrative sub counties namely: Marsabit Central, Leisamis, North Horr, and Moyale. Sub-counties are further divided into 20 wards and administrative villages. There are 4 sub-counties and 20 wards.

The proposed transmission line traverses through Leisamis Sub County from Loiyangalani via Kargi location to Hulahula in Saku Constituency

4.1.2 Religion and Local Beliefs

Marsabit County is said to have been named after a Burji farmer called Marsa who came to Marsabit from Ethiopia by colonialists to teach locals how to grow crops.

Marsabit County is populated by various ethnic communities including the Cushitic who comprises of: Gabbra, Rendile, Borana, Burji, El Molo, Somalis, and Waata. Marsabit is also inhabited by the plain Nilotes, Turkana and Samburu communities. Men are traditionally responsible for taking care of animals, while women are tasked with taking care of their children and performing day-to-day chores in the home. The principal ethnic groups of people that are found in the project area are; Rendille, Gabra, Boranas and Burji. Islam, Christianity and other traditionalist religions are some of the main religions practiced in the area.

4.1.3 Population and Demography of Marsabit county

According to the Kenya National census exercise that was carried out in 2009 the population of Marsabit county is approximated to be 291,166 (52% Male and 48% female). The county's projected population was 316,206 people by 2012. The projections are based on annual growth rate of 2.75 %.

The majority of the population in the county is confined between ages 0-24 years; which makes 67.8% of the total population in the county (KNBS 2009). This is an indicator of a growing population and the county therefore expects greater pressure on resources in future if the trend continues.

- Profile of the respondents

The socio – economic survey was done during the month of November 2016 and it covered mainly the people who attended the public *barazas* and also the targeted individuals who would be affected directly by the project. The sampling was done randomly targeting the household heads only.

- Gender

As shown in the figure below, the gender distribution of the respondents was found to be 48% while women were 52%. This is because ladies were attending the public *barazas* freely and willing to be interviewed.

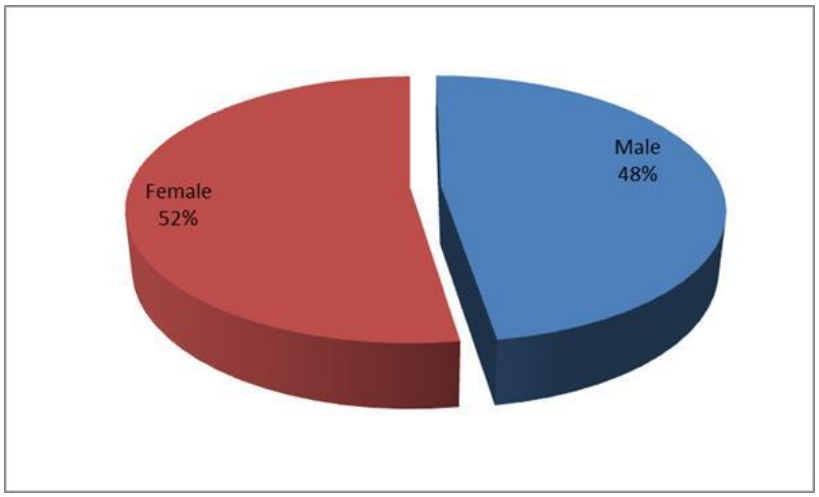


Fig. 4.1. Gender

- Age

As indicated in the figure below, over 50% of respondents fall within the age bracket of over 36 years with majority falling in the age bracket of 26 to 35 years. This is the age which is productive economically.

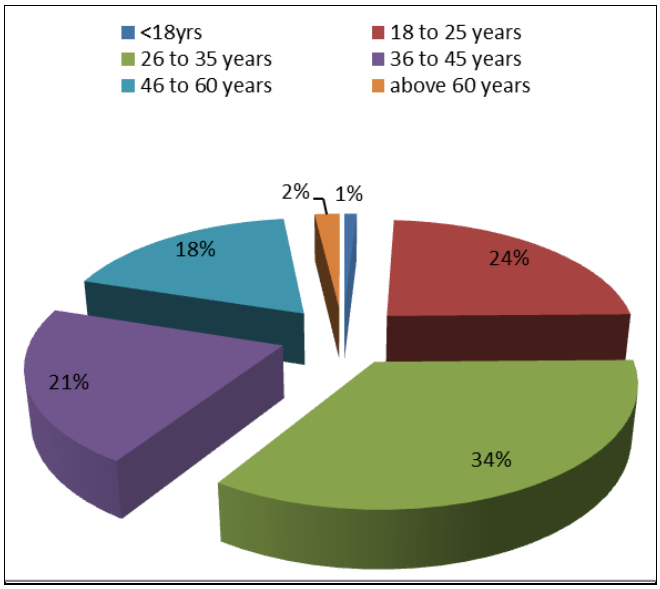


Fig. 4.2.: Age

- Level of education

There are few educational institutions in the project area. They include secondary schools, primary schools, and nurseries. Table below shows majority (60%) of the respondents have never attended any level of school and over 30% had the mid lower level of education at primary and Secondary; while only 2% had university education. This implies that majority of the community members cannot read and write and that the illiteracy level of the community involved is very high.

Table 4.1: Highest Level of Education Attained

Level	Percentage (%)
Primary	19.0%
Secondary	12.0%
Post-Secondary	7.0%
University	2.0%
Never Attended	60.0%

- Marital Status of the Respondent

As indicated in the table below, 85% of the people interviewed were married people who have live in the area for not less than five years hence have enough information of the area. 8% 0f the respondents were widows who have been left behind by their loved ones but still live in the area and depend on livestock for livelihood sources. The 7% who are not married are majorly youths who took part in the survey. This shows that the questionnaire survey covered both the young and old, married and married. Widows (8%) are considered the vulnerable group and needs assistance during compensation and relocation should they be affected by the project directly.

Marital status	Percentage (%)
Married	85.0%
Widowed	8.0%
Divorced	1.0%
Never Married	7.0%

- Household size

Majority of the married respondents (51%) said that their household size consist of 4 to 6 members while 29% said their size is over 7 members. Only 20% had household members who are less than 3.

Household size	Percentages (%)
Less than 3	20.0%
4 to 6	51.0%
7 and Above	29.0%

- Occupation

From the figure below; the occupation of the respondents were found to be 88% livestock keeper; while 7% of those interviewed said that they are both livestock keepers and businesses owners. The communities involved are mainly pastoralists and therefore only a small percent (3%) are doing farming especially in Hulahula location. Only 1% of the respondent depended solely on business and trading as their source of income

Fig. 1.3: Occupation

4.1.4 Education Level

As of 2013, there are 126 primary schools and 16 high schools in Marsabit County. The county has an enrolment of 41,200 where gross enrolment rate is 43 % and 3,131 students respectively.

The county's Teacher to Pupil Ratio is 1: 54 for public primary schools and 1:30 for public high schools. The county has high dropout rate at 43 % in primary schools and 10% in secondary school (Marsabit CIDP 2013-2017).

The county has literacy rate of 27 % and 22 % of the population can read and write respectively despite having 26 % of residents having primary education and 6% have secondary education.

The high rate of literacy is influenced by nomadic way of life, inter-tribal conflicts, and cultural practices such as "*Moranism*" and early marriages.

Socio-economic survey conducted shows that there are several learning institutions around the project area ranging from day care, nursery, primary, secondary and colleges.

4.1.5. Livelihood activities and sources income

A person's livelihood refers to their "means of securing the basic necessities -food, water, shelter and clothing- of life". Livelihood is defined as a set of activities involving securing water, food, fodder, medicine, shelter, clothing and the capacity to acquire above necessities working either individually or as a group by using endowments (both human and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity. The activities are usually carried out repeatedly. Livelihoods in the proposed project area were captured through data obtained through questionnaires, the transect walks, interviewing of the villagers and field visits.

Livestock keeping, business/investment and a little bit of farming activities are the most important livelihood strategies in the project area. Livestock keeping is the predominant economic activity in the area in terms of employment, food security, income generation and overall contribution to the socio-economic wellbeing of the people. The livestock kept in the area include; camels, cattle, goats and sheep

The income of the PAPs varied from household to household due to the different economic activity they were involved in. Majority (85%) of the household reported to earn less than Ksh.10, 000 per month as the most predominant amount while 11% earn between Ksh.10,000 to 20,000 per month. Male headed households showed to be earning more income than the female headed households in the project area.

Income (shs)	Percentages (%)
Less than 10,000	85.0%
10,001 to 20,000	11.0%
20,001 to 30,000	4.0%

4.1.6. Access of public services water

Household water in the proposed project areas is largely taken from boreholes and which is salty water. The PAPs indicated high numbers of water borne diseases such as typhoid and cholera due to contamination of the water sources. It was also recorded that all the households in the project utilize pit latrines.

4.1.7. Energy Sources

92% 0f the respondents use firewood and 8% use charcoal as a source of energy for cooking. Firewood is the most common cooking fuel by gender at 90% in male headed households and 91% in female headed households.

1% of respondents confessed that they use electricity power as a source of lightening. This is because the area is not connected to power especially in Kargi, Bagasi and Kambinye areas. The one percent that has power connection was mainly from Hulahula location which is near Marsabit town. A further 24% use lanterns, 60% use

tin lamps and 16% use fuel wood.

4.1.8. Health Care Services

During the survey and field visits there were visible health care facilities within the project area, though some of the residents have to travel some distance to access government hospitals and health centers. Most the respondents interviewed preferred to get medication in the nearby clinics. The most prevalent illnesses are malaria and typhoid especially among the children than adults.

4.2 Environmental Features

4.2.1 Climate

Most parts of the county are arid, with the exception of high potential areas around Mt. Marsabit such as Kulal, Hurri Hills and the Moyale-Sololo escarpment. The county experiences extreme temperatures ranging from a minimum of 10.10 C to a maximum of 30.2o C, with an annual average of 20.10 C. Rainfall ranges between 200mm and 1,000mm per annum and its duration, amount and reliability increases with increase in altitude. North Horr (550m) has a mean annual rainfall of 150mm; Mt. Marsabit and Mt. Kulal 800mm while Moyale receives a mean annual rainfall of 700mm.

Marsabit County lies at the border of Ethiopia and Kenya. Most of the county is mainly low-lying at 400 and 700 masl.

Land-use in the county is mainly livestock rearing and nomadic pastoralism is the major way of life. The area is interspersed with several mountain ranges and hills including the Ndoto Mountains (2660 m) to the west, and Marsabit Mountain (1545 m) within Marsabit Town. The county is home to the Burji, Boran, Ariaal and Rendille communities who are mainly traders, pastoralists and also carry out some irrigation farming.

The soil distribution is influenced by intensive variation in relief, climate, past volcanic activities and the underlying rocks. Marsabit County is arid with low and unreliable rainfall ranging between 75 and 400 mm annually.

The average temperatures range between 26 and 32°C. These temperatures are higher within the Chalbi Desert. The desert is rocky and devoid of vegetation, except for few scattered Acacia species. It has a mean annual rainfall of 200 mm in the lowlands and 800 mm in the highlands.

Monthly maximum and minimum wind speeds of 23.8Kph and 17.4Kph are normally experience in August and December respectively. Mean monthly value is 20.366Kph.

Impact on Project

The climate in the project areas as described above is not expected to create adverse impacts during the construction phase, or on the performance of the project upon commissioning.

4.2.2 Soils and Geology

Most predominant geological formation in the county is volcanic rocks. They extend both westward and eastward from the eastern part of the Rift Valley to Ethiopia border. These volcanic rocks are interrupted in a few areas by pockets of quaternary sediments and Mozambique belt. Other geological formations are associated with the old lake beds of Lake Turkana and Lake Chalbi. The south western and north eastern parts of the county are underlain by old, metamorphic rock of pre-Cambrian origin. These are covered by tertiary and Pleistocene sheets and cones of volcanic rock in the Central and North Eastern parts, especially in and around the central volcanic centres of Mt. Kulal, Hurri Hills and Mt. Marsabit

The South Western plains are covered by quaternary sediments washed out from the higher areas in more recent geological times. Between the hills of Mt. Marsabit, Mt. Kulal, Hurri Hills, the bed of the seasonal Lake Chalbi is also covered by recent sediments. The rest of the county is covered by rocky, stony and rugged lava plains with poor soil development. Some of these soils in the western part of the district have acidic moisture and are saline as in Chalbi Desert.

The area below 700m above sea level is a low potential range land and forms about 75 per cent of the total land area. As a result of low, unreliable rainfall and high rates of evaporation, the soils are shallow and poor. The areas at the foot of the mountains comprise of Moyale-Sololo escarpment, the slopes of the Hurri Hills, the lower slopes of Mt. Marsabit and the middle slope of Mt. Kulal. It also includes the plains of Dida Galgallu, Bure Dera, Kaisut and Milgis. These areas receive moderate rainfall of about 700mm annually. Livestock and crop production are the major economic activities with maize, sorghum, millet, beans, fruits and vegetables being the main crops.

4.2.3 Hydrology

Occurrence of surface water is very rare in the project area. Only after heavy rains, shallow pools and seasonal water courses may be filled with water for a few and probably up to a maximum of a few weeks. The drainage ways in the project area are dry river beds referred to as laggas. These drainage ways have bouldery and stony riverbeds. Many laggas in the project area seem to be too wide for the existing climatic conditions. They have wide beds with braided characteristics and changing stream channels. Sometimes, once in every 5 to 10 years, the laggas are filled up completely. There are a variety of sources of water for the population and livestock

in the project area. They consist of permanent springs, boreholes and waterholes dug in the riverbeds. Permanent surface water is found on the top of Mt. Kulal but this source of water is outside the project area.

4.2.4 Water Quality

In the project area where water scarcity is very high, the importance of the quality of available water supplies cannot be overstated. Even of greater significance is the fact that the lake water is used by a section of local community for domestic purposes and for watering of livestock. Indeed the El Molo and the Turkana already attribute some of their health problems to the use of water from Lake Turkana.

4.2.5 Biodiversity

a) Flora

Most of the project area is covered by deciduous dwarf shrubland. There are also large areas of barren land where vegetation is very scarce. The common plant species of the project area include shrubs such as *Indigofera spinosa*, *Duosperma eremophilum*, *Sericocomopsis hildebrandtii*, *Acacia reficiens*, *Acacia mellifera* and *Commiphora africana.* The most prominent tree of the project area is the *Acacia tortilis* which is found along the laggas and along the drainage areas. Occasionally *Delonix alata* is also found along the laggas. Around Loiyangalani area where there are water springs, *Hyphaene compressa* is well established. Annual grasses are common especially during the rainy season. They include *Aristida mutabilis*, *Aristida adscensionis* and the species of *Eneopogon* and *Cencrus*. Although the vegetation is scarce, plants play an important role in the life of pastoralists of the project area. They provide firewood, materials for the construction of the houses and livestock enclosures and feed for livestock including camels, sheep and goats. The plants found in this area are also valued for edible and medicinal products and as a valuable source of fibre for rope making and gum. Uses of some common plants in the project area are outlined below as follows:

Acacia reficiens is relatively unpalatable but is the main source wood for pastoralist communities.

- The foliage of *Acacia tortilis* and *Acacia mellifera* is browsed by camels and goats while the fallen leaves and flowers are eaten by sheep.
- The fruits of *Acacia tortilis* are eaten by all livestock species.
- *Salvadora persica*, *Cordia sinensis*, *Sericocomopsis hildebrandtii*, *Indigofera spinosa* and *Acacia senegal* provide browse for livestock ;
- Thorny trees such as *Acacia* and some *Commiphora* are lopped to provide boma materials.

- Soft-timber trees such as *Delonix*, *Commiphora* and E*rythrina* are used for making milk pots, bowls, stools and drinking troughs.

The vegetation of the project area is currently under great pressure of exploitation. Based on discussions with members of local community, human and livestock population of the project area has been growing steadily in recent years. This is mainly due to increased insecurity brought about by conflicts among certain ethnic groups in the area and subsequent increased settlements close to Kargi centre where adequate security is available. This trend is currently causing high demand for fuel wood and building materials. As the human and livestock pressure increases, there is sharp increase in over harvesting of plant materials further away from Kargi. The increased resource utilization and degradation has brought about dwindling vegetation cover and encroachment of desertification related phenomenon.

b) Fauna

The project area suffers from paucity of wildlife. This is mainly due to increasing population with subsequent increase in poaching activities especially for the big game. For example, Elephants *(Loxodonta africana)* and black rhinoceroses *(Diceros bicornis)* were once plentiful on the lower slopes of Mt. Kulal until 1976 but have now been exterminated by poaching. Other wildlife species including Greater kudu *(Tragelaphus strepsiceros)* Oryx *(Oryx beisa)*, *G*erenuk *(Litocranius walleri)*, Grant's gazelle *(Gazella granti)*, *G*iraffe *(Giraffa camelopardalis) and* Grevy's zebra *(Equus grevyi)* occurred on the middle and upper slopes of Mt. Kulal. The last buffaloes *(Syncerus caffer)*, which lived in the higher levels of the montane forest, were seen in 1976 and the species is apparently extinct on Mt. Kulal now.

During the field study, we were only able to see an occasional dikdik and hare within the project area. However, the team saw gerenuk, stripped hyaena, jackal and ostrich between the project area (Loiyangalani) and Marsabit (outside the project area). The exceptionally low densities of wildlife especially the mega fauna within the project area is attributed to poaching and intense competition between the wildlife and livestock.

4.3 Environmental Degradation

Both natural and human induced environmental degradation is currently taking place in the project area.

4.3.1 Natural Degradation

The project area has undergone tremendous natural degradation in form of erosion. Erosional processes including gully, rill and stream bank erosion are common in the project area. In addition, erosional processes by strong winds (Aeolian) in the project area are quite rampant.

- Rill erosion – Rill erosion is common all over the project area. The process of rill erosion becomes more serious where natural vegetation has been damaged. In such cases, small rills resulting from splash and rill wash erosion may join and form the beginning of somewhat deeper rill.

- Stream bank erosion – Fluvial processes are limited to riverbeds especially the laggas in the project area. A decrease in vegetation cover increases runoff and the amount of eroded materials especially during heavy rains. This has a net effect of enhancing stream bank erosion. During heavy floods the riverbeds often change their courses.

- Wind (Aeolian) erosion – Due to the strong winds prevailing in the area, aeolian processes are common. Presence of aeolian erosion in the project area is an indicator of overgrazing and desertification.

4.3.2 Human induced degradation

Although the above erosional processes are basically natural, the inhabitants of the project area have enhanced degradation in this area. The cutting of trees and shrubs by the pastoralists for construction of houses and for fuel is a major cause of degradation in the area. In addition, overstocking of the fragile area causes unbalanced use of vegetation by livestock thus causing overgrazing and degradation of the environment of the project area. Around Kargi, trees such as Acacia tortilis, Salvadora persica and Hyphaene compressa are under tremendous pressure of exploitation for building materials.

In addition, the area is now being polluted with heterogeneous solid wastes, including paper, plastic ware, metallic cans, pieces of textiles, broken bottles, bottle tops and other forms of solid wastes.

In addition, this area and areas surrounding manyattas are polluted with material of faecal origin. An interesting development in the project area is the introduction of an alien invasive species commonly referred to as prosopsis (*Juliflora prosopsis*). This plant is currently spreading and has already covered substantial areas in Kargi centre. If no steps are taken to eradicate it, prosopsis may turn out to be an environmental and health hazard.

In other areas, the plant has established and colonises large areas to the exclusion of indigenous plants. It has been reported that livestock at times die upon feeding on the pods and wounds inflicted by the thorns are difficult to heal.

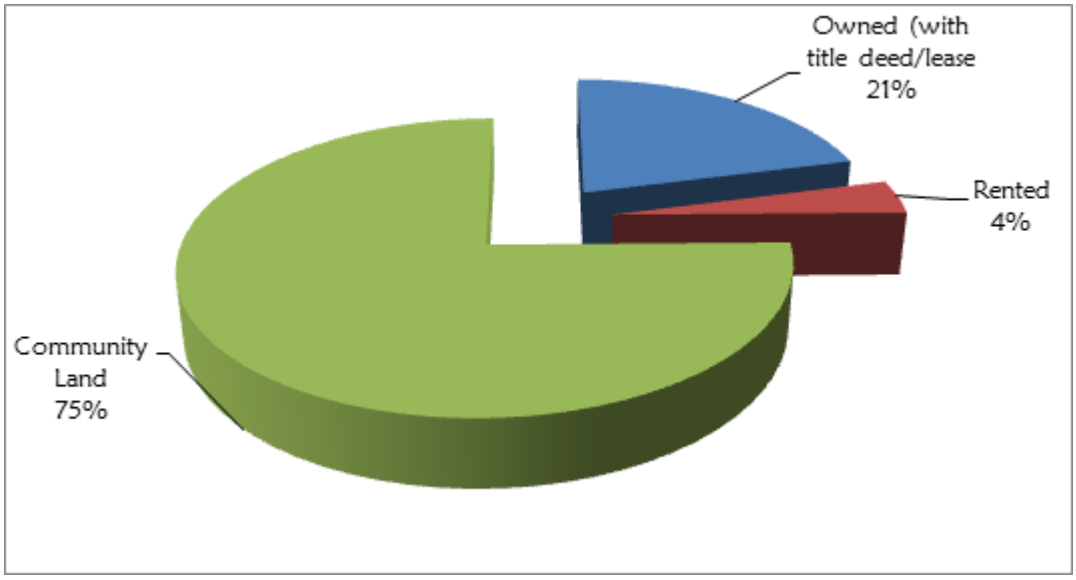
Figure 4.1: Section of Chalbi Desert

4.3.3 Biological Environment

The biological environment of the project area encompasses the biodiversity of this arid area. The most prominent biodiversity components of the project area are the terrestrial flora and fauna

4.4. Land tenure

Land ownership in the area is classified either as communal land or privately owned land. During the survey, it was revealed that in the project area land ownership is majorly (75% of respondents) communal land influencing the current settlement trends. The landownership issues in the area will be addressed in detail under the RAP process on a separate report.



CHAPTER FIVE: ANALYSIS OF PROJECT ALTERNATIVES

5.1 Introduction

Several alternatives were considered to ensure that the most feasible option of project development was adopted. The project alternatives considered include the following:

5.2 The "No Action" Alternative

The "No Action" alternative is often defined by the baseline information and is crucial in the assessment of impact because other alternatives are weighed with reference to it.

Qualitative analysis indicates that there will be no significant negative effect on either the bio-physical or the socio-cultural environment of the proposed project. Without the project, we cannot say the environmental situation will either improve nor can we say that it will necessarily deteriorate.

The "No Action" Alternative is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The proponent will not benefit from the revenue expected from the facility
- The government kitty will not benefit from the revenue to be earned due to the establishment of the proposed project
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
- Information flow and public education awareness through electronic media, especially the television will be hampered
- The economic status of the Kenyans and the local people would remain unchanged
- The local skills would remain under utilized

5.3 Line Routing Alternatives

In proposing the above concept, consideration was given to social and environmental impacts of the projects. The numbers of transmission lines have been limited to those that are technically required whilst complying with KETRACO's planning criteria.

The concept developed largely avoids built up areas, thus minimising the need for land acquisition and resettlement. The Loiyangalani - Marsabit line route in itself has

been chosen to avoid settlements and their associated infrastructure as well as tourist areas. The proposed route avoids settlements, heritage and forest areas, thus minimising any adverse impacts.

However, the line may need re-routing or change in design in some sections since it may cause adverse impacts. **The main critical section is where the line intersects the proposed Kenya – Ethiopia 500HDC Transmission line.**

CHAPTER SIX: CONSULTATIONS AND PUBLIC PARTICIPATION

6.1 Introduction

The EMCA 1999 and IFC Performance Standards call for effective stakeholder participation and public in the EIA process, this case an ESIA study. This chapter describes the Stakeholder Engagement Exercise (also known as Public Consultation and Participation) that was carried out for the proposed Loiyangalani - Marsabit 400KV power transmission line.

This chapter summarizes the findings of the consultations with the key stakeholders

6.2 Public Consultation Framework Adopted

Stakeholder engagement is a key part of this ESIA study process. One of the key aims of the stakeholder engagement exercise is to ensure all relevant stakeholders are provided with the opportunity to express their concerns and opinions, which are incorporated as early as possible in the project development: at planning, implementation and operation phase and in the effect minimize the potential unexpected opposition of the proposed project and potential adverse effects to the environment. It is also very beneficial in incorporating the views of the public into the design process for the adoption of the best workable models and systems. The stakeholder engagement exercise also provides NEMA with the necessary information to assist it in making an informed decision about the Project.

6.2.1 Public Consultation and Participation/Stakeholder Engagement Objective

The main objective of the exercise was to inform stakeholders about the project and its likely effects, which in turn would incorporate their inputs, views and concerns, and thus enable their views to be taken into account during the decision-making. The specific objectives of the consultations were geared towards:-

- Obtaining local and traditional knowledge that may be useful to decision making including Indigenous Knowledge Systems (IKS)
- Facilitating consideration of alternatives, mitigation measures and trade-offs (if any)
- Ensuring that important impacts are not overlooked and benefits are maximized
- Reducing chances of conflict through early identification of contentious issues
- Providing an opportunity for stakeholders to influence the Project design and operational plan in a positive manner
- Improving transparency and accountability of decision making
- Increasing public confidence in the ESIA process

6.2.2 Standards and Guidance on Stakeholder Engagement

a) National Legislative Requirements

Under the laws of Kenya several statutes require the participation of stakeholders in projects especially where the projects are likely to affect stakeholder livelihoods directly or indirectly.

Pertinent legislation includes:

- The Constitution of Kenya of 2010
- The Environmental Management and Coordination Act (EMCA) of 1999
- The Environmental (Impact Assessment and Audit) Regulations of 2003
- The Occupational Safety and Health Act of 2007

b) International Standards and guidance

International Finance Corporation (IFC) policies, standards, and guidelines are generally considered to represent international best practice in this arena, including those on project consultation and disclosure. These include:-

- IFC Performance Standard 1: Assessment and Management of Environmental and Social
- Risks and Impacts, 2012
- IFC's Access to Information Policy (AIP), 2012
- AFDB Handbook on Stakeholder Consultation and Participation

6.3 Stakeholder Engagement Exercise

The stakeholder engagement exercise was undertaken in the following steps:

- Stakeholder identification and analysis to establish the level and mode of engagement per stakeholder group
- Stakeholder engagement through the use of appropriate tools and methods

6.3.1 Stakeholder identification and analysis

The first step in the process of public participation process was stakeholder identification. The main aim was to determine all organizations and individuals who may be directly or indirectly (positively or negatively) affected by the proposed project. In the end, the stakeholders were grouped into two main categories depending on their various needs, interest, and potential influence to the project. These included:

Primary Stakeholders - The directly affected by the project. These included: - The local leaders and Local Communities along where the power line will pass through

Secondary Stakeholders - The indirectly affected by the project but influence development through project implementation. These included: -

- National Government
- County Government

6.3.2 Tools and Methods of Engagement

I. Tools of Engagement

a) Guides

Guides were developed and used in the engagement of the key stakeholders; these guides have been appended in ***section 12.1 and 12.2*** of this report

b) Public participation and consultation meeting registers

The registers were used to record all individuals who attended and participated in the exercise

c) Observation

d) Photography

II. Methods for stakeholder engagement

The following methods were used in the stakeholder engagement exercise:

a) One-on-one interviews

The one-on- one interviews were applied in all the officials meetings and also in administering of the household socio-economic questionnaires. Interviews were conducted in participants' language of choice. In most instances, the local communities were interviewed using their local language while for the officials, they chose between Kiswahili and English depending on the language they were comfortable with. Stakeholders were given a brief of the project and the objectives before they gave their opinions.

Key stakeholders who were interviewed with this project comprised individuals from all levels (local community levels, national government, and county government level). These individuals included:

- Local community members administered with the household Socio-economic questionnaires. This consisted of an average of 20 per location for 3 locations.
- National Government
- County Government

b) Community Meetings (Barazas)

Baraza meetings were held with community members around the project area. The community Baraza meetings targeted the local residents from locations within the project area. These meetings were held in the following areas:

- Hulahula
- Kambinye
- Kargi shopping centre
- Bagasi

In all the meetings, there was a brief of the project given by the ESIA experts to aid in the understanding of the project and enable community members to raise their concerns and comments. Those with concerns commented and contributed issues of concern in-person. This feedback was recorded and reflected back in the minutes to ensure accuracy. Minutes of all meetings and pictorial evidence are appended in this report

Figure 6.1: Public consultation and participation meeting held at Kargi baraza park

Figure 6.2: Kambinye residents registering themselves after a public consultation and participation meeting

6.4 Outcome of the Stakeholders Engagement

6.4.1 Background

From the field work, it was apparent that the majority of the stakeholders were not aware of the proposed project, therefore the consultants explained to the public and relevant stakeholders that the proposed development would involve construction of a 400kV transmission line from Loiyangalani to Marsabit and also responded to the queries that the public sought to know about the project. The proposed project was nevertheless received with mixed reactions by the community as they anticipated numerous impacts (both negative and positive). The local communities and major stakeholders independently gave their views, opinions, and suggestions in their best interest, bringing out the factors that affected the circumstances, influences, and conditions under which their organizations exist. However, all the environmental and social issues which were raised can be adequately mitigated exhaustively as explained in chapter eight of this report. Other issues surrounding the project were successfully settled during the public meetings since ESIA team responded to the issues which were unclear to the public. The consultant particularly gave close attention to persons within the proposed way leave corridor. The views of these stakeholders were considered and their names, identification numbers and contacts were taken for future references as required by NEMA. (See appendix for the list of participants in the Consultation and Public Participation).

6.4.2 Issues Raised

Interviews with the Key informants were carried out on 14th to 18th November 2016 through administering well-structured questionnaires. Comprehensive public participation meetings were held on 25th November 2016 with various Administrative leaders, community leaders and the residents who are likely to be affected by the project along the way leaves trace. The views of these stakeholders were captured and minutes of the meetings taken and attached in the appendices.

The views/ concerns of the stakeholders present were noted and their identification and contact details taken as required by NEMA. The meetings minutes and lists of attendance are attached in the Appendices.

a) Positive Issues

The following is a summary of the views of the stakeholders interviewed:

(i) The project is good for the development of the country since it will boost power supply and improve on industrial development, and should therefore be undertaken.

(ii) The project will improve businesses in the area and also create job opportunities to the local Youth during construction phase.

(iii) The project will enhance Security due to lighting in the neighbourhood at night.

(iv) Attraction of innovation and invention leading to new investments due to adequate power access which will promote the local and national economy.

b) Negative Issues

Some of the stakeholders had a few reservations about the project and raised the following concerns:

(i) The project may lead to displacement of the residents.

(ii) Resettlement of residents may interfere enormously with their livelihoods.

(iii) There would be increased pollution from transport vehicles during construction.

(iv) There would be electromagnetic radiations and risk of electrocution that may affect those residing near the way leave.

(v) There would be possibility of insecurity in the areas due to the influx of other people during construction phase.

(vi) The project will lead to cutting down of trees which are very important in some areas that are very arid and semi-arid such as in Marsabit.

(vii) There would be loss of land and property since residents may be required to relocate.

(viii) Some community members were wary of the presence of the high-voltage wires in their immediate environment, especially risks of Leukemia

6.4.3 Key Stakeholders' Suggestions.

The following suggestions were raised during the consultations:

(i) KETRACO in partnership with KPLC should provide stepped-down voltage power to the residents along the proposed line for domestic use.

(ii) Compensation of land should be done with consideration of the current economic situation

(iii) The proponent should ensure that trees are not cut down unnecessarily and those that will be felled should be replaced elsewhere.

(iv) The proponent should assist the local communities in other projects since they will not directly benefit from the project e.g. construction of classrooms for schools, assist students from the villages to attend secondary schools, drill borehole for villages, assist in control of HIV/AIDS, etc.

(v) The Proponent should ensure proper environmental management practices are put in place.
(vi) The proponent should consider employing casual workers from the local areas during construction phase of the project.
(vii) Noise pollution should be controlled.
(viii) The affected residents should be given ample notice to move and be compensated before relocating.
(ix) The proponent should put up security lights in the project area to assist in lighting the neighbourhoods.
(x) In regard to the risk of leukemia, the team leader explained that research does not show to be true and hence these are at present only perceived risks that cannot be quantified empirically

During the survey findings, the minority of the community members indicated that they had prior information about the project while the majority did not have any information. However, all the community members supported the implementation of the project.

In the Appendix of this report, it outlines the summary of the outcome of the stakeholder engagement.

CHAPTER SEVEN: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

7.1 Introduction

The following section presents in detail the environmental and social impacts that are expected to arise from the implementation of the proposed Loiyangalani-Marsabit 150km, 400kV Transmission Line. The environmental and social impacts are anticipated to vary in magnitude, extent, location, timing and duration. They will occur in the different stages of the project i.e. the design phase, construction, operation and decommissioning phases. Both positive and negative project impacts have been identified through detailed impact predictions methods, key informant interviews and public consultations held at the community level

7.2 Planning and Construction Phase

7.2.1 Positive Impacts

1. Creation of Employment Opportunities

Both skilled and unskilled labour will be required during the construction and maintenance of the 400kV line. Some short-term employment opportunities during the construction phase include: Right of way (ROW) clearance, pit dressing, loading and offloading of construction materials and deliveries, record keeping and provision of security at active sites and temporary campsites and stores. Also, there will be some indirect job opportunities such as catering, kiosks, barber shops, etc., to service the crew.

Long term employment opportunities resulting from the project include maintenance works which may require skilled labour. Some maintenance activities such as clearing of vegetation clearance along the way-leave will still provide seasonal jobs or the community members.

2. Increased economic activity in both the project areas and at the national level

During construction, the workers will need basic amenities such as food, shelter and clothing. They will as well need recreation for time off. All these goods and services will be sourced from providers in the projects are thus increasing the economic activity around the same area.

At the national level, indirect economic gains will be realised too. Construction materials and services locally available will be put into use. These include: materials such cement, sand ballast, reinforcement steel personal protective equipment and services such as transportation of materials and warehousing and logistics.

3. Contribution to Government Revenue

The Government of Kenya currently charges Value Added Tax (VAT) on electricity consumed for both domestic and industrial use. Construction of the 400kV Loiyangalani-Marsabit 150km, 400kV Transmission Line will attract this levy and other charges such as pay as you earn (P.A.Y.E) tax from construction workers, and NEMA licence fee paid by the proponent to NEMA. Consultants and construction companies that will be engaged in the project are subject to local taxes.

4. Improved road infrastructure

Implementation of the proposed project will require a road network to facilitate ferrying of materials and equipment to the construction sites. A favourable road network will allow for easy movement of machinery and delivery of construction material to the sites. The contractor will rehabilitate existing roads and/or create new roads which may end up being used in the long term by the residents.

5. Benefits of Engagement by Both Genders

The proponent encourages involvement of both Women and men in realisation of the proposed project. Local employment opportunities that will be available during the construction phase anticipate generation of income for both women through activities such as providing food for construction crew and the other such activities.

6. Enhancement of the Socio-cultural and Local Leadership Structures

Leadership in most part of the project area is characterized by authority from the area chiefs at the community level. The proposed project could reinforce the authority of the community leaders as most of the residents entrust them with information and property dealings. It is suggested that the proponent utilises them in every undertaking. This will act both ways in ensuring the project runs smoothly and at the same the proponent would be reinforcing the authority of the chiefs as the community observes how they have been involved.

7. Corporate Social Responsibility (CSR) Benefits

The proponent conducts community social responsibility initiatives for the project affected communities. This is done as a way of giving back to the community in any development project. Communities living in the project affected areas may benefit from water projects, bursaries or schools depending on what they would agree with the proponent to be undertaken as a CSR activity.

7.2.2 Negative Impacts

1. Relocation of Project Affected Persons and Property

Locating the transmission line by the proponent and has been done in a way such that it avoids extensive relocation of individuals. However, where it is unavoidable, implementation of the project will lead to displacement of persons, relocation of structures including houses and social amenities and clearance/cutting down of trees and other vegetation. This necessitates compensation and resettlement of the affected persons and property.

2. Impact on Land Use Patterns

The land affected by the transmission line route will lead to displacement of the land owners, clearance of vegetation, restricted agricultural activities, and other social-economic activities that will be hindered.

3. Concerns over Occupational Safety and Health

Excavation, tower erection and conductor stringing may pose hazards to workers at construction sites and locals where safety measures are not put in place. Unmarked excavations pose a risk to livestock, wild animals and children. Poor sanitation and waste disposal at the active sites and camp sites also pose health risks to livestock and the residents living in the project area. The risk of HIV/AIDS exposure may also be increased as a result of sexual engagement between the construction crew and the locals.

4. Impact on Flora and Fauna

The impacts on Flora would be clearance of vegetation on excavation sites. The overhead cables would not affect shrubs and trees but tall trees exceeding a height of 12 feet will have to be cut down. This will lead to environmental degradation.

Impacts on Fauna would be risk to livestock falling into the excavation pits during the construction phase (short term) and bird-flight-patterns being affected in the long run.

5. Loss of crop land

The proposed Transmission Line is located and designed to minimize the impacts on the available crop land. However, there will be a small, permanent loss of some cropland where the pylons would be constructed. Where transmission line traverses agricultural may be temporarily disrupted during the construction phase.

On completion of the transmission line construction, the way-leave will still be available to the PAPs for grazing and for growing crops such as maize, beans, tomatoes, watermelons and sunflower – which do not grow taller than 12 feet.

6. Soil erosion

Soil erosion along the wayleave is expected during the construction phase. Movement of machinery and equipment in the project area will lead to interference of soil

structure hence causing soil erosion that may lead to siltation of water ways. However, these activities can be constrained to the wayleave area to minimise extent of soil erosion

7. Interference with Water Resources and Drainage

Construction works may affect water resources both in the short-term and in the long-term. Earth movements can result in loose soil particles that are consequently carried by surface water into water sources. In addition, oil/fuel spillages from machinery and water used for cleaning cement off machinery may contaminate ground/surface water Moreover, where the transmission line crosses over water resources, relocation of small dams and water pans may be effected to provide room for pylon foundations However, measures should be put into place to ensure, the transmission line construction and operation will not deter access to or use of resources such as water ways, water pans and small dams Water used for cleaning equipment, concrete mixing, sanitation and drinking will be sourced locally thereby increasing the area's water demand

8. Visual and Aesthetic Impacts

The physical presence and profile of the proposed project will alter the visual and aesthetic effects of the surrounding area. In addition, some level of undesired visual impact will arise during the construction of the proposed project. The construction works and completed works will be visible from the project area residents or pastoralists in these areas. However, this effect will be short term and site specific

9. Impacts on Archaeology and Cultural Heritage

There is need to ensure that all the cultural sites are not interfered with, however, some may be affected. These sites should be carefully looked into during the RAP and construction period to ensure that the few cultural/sacred sites within the community areas are preserved.

10. Vehicular and Human Traffic Impacts

Movement of heavy machinery and equipment during the construction phase is expected. These machineries will be used for ferrying workers and materials to the active site while equipment will be used for construction activities at the sites. This may lead to traffic diversions/ congestions in some instances

11. Impacts from Solid and Liquid Wastes

Construction activities will generate both solid and liquid wastes in all phases of the project. These may include: papers, cable drums, oil drums, spilt oil, planks of wood, glass, paints, adhesives, sealants, fasteners, and other domestic wastes. These wastes

are hazardous to people, soil and water within the project area if adequate mitigation measures are not enforced throughout the project.

12. Noise and Vibration Impacts

The construction phase will cause noise and vibration impacts in the short term from moving machinery, row clearing using chain saws, excavation activities and rock breaking. Majority of those that will be affected is mainly workers and immediate neighbours to the transmission line

13. Impacts from Rock Blasting

During construction process, rock blasting to create foundation for the pylons in rocky sections will most likely be necessary. Flying rocks will be a major concern for the blaster. Flying rocks from surface blasting operations can cause serious injury and death to employees and people living within the project area. The process of stone blasting/crushing may be lead to loss of vegetation cover, excessive noise, vibrations and dust. It is a contractual obligation for the contractor and the proponent to protect the communities from these impacts and restore/borrow the sites upon closure This may also pose accident risk to road users, children or animals, dust contaminating goods in roadside markets/homesteads and noise at sensitive receptors (schools and health centres).

14. Emissions and air pollution

Construction phase activities of the proposed line will give generation to dust and exhaust fumes from vehicles and machinery. Dust emissions will emanate from pit excavation activities and movement of machinery in the project area. This directly affects the air quality of the project area.

15. Increase in Social Vices

Overall population of the project area is expected to increase due to an influx of construction workers. This will directly affect the normal social set up of communities living in the project area thereby possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour, petty thieves and increased HIV/AIDS incidence and communicable diseases

7.3 Operation Phase

7.3.1 Positive Impacts

1. Increased Electrical Capacity, and Reliability of Supply to Project area

The construction of the Loiyangalani-Marsabit 150km, 400kV Transmission Line will be a step forward towards achieving the goals of Vision 2030 with regards to

enhancement of electrical capacity. An immediate impact would be the cost of electricity gradually going down and frequency of power outages minimised.

Other notable impacts include:

- Increased industrial activity due to the availability of a steadier and higher capacity power supply in comparison to the existing one.
- Increased establishment of economic and social sectors such as agriculture, hospitals and educational centres resulting from increased availability of electricity

2. **Creation of Employment Opportunities**

Both skilled and unskilled labour will be required during the maintenance of the 400kV line. Some maintenance activities such as clearing of vegetation clearance along the way-leave will still provide seasonal jobs or the community members.

3. **Contribution to Government Revenue**

Similar to the planning and construction phase, the operation phase will also attract VAT on electricity consumed for both domestic and industrial use. P.A.Y.E tax from maintenance employees, and NEMA licence fee paid by the proponent to NEMA, and taxable professional fees to the consultants, after conducting annual environmental audits, are also other avenues for the government to get revenue.

4. **Enhancement of Tree Species Diversity**

Environmental management good practices demand that the proponent ensures environmental restoration on construction completion. Through afforestation with non-invasive indigenous species and landscaping activities – which would involve the local community –Contractor could improve the biodiversity of the project area. Continuous audit of this activity would ensure sustainability of the initiative

7.3.2 Negative Impacts

1. **Concerns over Occupational Safety and Health**

Regular maintenance of the transmission line: During the operational phase, annual clearance of the wayleave area is necessary. Bush and tree growth near the transmission line will necessitate bush and vegetation clearing from time to time. Hazards of these activity include physical harm resulting injuries sustained from tools and equipment, ergonomic problems such as poor working posture, dust inhalation, attacks from wild animals etc.

Accidental failure of pylon structures or breakage of conductor cable: Incase a conductor cable breaks or a pylon structure collapses, it may lead to electrocution or

loss of property that may be as a result of fires. Electrocution may also occur in the event tools such as ladders, motor vehicles or other equipment comes in direct contact with live conductor cables during maintenance works

2. Impacts from Solid and Liquid Wastes

During the operation phase, there will obviously be staff stationed at the sub-stations, meaning both solid and liquid waste will be generated. Additionally, the day to day operations are bound to generate waste such as oil spills, plastic containers, metal containers, paper, et cetera.

3. Noise and Vibration Impacts

Noise during the operation phase will only be realized from corona effect - acoustic noise produced by transmission lines which are greater with high voltage power lines ranging from 400 - 800kV which generate discharges.

4. Perceived Danger of Electrostatic and Magnetic force

Electric transmission lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage and the lateral distance from the transmission line to the receptor. Many studies published during the last decade on occupational exposure to Electro-Magnetic Fields (EMF) have exhibited a number of inconsistencies and no clear, convincing evidence exists to show that residential exposures to electric and magnetic fields are a threat to human health. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside of 30 m provided for the wayleave area

5. Impacts on Aircraft Navigation

There exist three airstrips along the project area – Marsabit, Loiyangalani and North Horr airstrips. The proposed line will not have major impacts on the air traffic for either airstrip. However, the maximum height of the tower structures will be in accordance with the requirement of the Kenya Civil Aviation Authority (KCAA).

6. Impacts on Wildlife Habitats and Migratory Birds

Birds nesting in the towers pose a danger both to themselves and to the safe operation of the power line. Large nests eventually fill with droppings that can reach the conductors and cause electric shocks or burns to birds. These will need to be regularly removed as part of routine maintenance. Previous studies suggest that climbing animals, such as baboons and monkeys learn to keep away from conductors.

The impact of a transmission line on other fauna is limited as most areas are sparsely populated and the way-leave will be cleared manually of vegetation and as such the use of herbicides is not envisaged.

7. **Risk of Fire Outbreaks**

During the entire operational phase of the proposed line, electric faults on the transmission line may pose a fire risk. This may be caused by bird collisions or high growing vegetation is not managed along the wayleave. Considering that most of the project area lays in the semi-arid climatic regions, this may lead to forest fires in such an event

7.4 Decommissioning Phase

7.4.1 Positive Impacts

1. **Creation of Employment Opportunities**

Both skilled and unskilled labour will be required during the decommissioning exercise – direct opportunities for labourers site and indirect opportunities for community members such as catering, kiosks, barber shops, etc., to service the crew.

2. **Benefits of Engagement by Both Genders**

The proponent encourages involvement of both Women and men in the decommissioning exercise. Specifically, generation of income for women through activities such as providing food for construction crew and the other such activities since as women are generally a marginalised group in the project area.

3. **Enhancement of the Socio-cultural and Local Leadership Structures**

Just as in the construction phase, the proponent could reinforce the authority of the community leaders by utilising them in every step of the decommissioning exercise. This will act both ways in ensuring it runs smoothly and at the same the proponent would be reinforcing the authority of the chiefs as the community observes how they have been involved.

4. **Increased economic activity in the project area**

The on-site workers will need basic amenities such as food, shelter and clothing. They will as well need recreation for time off. All these goods and services will be sourced from providers in the projects are thus increasing the economic activity around the same area.

7.4.2 Negative Impacts

1. **Concerns over Occupational Safety and Health**

Hazards that the high voltage transmission line may pose to workers and residents during the decommissioning phase are similar to those discussed in the construction phase above

2. **Vehicular and Human Traffic Impacts**

Movement of heavy machinery and equipment during the decommissioning is expected. These machineries will be used for ferrying workers and materials from the active site while equipment will be used for dismantling of the transmission line

3. **Impacts from Solid and Liquid Wastes**

Decommissioning activities will generate both solid and liquid wastes such as: papers, cable drums, oil drums, spilt oil, planks of wood, glass, paints, adhesives, sealants, fasteners, and other domestic wastes. These wastes are hazardous to people, soil and water within the project area if adequate mitigation measures are not enforced during the decommissioning exercise.

4. **Noise and Vibration Impacts**

The decommissioning activities will be similar in nature as those during the construction phase. The impacts will be as a result of moving machines, communication of workers and outgoing vehicles transporting project materials and workers to and out of the proposed sites.

5. **Emissions and air pollution**

Decommissioning phase activities of the proposed line will give generation to dust and exhaust fumes from vehicles and machinery. Dust emissions will emanate from pit excavation activities and movement of machinery in the project area. This directly affects the air quality of the project area

6. **Increase in Social Vices**

Just as in the construction phase, population of the project area is expected to increase due to an influx of workers during the decommissioning phase. This will directly affect the normal social set up of communities living in the project area thereby possible decay of morality, increase in school drop-outs due to available unskilled labour, possible child labour, petty thieves and increased HIV/AIDS incidence and communicable diseases.

CHAPTER EIGHT: IMPACT MITIGATION AND ENHANCEMENT MEASURES

8.1 Introduction

The section below gives detailed analysis of the impact enhancement and mitigation measures necessary for the realization of the proposed construction of Loiyangalani-Marsabit 150km, 400kV Transmission Line. The proposed mitigation measures are intended to eliminate or bring the impacts to a minimum while enhancing the positive impacts.

8.2 Enhancement of Positive Impacts

The proponent will ensure effective enhancement of all the possible positive impacts of the project. This will be done through effective enforcement of the project's Environmental and Social Management Plan at all phases of the project. Mitigation of all adverse impacts will be ensured as addressed in the Environmental and Social Management Plans. Unforeseen impacts will also be addressed through the Monitoring and Evaluation Plan

The proponent shall also maximize the use of local labour where possible to ensure maximum participation of the community in the project. Capacity enhancement will also be realized through training of the employed locals and community sensitization activities. Gender issues will be catered for through provision of equal opportunities for women in recruitment and acquisition of local products and services.

8.3 Proposed Mitigation Measures for Negative Impacts

8.3.1 Planning and Construction Phase

1. **Relocation of Project Affected Persons and Property**

Line should be routing be done in a way such that it avoids extensive relocation of individuals. However, where this is unavoidable, compensation and resettlement of the affected persons and property should be done.

2. **Impact on Land Use Patterns**

Similar to the point above, where this is unavoidable, resettlement should be done such that the affected persons will be able to enjoy at least the same uses they previously had n their land, or receive adequate compensation to cover for their loss.

3. **Alteration of land ownership patterns**

In the instances where land ownership shall be altered, the owners shall be adequately compensated in accordance with the prevailing regulations on displacement of persons.

4. Concerns over Occupational Safety and Health

Occupational Safety and Health impacts are anticipated during the construction phase of the project. Management of onsite safety and health shall be in line with the Occupational Safety and Health Act (OSHA) 2007. The envisaged impacts can be lessened through;

- A trained occupational health and safety supervisor shall be stationed at each site
- Toolbox talks meetings should be held on a daily basis before commencement of work at the sites
- Ensuring that both active sites are well marked and secured with the appropriate tape at all times to prevent injury to both outsiders and animals – both domestic and wild- as a result of falling from heights
- Continuous sensitization of the community on possible hazards associated with works before and during the construction works
- The contractors shall put up appropriate safety signage at active sites at all times. Signage may be displayed in local language to address the issue of language barrier where local workforce is used
- The proponent will ensure that no minors are employed at the work sites at all times. A register of all the workers shall be maintained together with their ID/ Passport numbers
- All workers and visitors to active sites shall put on necessary personal protective equipment at all times. This will include a helmet, reflective jacket, safety boots, hand gloves and overalls. Body harnesses shall be worn whenever working on heights is involved.
- Hoisting equipment shall be provided at sites where erection activities are to be carried out. This equipment shall be properly rated and maintained. The equipment shall be used in uplifting of loads which are beyond sensible weights that can be lifted by human labour
- First aid equipment and a qualified first aider shall be provided at the transmission line.

- Workers together with community members shall be provided with HIV/AIDS sensitization forums and campaigns. The construction crew shall also be provided with appropriate sanitary facilities and HIV/AIDS prevention and management facilities such as testing, counselling and condoms.
- Appropriate road signs shall be strategically placed in the project area to serve as warning to motorists and pedestrians during the construction activities. This will include speed limit signage of 40KM per hour and diversion signage
- Appropriate waste management equipment shall be provided at active site to aid in waste segregation and disposal. The separate bins shall be marked with the different categories of waste
- Piled earth material shall be well levelled off on completion of construction works at every site

5. Impact on Flora and Fauna

Impacts on Flora and Fauna should be kept to the minimum. The proponent shall ensure that vegetation clearing is limited to the project area only and that transportation of construction materials is done through the existing road infrastructure. The areas to be cleared for workers camps/material storage shall be marked out prior to the clearing process. Manual clearing such as slashing is encouraged and use of machinery should be limited to excavation of the pylon sites only.

Wildlife and environmental preservation awareness campaigns should be conducted on the construction workers to ensure that they do not exploit natural resources through hunting or destruction of forest resources. On completion of the construction works, the area around the pylon sites will be allowed to re-vegetate with indigenous species.

6. Soil erosion

The project area is generally arid and semi-arid. Unsuitable soils will be excavated and stockpiled until a suitable formation is reached. Appropriate pollution control measures will be used as determined by the civil contractor. Where soils excavated for pylon/gantry tower foundations will be found to be suitable, the same will be used for backfilling excavations and will not be left exposed to wind or water for long periods.

Construction traffic will follow defined temporary access routes to be established as part of the works so as to avoid damaging the soil structure in the wider area. Repairs to access roads will be undertaken to maintain the surfacing and prevent soil erosion. Areas exposed due to the removal of vegetation are more susceptible to erosion

during heavy rainfall, so areas will be reinstated as soon as possible to minimize this effect.

7. Interference with Water Resources and Drainage

Site workers will be trained in clearing up spillages and spillage kits including suitable PPE will be available in storage areas. Effluents containing soil, cement or oil will not be allowed to flow into any water drainage or water courses. Water from washing out of equipment will also not be discharged into drains to water drains to roads or water sources Temporary stockpiles shall be located away from drainage and surface run off shall be directed away from stockpiles to prevent erosion.

Control of water is of great importance during construction to prevent exposed soils eroding and silting up surrounding watercourses. It is essential that the works have little or no impact on the existing hydrology due to the ecology surrounding the project sites. While the water demand for the project at this stage is unknown, it could be satisfied in one of three ways namely:

- Abstraction of water from the existing boreholes in the local area after getting formal consent from the borehole owner; or
- Use of water bowsers and storage of water in tanks in the laydown area and camp sites; or
- Sinking new boreholes or abstracting water from suitable water bodies in accordance with the Water Resource Management Authority (WRMA) requirements.).

Wastewater from sanitation on the worker camps will be collected in mobile containers and discharged into pit latrines which will be decommissioned on completion. It will be necessary to locate such disposal sites such that the effluent does not contaminate water resources such as boreholes used by the local community.

The discharge of any effluents will be carefully managed with agreement of NEMA with regard to the detailed methods of disposal. Standard good working practices should ensure that any impacts due to the quality of water discharging from the project are insignificant

8. Visual and Aesthetic Impacts

It is general practice to restore the Pylon sites after construction, although the replacement of tall vegetation is not a part of restoration directly within the site. The community should also be involved in environmental restoration process through planting of trees and other landscaping activities and as a result improve the vegetation cover and appearance of the affected project area

9. Impacts on Archaeology and Cultural Heritage

There are no major cultural sites in the project area. However, there may be few and small sacred areas close by the proposed route which may be carefully looked into during the RAP and construction period, with community consultations at every stage. This will ensure that the few cultural/sacred sites within the community areas are preserved.

10. Vehicular and Human Traffic Impacts

Transportation of construction material to specific sites should be done through existing road infrastructure where possible. Rehabilitation of roads that have dilapidated as a result of such transportation should be done by the proponent. In addition, design of detours and diversions where necessary should be done with consultations with the local communities.

11. Impacts from Solid and Liquid Wastes

Generation of both liquid and solid waste is anticipated as discussed above. Mitigation of this impact shall be effected through:

- Continuous sensitization of construction workers on issues of environmental protection and health
- Provision of adequate waste management facilities at both the construction sites and workers' camps. These shall include separate waste bins for the hazardous, biodegradable and non-biodegradable waste disposal
- Waste collected at site shall be disposed offsite in approved waste dumping facilities in the project area
- Excavated soil material shall be used for backfilling if found suitable and any excess of it shall be properly evened off on site

Appropriate sanitation facilities shall be provided at active sites for human waste disposal

12. Noise and Vibration Impacts

Noise emitted during the construction phase will be minimised through use of noise reduction technologies such as silencers/mufflers and provision of hearing protection devices for workers. Additional noise abatement measures may need to be implemented e.g. close to residential and sensitive wildlife areas, including careful selection and use of plant and hours of working.

13. Impacts from Rock Blasting

In case there will be need for rock blasting during excavations, the contractor should create awareness to adjacent communities through the local administration. He should also provide safety signage, humps, banksmen and watering to suppress dust. Proper blast design, driller-blaster communication, inspection prior to loading and firing the blast, removing employees from the blast area, controlling access to the blast area, and using a blasting shelter should also be observed.

An experienced driller should be used to detect potential problem areas such as voids, mud seams, incompetent rocks, and other irregularities by observing the progress of drilling. The drill log should include the details of any unusual or exceptional circumstances noticed during drilling. A blaster may need to alter the loading configuration to alleviate potential problems

14. Emissions and air pollution

The proponent shall put in place appropriate dust mitigation measures at active sites during the construction phase. This will include covering up of stock piles of dusty materials, limiting of speed limits of vehicles within the project area and sprinkling of water. Emissions from machinery and equipment shall be minimized through adequate servicing and maintenance

15. Increase in Social Vices

Continuous sensitization of community members and construction workers will help in curbing social vices that may arise. For the community members, this could be done through the chiefs and village elders, while for the construction workers during the daily toolbox talks.

Other measures would be encouraging community policing to deter any would be perpetrators from engaging in these vices.

8.3.2 Operation Phase

1. Concerns over Occupational Safety and Health

Regular maintenance of the transmission line: This can be mitigated against by ensuring proper use of PPEs during such activities and sensitization of the workers on the importance of using PPEs.

Accidental failure of pylon structures or breakage of conductor cable: Provision of fire extinguisher, fire safety training for workers, and making sure that a Safety officer is always present on site are mitigation measures that may be implemented.

2. Vehicular and Human Traffic Impacts

Locating of access roads to the project sites should be decided upon earlier on in the construction phase in consultation with the local community to avoid disagreements or conflicts that may arise later, long after the construction work is finished for example, a community member claiming that traffic to the stations is cutting through his/her land as has been the case in other similar projects.

3. Impacts from Solid and Liquid Wastes

Any waste generated during the day to day operation of the transmission line should be carefully managed with agreement of NEMA, the county departments of environment, and other relevant bodies, with regard to the detailed methods of disposal. Standard good working practices should ensure that any impacts due to the quality of water discharging from the project are insignificant.

4. Noise and Vibration Impacts

As discussed earlier, noise during the operation phase will only be realized from corona effect and this being a 400kV line; such an effect will be experienced.

5. Perceived Danger of Electrostatic and Magnetic force

Electric transmission lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage and the lateral distance from the transmission line to the receptor. Many studies published during the last decade on occupational exposure to Electro-Magnetic Fields (EMF) have exhibited a number of inconsistencies and no clear, convincing evidence exists to show that residential exposures to electric and magnetic fields are a threat to human health. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside of 30 m provided for the wayleave area

6. Impacts on Aircraft Navigation

There exist three airstrips along the project area – Marsabit, North Horr and Loiyangalani airstrips. The proposed line will not have major impacts on the air traffic for either airstrip. However, the maximum height of the tower structures should be in accordance with the requirement of the Kenya Civil Aviation Authority (KCAA).

7. Impacts on Wildlife Habitats and Migratory Birds

Regularly removal large nests as part of routine maintenance will prevent them from getting electrocuted. As for wildlife habitats, climbing animals, such as baboons and monkeys learn to keep away from conductors so the impact on them is limited.

The impact of a transmission line on other fauna is also limited as most areas are sparsely populated and the way-leave will be cleared manually of vegetation and as such the use of herbicides is not envisaged.

8.3.3 Decommissioning Phase

1. Concerns over Occupational Safety and Health

Occupational Safety and Health impacts are anticipated during the decommissioning phase of the project. Management of onsite safety and health shall be in line with the Occupational Safety and Health Act (OSHA) 2007. The envisaged impacts can be lessened through;

- A trained occupational health and safety supervisor shall be stationed at sites being decommissioned
- Toolbox talks meetings should be held on a daily basis before commencement of work at the sites
- Ensuring that both active sites are well marked and secured with the appropriate tape at all times to prevent injury to both outsiders and animals – both domestic and wild- as a result of falling from heights
- Continuous sensitization of the community on possible hazards associated with works before and during the decommissioning works
- The contractors shall put up appropriate safety signage at active sites at all times. Signage may be displayed in local language to address the issue of language barrier where local workforce is used
- The proponent will ensure that no minors are employed at the work sites at all times. A register of all the workers shall be maintained together with their ID/ Passport numbers
- All workers and visitors to active sites shall put on necessary personal protective equipment at all times. This will include a helmet, reflective jacket, safety boots, hand gloves and overalls. Body harnesses shall be worn whenever working on heights is involved.
- Hoisting equipment shall be provided at sites where erection activities are to be carried out. This equipment shall be properly rated and maintained. The equipment shall be used in uplifting of loads which are beyond sensible weights that can be lifted by human labour
- First aid equipment and a qualified first aider shall be provided at each project site.

- Workers together with community members shall be provided with HIV/AIDS sensitization forums and campaigns. The construction crew shall also be provided with appropriate sanitary facilities and HIV/AIDS prevention and management facilities such as testing, counselling and condoms.

- Appropriate road signs shall be strategically placed in the project area to serve as warning to motorists and pedestrians during the decommissioning exercise. This will include speed limit signage of 40KM per hour and diversion signage

- Appropriate waste management equipment shall be provided at active site to aid in waste segregation and disposal. The separate bins shall be marked with the different categories of waste

2. Vehicular and Human Traffic Impacts

Transportation of materials from the sites being decommissioned should be done through existing road infrastructure where possible. Rehabilitation of roads that have dilapidated as a result of such transportation should be done by the proponent. In addition, design of detours and diversions where necessary should be done with consultations with the local communities

3. Impacts from Solid and Liquid Wastes

As in the construction phase, mitigation against impacts resulting from generation of solid and liquid wastes can be managed in the following ways:

- Continuous sensitization of workers on issues of environmental protection and health

- Provision of adequate waste management facilities at both the sites and workers' camps. These shall include separate waste bins for the hazardous, biodegradable and non-biodegradable waste disposal

- Waste collected at site shall be disposed offsite in approved waste dumping facilities in the project area

- Excavated soil material shall be used for backfilling if found suitable and any excess of it shall be properly evened off on site

4. Noise and Vibration Impacts

The decommissioning activities will be similar in nature as those during the construction phase. Noise emitted will be minimised through use of noise reduction technologies such as silencers/mufflers and provision of hearing protection devices for workers. Additional noise abatement measures may need to be implemented e.g.

close to residential and sensitive wildlife areas, including careful selection and use of plant and hours of working

5. Emissions and air pollution

The proponent shall put in place appropriate dust mitigation measures at active sites during the construction phase. This will include covering up of stock piles of dusty materials, limiting of speed limits of vehicles within the project area and sprinkling of water. Emissions from machinery and equipment shall be minimized through adequate servicing and maintenance

6. Increase in Social Vices

Just as in the construction phase, population of the project area is expected to increase due to an influx of workers during the decommissioning phase. Continuous sensitization of community members and workers will help in curbing social vices that may arise. For the community members, this could be done through the chiefs and village elders, while for the workers on site during the daily toolbox talks.

Other measures would be encouraging community policing to deter any would be perpetrators from engaging in these vices

CHAPTER NINE: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

Proper management of the envisaged environmental and social impacts resulting from implementation of the proposed project will be key so as to enhance the positive impacts and minimise the adverse effects. This section outlines the Environmental and Social Management Plan (ESMP) for the Loiyangalani-Marsabit 150km, 400kV Transmission Line. The Environmental and Social Management Plan (ESMP) provides a logical framework for management of environmental and social impacts. Responsibilities and time frames for the implementation of the various aspects of the ESMP have been identified.

This ESMP shall be available to qualified contractors who will bid for the project construction. This will be to ensure that the environmental and social costs are factored into their costing. The successful contractor shall be required to come up with his own specific ESMP and work methods that will ensure safe construction of the project ensuring compliance to applicable HSE legislations and standards

The project proponent, KETRACO, will be mandated with the task of ensuring full compliance to the ESMP's provisions

9.2 Environmental and Social Management Plan

9.2.1 Planning and Construction Phase

Table 9.1: Mitigation Measures at Planning and Construction Phase

Potential impacts	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
Relocation of project affected persons and property	Compensate all the affected property and also loss of Livelihood	KETRACO	Throughout the project Implementation		As per the RAP report
Impact on land use patterns	• Continuous community sensitization and awareness creation regarding the project. • Compensation where necessary	KETRACO/ Contractor	Periodically, prior to project implementation	Number of complaints from the local community Minutes of consultative meetings held	
Occupational Health and Safety concerns	• Continuous supervision of occupational, health and safety management by the contractor to ensure compliance • Enlist a Health and Safety consultant to assist	KETARCO/ Contractor	Prior to and periodically throughout construction	Field Reports	Internal costs
Impact on flora and fauna	• Ensure that vegetation clearing is limited to the project area only • Ensure that transportation of construction materials is done through the existing road infrastructure. • Manual clearing such as slashing is encouraged	Contractor	Routine inspection	• Area of land (ha) cleared • Number and type of trees cut down • Number of	

Potential impacts	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
	and use of machinery should be limited to excavation of the pylon sites only. • Wildlife and environmental preservation awareness campaigns should be conducted on the construction workers to ensure that they do not exploit natural resources through hunting • On completion of the construction works, the area around the pylons sites will be allowed to re-vegetate with indigenous species			indigenous trees planted • Species used to re-vegetate	
Employment of local labour	• Maximise use of local labour in execution of construction activities in which they are qualified for. • Involvement of local leaders in recruitment process	Contractor	Throughout the construction phase	Percentage local workers employed as a percentage of total workforce	Contractors cost
Noise and vibration impacts	• Use of noise protection devices when working with noisy equipment • The construction should be done during daytime (from 6 am to 6 pm) near residential areas to minimize noise impacts	Contractor		Noise and vibration impacts	
Soil Erosion	• Employ appropriate pollution control measures • Where soils excavated for pylon/gantry tower foundations will be found to be suitable, the same will be used for backfilling excavations and will not be left exposed to wind or water for long periods. • Construction traffic to follow defined temporary access routes to be established as part of the	Contractor	Daily Inspection	Status of ground cover in constructed areas	Contractor's cost

Potential impacts	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
	works so as to avoid damaging the soil structure in the wider area. • Repairs to access roads will be undertaken to maintain the surfacing and prevent soil erosion • Areas exposed due to the removal of vegetation are more susceptible to erosion during heavy rainfall, so areas will be reinstated as soon as possible to minimize this effect.				
Impact on water resources and drainage	• Storage and transportation of oil, fuel and other hazardous material to be done in appropriate containers • Training of site workers on handling of spillages • Availing spillage kits including suitable PPE in storage areas • Proper management of waste containers, litter and other waste generated during construction in compliance with waste management regulations 2006 • Adherence to EMCA Regulations on water quality • Routine inspection • Maintenance records	Contractor	Routine Inspection	Water quality tests Lack of spillages at active sites	Contractors cost
Visual and aesthetic Impact	• Extensive public consultation during the planning of the pylon sites • After construction, natural vegetation should be restored in non-operational areas of the site and/or additional landscape planting with local indigenous species used to improve views into the	Contractor	Frequently	Minutes of public consultations Number of trees planted	

Potential impacts	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
	site				
Impacts on Archaeology and Cultural Heritage	Carefully look into such sites during the RAP and construction period, with community consultations at every stage to ensure their preservation	KETRACO/Contractor	Prior to, and during construction	Information acquired from community consultations	
Vehicular and Human Traffic Impacts	• Rehabilitation of roads • Design of detours and diversions where necessary	Contractor	Frequently	Status of access roads being used	
Impacts from Liquid and Solid wastes	• Sensitization of workers on environmental protection and safety • Provision of solid waste management facilities for the temporary storage and segregation of waste prior to disposal • Liaison with the local County authorities on suitable dumping site for generated waste. • Excavated soil to be used for backfilling if suitable	Contractor	Daily Inspection	• Site neatness • Presence of waste collection receptors	Contractor's cost
Noise and Vibration Impacts	• Use of noise reduction technologies such as silencers/mufflers • Provision of hearing protection devices for workers. • Careful selection and use of plant and hours of working	Contractor	Daily Inspection	• Level of noise being generated • Complaints received	
Rock blasting impacts (If applicable)	• The contractor should create awareness to adjacent communities and work closely with the local administration	Contractor	As need arises	Records of successfully blasted areas without	Contractors cost

Potential impacts	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
	• The contractor should provide safety signage, humps, banksmen • Watering to suppress dust • Ensuring proper blast design and driller-blaster communication • Carry out inspection prior to loading and firing of the blast • Controlling access to the blast area, and using a blasting shelter • Use of an experienced driller to detect potential problem areas such as voids, mud seams, incompetent rocks, and other irregularities by observing the progress of drilling			incidences, accidents or near misses	
Emissions and air pollution	• Sensitization of workers on environmental protection and safety • Control speed of construction vehicles • Water should be sprayed during the construction phase on dusty excavated areas • Regular maintenance of plant and equipment • Provision of dust masks for use when working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission	Contractor	Daily monitoring	• Records of water sprinkling • Records of machine and vehicle service	Contractors cost
Increase in Social Vices	Continuous sensitization of community members and construction workers	Contractor	Frequently	Complaints from the community	

9.2.2 Operation Phase

Table 9.2: Mitigation Measures at Operation Phase

Potential environmental impact	Mitigation and Enhancement Measures	Responsibility	Implementation Timeline	Verifiable Indicators	Estimated Costs (KSh)
Concerns over Occupational Safety and Health	• Ensuring physical integrity of structures is maintained • Deactivating and proper grounding of live power distribution lines before work is performed on, or in close proximity to the lines • Ensuring that live wire work is conducted by trained workers only • Ensuring the workers are properly isolated and insulated from any conductive object (live – line work)	Contractor	Project period	Accidental statistics	Operation cost
	• Testing of structures for integrity prior to undertaking work • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures • Inspection, maintenance and replacement of fall protection equipment • Use of helmets and other protective devices • Provision of first aid facilities at site	Contractor	Frequently	• PPE records • Use of proper PPE	Contractors cost
Rehabilitation of roads	• Design of detours and diversions where necessary	Contractor	Frequently	Status of access roads being used	• Rehabilitation of roads • Design of

Potential environmental impact	Mitigation and Enhancement Measures	Responsibility	Implementation Timeline	Verifiable Indicators	Estimated Costs (KSh)
					detours and diversions where necessary
Impacts from Solid and Liquid Wastes	• Waste generated during the day to day operation of the transmission line should be properly managed	Contractor			
Noise and Vibration Impacts	• Nil	Contractor			
Perceived Danger of Electrostatic and Magnetic force	• There should be no potential health risks for people living outside of 60 m provided for the wayleave area	Contractor	During RAP		
Impacts on Aircraft Navigation	• The maximum height of the tower structures should be in accordance with the requirement of the Kenya Civil Aviation Authority (KCAA).	KETRACO/ Contractor	During design		Nil additional cost – part of basic design requirement
Impacts on Wildlife Habitats and Migratory Birds	• Undertake wire marking to alert birds to the presence of power line • Build raptors platforms on top of pylons for roosting and nesting	Contractor	Prior to final commissioning or as appropriate	Cases of bird mortalities	Nil additional cost – part of basic design requirement
Risk of Fire Outbreaks	• Carry out routine thinning, slashing, and other maintenance activities, within the transmission line • No burning of any materials should be permitted at the site	Contractor	Project life time	Accident statistics	Operation cost

9.2.3 Decommissioning Phase

Table 9.3: Mitigation Measures at Decommissioning Phase

Potential environmental impact	Proposed mitigation measures	Responsibility	Implementation Timeline	Verifiable indicators	Estimated Costs (KSh)
Concerns over Occupational Safety and Health	• Use site barrier tapes to isolate the site and bar intruders from accessing the area in case of a dropping object • Test structures for integrity prior to undertaking work • Implement a fall protection program that includes training in climbing techniques and use of fall protection measures • Inspection, maintenance and replacement of fall protection equipment • Use of helmet and other protective devices • Provision of first aid facilities at the site	KETRACO/ Contractor	Daily Inspection	• Medical records and training records • Use of proper PPE	Contractors cost
Vehicular and Human Traffic Impacts	• Rehabilitation of roads • Design of detours and diversions where necessary	Contractor	Frequently	Status of access roads being used	
Impacts from Solid and Liquid Wastes	• Sensitization of workers on environmental protection and safety • Provision of solid waste management facilities for the temporary storage and segregation of waste prior to disposal • Liaison with the local County authorities on suitable dumping site for generated waste. • Excavated soil to be used for backfilling if	Contractor	Daily Inspection	• Site neatness • Presence of waste collection receptors	Contractor's cost

	suitable				
Noise and Vibration Impacts	• Provision of hearing protection devices when working with noisy equipment • Use of serviceable equipment with low noise emission • Instruction to truck and machine operators to avoid raving of engines	Contractor	Regular inspection	Records	Contractors cost
Emissions and air pollution	• Control speed of construction vehicles • Water shall be sprayed during the decommissioning phase to reduce dust emission • Provision of dust masks for use while working in dusty conditions • Use of serviceable vehicles and machinery to avoid excessive smoke emission	Contractor	Periodic inventory of personal protective equipment	Decommissioning plan Records	Contractors cost
Increase in social vices	Continuous sensitization of community members and construction workers	Contractor	Frequently	Complaints from the community	
Decommissioning Impacts	• Buildings to be demolished where reuse not appropriate • Re use materials where appropriate • Remove all plant and equipment • Remove all solid and liquid wastes • Remove all access roads; • Re-vegetate sites	KETRACO/Contractor	Daily inspection	• Demolition records • Rehabilitated project area	Contractors cost

9.3 Monitoring

Environmental, health and social monitoring of project activities forms an important component of implementation of the proposed 400kV 150km Loiyangalani - Marsabit transmission line. It provides a platform to follow up on the level compliance to the proposed mitigation/enhancement of the expected impacts and adjustment of this mitigation measures where unexpected impacts are encountered. Monitoring activities include;

- Site visits to visually observe the management of ESMP provisions
- Analysis of individual environmental and safety parameters
- Site sampling to analyse consistency in compliance to HSE requirements
- Regular site meetings with the proponent and contractor to discuss HSE concerns

These activities will ensure effective implementation and management of proposed mitigation measures. In addition, new and unforeseen impacts other than those discussed in the ESMP will be easily and continuously addressed. The contractor will also be expected to employ a local overall HSE manager and local site specific HSE supervisors to enforce compliance to the ESMP. An HSE manager appointed by the proponent shall also ensure that mitigation measures are implemented throughout all the project phases

Environmental, health and social management monitoring program will propose monitoring activities that will be carried out at the preconstruction, construction, operation and decommissioning phases. The contractor will be mandated to come up with measures that will ensure the program is effected during the construction phase. KETRACO will also employ a consultant who will guide and supervise the contractor on ESMP implementation. The consultant will report to KETRACO regularly on compliance to ESMP by the contractor for action. The level off periodic monitoring on completion of construction activities will be determined in the operational phase

9.3.1 Internal Monitoring

The responsibility to conduct time to time internal monitoring of the proposed projects on ESMP management and HSE clauses provided in the contract lays with the proponent. The evaluation of compliance level to HSE management will be guided by a detailed ESMP programme approved by Contractor.

The objective of internal monitoring and audit will be:

- To identify gaps in implementation of the ESMP by the contractor
- Ensure compliance to legal requirements provided in EMCA 1999

- Guide the contractor's management of HSE requirements from time to time where unforeseen impacts are encountered

The proponent will continue the monitoring process during the operation and decommissioning phases of the projects ensuring that the minimum allowable Environmental parameters are maintained. These parameters include,

1. Workforce Training

The contractor shall monitor induction of workers to ensure they are adequately trained on HSE management on top of the specific skills required for their job description. The proponent should monitor induction training and tool box talks records regularly. The contractor shall also train site specific HSE supervisors to enforce the trainings.

2. Monitoring of Accidents Prevention/ Health Management

The Proponent will procure services of an independent environmental, health and safety (HSE) consultant to undertake frequent audits on the contractor during project implementation. The consultant will undertake regular site inspection visits (frequency shall be agreed upon with Contractor) to monitor how the contractor is managing his work force and activities with regard to accident prevention and health management.

The contractor's safety manager on the other hand shall ensure that appropriate safety signage and personal protective equipment is availed to the construction workers at all times.

Indicators that will be used in evaluation of accident prevention and health risks management includes;

- Provision of adequate personal protective equipment to workers at all phases of the project
- Presence of displayed safety warning signs and markings at active sites and on tower structures on completion
- Adequate human waste disposal and sanitation facilities are present at active sites
- Community awareness on safety risks associated with the project
- Compiled records of actual accidents/ incidences that have been encountered
- Report health cases that are related to the project

3. Soil Erosion and Conservation Monitoring

Construction activities such excavations and transportation of construction materials within the project areas may lead to loosen soil structure thereby resulting in erosion. The contractor will be responsible for ensuring that appropriate soil conservation and erosion prevention measures are practiced throughout the construction phase.

4. Noise Levels Monitoring

Emission of noise is expected during the construction phase. Major sources of noise will be from machinery such as excavators. However, the noise levels may not be an issue as emission is site specific and low regular monitoring of these noise levels should be conducted to ensure that they recommended limits are not exceeded. Consultation with the PAPs will aid in establishing the extent of this impact

5. Air Quality Protection

Dust and emissions from machinery should be monitored by the contractor and adequate measures employed in ensuring air quality. This will include watering down of active sites/ roads and other areas generating the dust or maintenance of machinery with excessive smoke emissions. In addition, where excessive wind is observed, dust generating activities can be halted for some time.

6. Solid and Liquid Waste Management Monitoring

Monitoring of waste generated at both the site and workers campsite during the construction phase shall be done by the contractor's HSE manager. He will ensure that;

- Records of the type and waste amounts generated at the sites is kept
- Adequate and separate waste management facilities are provided at each site. The equipment shall be such that it aids in waste segregation
- All generated waste is bound to the specific sites boundary and littering of the environment is discouraged
- Human waste disposal facilities are provided at each site
- Collected waste is properly disposed away from site at dumping sites approved by the local county government

9.3.2 External Monitoring

The Kenyan government's environment management body NEMA shall issue approval for the implementation of the proposed project. Moreover, it shall ensure that the provided mitigation measures are implemented in implementation of the project. NEMA shall offer oversight of the implementing bodies through review of monitoring reports. The proponent shall therefore provide the agency with annual progress reports on environment, health and safety management

9.3.3 Environmental Audits (EA)

Environmental audits during all phases of the project implementation are key in ensuring full compliance to ESMP requirements. The goal of EA will be to establish if the proponent are complying with environmental requirements and enforcing the existing legislation. The purpose of EA is to determine the extent to which the activities and programs conform to the approved environmental management plan. The Consultant recommends that an independent consultant will be sourced to oversee environmental management throughout the construction phase and during the operational phase and decommissioning phase. He will provide Environmental audits in line with NEMA's requirement.

CHAPTER TEN: CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion

From a broader perspective, the project has low overall environmental impacts since it will source energy from green sources (wind power) thus reducing environmental consequences of thermal energy production that is currently used to complement hydro-power production in Kenya. When alternatives are considered, it is clear that this project will provide Kenya the opportunity to reduce her carbon footprint over time.

The intensity of impacts will be relatively higher at the tower construction sites within the RoW. These impacts are related to land degradation, noise, waste handling, air quality and vegetation clearance. These potential impacts are easy to mitigate through proper construction planning. However, impacts on vegetation could be locally substantial during construction phase since stringing may necessitate removal of some trees to create access. This impact on vegetation is transient and reversible. Impacts on wildlife during construction are related to possible effects on wildlife movement if tower construction and stringing across animal migration route coincide with their movements. This is easily mitigated by scheduling construction so that it does not coincide with animal migrations.

During construction, potential impacts on local communities and enterprises are largely positive, as the construction activities provide direct job opportunities and indirectly create income from trading through supply contracts, food vendors, accommodation, entertainment etc. However, these positive impacts are limited to the duration of the construction activities and would not have a significant sustainable positive impact on the local economy.

In conclusion, the impacts associated with this project are subtle and easy to avoid or mitigate

10.2 Recommendations

Clearance of Vegetation: Unnecessary clearing of vegetation should be avoided to in order to reduce soil erosion. The proponent should also liase with relevant agencies like the Forestry Department for permission to clear the way leave. However, the company shall ensure re afforestation is done and the cleared areas retain their aesthetic value

Resettlement Action Plan (RAP): A comprehensive Resettlement Action Plan should be conducted by the proponent to identify those who will be affected by the proposed project and compensate them accordingly.

Mitigation Measures: Mitigation measures outlined in this report should be adhered to and the Environmental and Social Management Plan (ESMP) implemented to the letter. The implementation of this ESMP wil be key in achieving the appropriate environmental management standards as detailed for this project.

Annual environmental audits: Contractor should undertake annual environmental audits (EA) of the project after completion to confirm the efficiency and adequacy of ESMP

Monitoring: The impacts of the proposed project should be monitored closely by the Proponent in collaboration with NEMA and Environment and Health & Safety Department at Contractor and KETRACO. The Consultant recommends that an **independent consultant** will be sourced to oversee environmental management throughout the construction phase and during the operational phase and decommissioning phase. He will provide Environmental audits in line with NEMA's requirement

Design Alteration of Transmission line at critical areas: The proposed transmission line should be redesigned to minimise negative impacts where it crosses the Kenya – Ethiopia Proposed Transmission line

Licence: All the negative impacts identified can be mitigated, and will restore the ecosystem to near or original state. We thereby recommend that the proponent should be licenced by NEMA to continue with the construction of the proposed project

The proponent should work closely with local people, community leaders, County Government and other stakeholders to ensure smooth implementation of the project

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APPENDICES

Appendix I: Key Informant Reports

A. KEY INFORMANT REPORTS FOR MARSABIT COUNTY TO INFORM THE ESIA REPORT FOR PROPOSED 400kV LOIYANGALANI - MARSABIT TRANSMISSION LINES

DATE: 14TH NOVEMBER, 2016

The consulting team spent the whole day consulting the key informants as required by NEMA. This is to get additional information, sensitize the key informants, collect existing data where possible and get their view on the proposed project.

The team managed to meet the following key informants and managed to get the following information.

CULTURE AND SOCIAL SERVICES DEPARTMENT

Key Informant: Edward Lemoton

Assistant Director- Culture and Social Welfare Marsabit County

In attendance: See attached list

Peter Kimani; the team leader gave a brief background of the project and informed the key informant that the main activity at this point was to carry out an Environmental and Impact Assessment (ESIA) by engaging the community most likely to be affected through public consultation and carry out questionnaires.

Mr Edward informed the consulting team the following issues concerning culture and social life of the Samburu, Rendile and Turkana communities which are the communities likely to be affected directly or indirectly by the proposed project:

i. These are pastoral communities hence live in Manyattas
ii. The manyatas are built along clan lines and according to seniority
iii. Some of the culture observed amongst the Rendile community are:
    - Every Manyatta has a shrine where elders meet every evening (Naapo) for prayers. They light a fire in the middle of the Manyatta during this occasion.
    - They perform sacrificial ceremonies (Sorio) every three months whereby they slaughter a goat and smear the blood on the doors of their Manyatta for the wellness of the community. This occasion is graced by elders and the first born boy child of every family in the Manyata and during that occasion, all animals must be brought home
iv. The Samburu observe the following cultures:

- Circumcisions
- Tradition marriages
- Age set transitions

v. Some of the things that the community may want protected are:
    - Schools
    - Shrines
    - Burial sites
    - Manyattas
    - Water points

vi. Religion wise, the communities are mostly traditional believers
vii. The literally level is too low;20%
viii. In times of relocating such communities, it becomes hard to compensate
ix. There are no permanent structures in the area

The assistant director after being well informed, she applauded the project for the fact that Marsabit County will be supplied with electricity power and also the county will be connected to the national grid.

The assistant director made it clear that the communities which might be affected are flexible and hence when well compensated as per the Resettlement Action Plan (RAP), they will have no problem with relocation to pave way for the proposed high voltage transmission lines.

He also informed the consulting team that the problem may arise in a case whereby the transmission line passes through a Manyata and only a few persons are affected and are required to relocate. In such a case, the whole Manyata may have to be compensated become they can't be separated due to the fact that they live in the Manyata on bases of clan and seniority. The cost of moving the whole Manyatta may be expensive since the compensating team have to cater for all the expenses including for the rituals performed when a new Manyata is build.

The consulting team promised the assistant director that all the information passed will be put in the EISA report and proper recommendations will be given as well
The assistant director promised the consulting team of support and cooperation where need be and the discussion was closed after an agreement that the project should go on.

B. COUNTY COMMISSIONER MARSABIT COUNTY

Key Informant: Joseph Orambui Nyakwara

Deputy County Commissioner - Marsabit County

In attendance: See attached list

The consulting team paid a courtesy call to the county commissioner's office in Marsabit County and met with the deputy county commissioner.

After introduction from the team leader about the project, he informed the commissioner that the main activity at this point was to carry out an Environmental and Social Impact Assessment (ESIA) through public consultation and use of questionnaires.

The deputy commissioner applauded the project and promised the team of coordination and support where need be.

C. ENERGY, LANDS AND MINING DEPARTMENT

Key Informant: Alex Ali Guleid

County Officer- Energy, Lands and Mining, Marsabit County

In attendance: See attached list

The consulting team visited the energy, lands, and mining department in the county and met Mr Alex Ali who is the county officer.

Peter Kimani the team leader gave a brief background of the project and he informed the officer that the main activity at this point was to carry out an Environmental and Social Impact Assessment (ESIA) through public consultation use of questionnaires.

The consulting team informed the key informant that there will be a substation at Hulahula from which Marsabit County will be supplied with electricity power.

The key informant informed the consulting team that:

i. Currently, the county uses power from diesel operated turbines
ii. The county is currently having power problems in terms of connections and disruptions which are majorly due to the on-going road constructions
iii. Schools have been connected with electricity
iv. The project would have of much help since it has been the county's wish to be connected to the national grid for consistence in terms of power availability

In terms of land, the key informant informed the team that:

i. The land is already divided and individually owned with title deeds under way
ii. At log logo, people are settled in individual level though the rest of the land is community owned
iii. The community land is managed by community with no formal ownership
iv. There are social amenities that are likely to be affected or displaced by the power line
v. The compensation of community land is done to the county government while individuals with title deeds is done to individuals
vi. Land use is mostly used for grazing but there are some areas like Huli and near mountains where agro pastoralist is practised
vii. The community is not so much attached to their land and therefore relocating them is not such an issue except for their cultural sites
viii. Land conflicts are there and there is an office in the county for conflict management
ix. The area receives very little rainfall hence suffers from severe droughts

The consulting team appreciated the information given and promised to pass the grievances through the ESIA report for action and guideline in the activities that will follow.

D. COUNTY DIRECTOR ENVIRONMENT- NEMA

Key Informant: Simon Tonui

Marsabit County

In attendance: See attached list

The consulting team visited the county director environment- NEMA and met Mr Simon Tunoi for interviews as a key informant for the ESIA study of the proposed high voltage power transmission line.

Peter Kimani the team leader gave a brief background of the project and he informed the officer that the main activity at this point was to carry out an Environmental and Social Impact Assessment (ESIA) through public consultation use of questionnaires.

Mr Simon Tanui applauded the proposed project since it will increase the electricity in the town and county as a whole hence uplifting the communities life.

E. AGRICULTURE, FISHERIES AND LIVESTOCK COUNTY DEPARTMENT

Key Informant- Assistant Director- Livestock Department

Marsabit County

In Attendance: See Attached Attendance List

Introduction on the project was done by ENWAG team leader Peter Kimani, he further informed the key informant that the main activity at this point was to carry out an Environmental and Social Impact Assessment (ESIA) by engaging the community most likely to be affected through public consultation and taking of questionnaires.

The consulting team learned the following from the livestock department:

i. In Marsabit County, 88% of the household keep livestock; which is the main driver of economy of the county.
ii. An estimated 95% of the land is used by pastoralists, where a great number of the households are still mobile. This is an age tested adaptation to the variable climatic conditions in these ecologically fragile rangelands.
iii. The pastoralists move the livestock where the rain falls as long as other factors that dictate mobility allow.
iv. The county pastoralists produce cow milk, goat milk, and camel milk which is an essential requirement for children below age of 5 years.
v. The county has only two agro vets, located at Marsabit and Moyale, mainly selling veterinary drugs without stocking other livestock inputs like feeds, grass seeds or equipment.
vi. The distribution channels for reaching the widely scattered pastoralist are poorly developed and the actual demand tends to be rather low.
vii. Human- human conflicts have been experienced in the area as a result of scarce grazing and water resources. These conflicts interfere with the provision of an enabling environment for livestock production.
viii. Grazing area in the county are communally owned with an exemption of urban area, forest areas, national parks, game reserves and conservancies

The assistance director informed the consulting team that the pastoralists in the county may not have an issue with the construction of the high voltage transmission line but may request that as a CSR project, construction of water points for livestock in the grazing areas should be done since the county has very little water supply.
The assistant director, livestock department agreed in support of the projects since Marsabit will be supplied with electricity power as well as be connected to the national grid.

F. WATER RESOURCES MANAGEMENT AUTHORITY MARSABIT SUB REGION OFFICE

Key Informant- Gilbert M Muturi- Water Right Officer

Marsabit County

In Attendance: See Attached Attendance List

After introduction from the Consulting team, Peter Kimani who is the ESIA expert gave a brief background of the project and informed the key informant that the main activity at this point was to carry out an Environmental and Social Impact Assessment

(ESIA) by engaging the community most likely to be affected through public consultation and taking of questionnaires.
The consulting team learned the following from the water right officer:

i. The main source of water is for the county is ground water with the highest borehole yield being 40m^3/year for Log logo aquifer which is recharged by the Marsabit hills
ii. There are dug wells and water pans in the area which have fried up so far due to the lack of rains and the current dry season
iii. The water sources are governed by Ewaso Ng'iro North Water Services Board
iv. The water is saline to acceptable degree of salinity

The boreholes in Marsabit County are distributed as follows

i. Kalole- no borehole
ii. Kamboe- two boreholes
iii. Logologo- two boreholes and a water pan
iv. Leisamis- three boreholes
v. Melile- three boreholes

He informed the consulting team that as long as the transmission line will not affect the water point, the community will have no problem with it since it will supply Marsabit with electricity power.

G. DIRECTOR ENVIRONMENT

Key Informant: Janet Ahath

Marsabit County

In attendance: See attached list

The consulting team visited the director of environment Marsabit County Madam Janet for interviews as a key informant for the proposed project.

Peter Kimani who is the ESIA expert gave a brief background of the project and informed the key informant that the main activity at this point was to carry out an Environmental and Social Impact Assessment (ESIA) by engaging the community most likely to be affected through public consultation and taking of questionnaires.
Madam Janet informed the consulting team that environmental issues are specific to specific areas in the county. However, some of the most occurring issues are:

- Forest destructions
- Wildlife poaching
- Water over abstraction due to lack of permanent rivers
- Charcoal burning in the hills and catchment area
- Timber and firewood harvesting
- Overgrazing
- Waste disposal and livestock droppings in the direct environment
- Presence of invasive weeds

She however, requested the consulting team to engage the community mostly likely to be affected in public consultation and participation as well as sensitization in a lengthy way.

She also requested that due to fact that the constructions of the high voltage transmission line will results to so many negative environmental impacts, mitigation measures should be well stated and applied.

She promised to coordinate with the consulting team and to help where need be and agreed that the project should go on.

Key informant meeting with the deputy county commissioner

Key informant interview with the county officer, land energy and mining

Key informant and the consultant team take a photo after the interview with the county cultural and social services staffs

Key informant interview at NEMA

Appendix II: Minutes of the Public Barazas

A. Minutes of Meeting Held at Hula Hula

MINUTES OF PUBLIC MEETING FOR THE PROPOSED LOIYANGALANI- MARSABIT ELECTRICITY TRANSMISSION LINE (400KV) HELD ON 14TH NOVEMBER, 2016 AT HULAHULA LOCATION, SAKU SUB-COUNTY, MARSABIT COUNTY.

PRESENT

See the attached list.

AGENDA

1. Opening Remarks.
2. Project Description
3. Issues/ concerns raised
4. Suggestions
5. A.O.B

Preliminary

The meeting was called to order at 11.00 am, chaired by the Area assistance chief, Charity Gobanai, after which she requested for a self-introduction by the ESIA team to the local residents. The assistance Chief then briefed the community about the meeting agenda and called upon the community members present to air their opinions and concerns about the project, after-which she welcomed the ESIA consultants to take over the meeting.

Min 1: Opening Remarks

The ESIA Consultants gave a brief overview of the whole evolution of environmental concerns and law that led to the present situation. They explained that in the Environmental Impact

Assessment process public consultation was a must, acknowledging that the public meeting was an important stage as is a requirement in the Environmental Management and Coordination

Act (EMCA) 1999. They also stated that the purpose of the meeting was to create awareness of the proposed Loiyangalani- Marsabit transmission line project, to obtain views/ concerns of the stakeholders, and to clarify issues that are not clear about the project. The consultant also gave a breakdown of the procedures involved in the capturing the views, presentation in the report and the follow up to the resolutions thus formulated to the time when a decision is made by the authority (NEMA).

Min 2: Project Description

The ESIA team gave a brief description of the project to the community members in attendance on Project area, location and beneficiaries; Administration of the project; Need for the project; Project design; Components of the system and Layout of the electricity line

They added that the project will have a power substation at Hulahula in Marsabit to boost the power supply in Marsabit County. The community members present were made aware that the project has an aim of increasing electricity interconnection in the region and the neighbouring regions as well as to increase access to more local electricity supply. The ESIA team insisted that development of sustainable energy projects is priority given to investors by the Kenyan government in order to curb the power crisis experienced country wide in order to help in achieving vision 2030.

The ESIA consultant emphasized that the project is very friendly to the environment since it will promote access to more and reliable electricity which will improve the living standards of the locals as well as attract more investments among others.

Min 3: Issues/ Concerns Raised

The Consultant invited the community members to give their views regarding the project as they wished, and the following concerns were raised:

Positive impacts

The community applauded the project construction and appreciated the public participation in the ESIA study with each of them giving a go ahead of the Project. Some of the reasons for the project appraisal were as follows:-

1. Job creation for the community: the community felt that the project development would create job vacancies at all levels of the construction and implementation process, hence improving means of livelihood of the people.
2. Increased electricity power supply source at the neighbourhood thus reducing electricity disruption such as blackouts.
3. Enhanced Security due to lighting in the neighbourhood at night.
4. Increased business in the locality.
5. Attract more foreign investments and promote industrial activity in the region.
6. Contribution to the national economy growth.
7. Increase in land value.

	Community Concerns	Responses
1	Electricity supply to Marsabit residents.	The ESIA expert explained that since the electricity is high voltage, it will be taken to a substation for standardization then be made available to Marsabit locals. He assured the locals that their area would be in the national electricity grid.
2	Compensation of the affected people.	The ESIA expert assured the locals affected of compensation of the land, structures and plants damaged as well as being offered additional 15% disturbance allowance.
3	Employment of locals	The ESIA expert assured the locals of temporary

	not outsiders in the project implementation.	employment such as unskilled labour. The locals insisted that Kenya police reserve (KPR) should also be considered for security Instead of the Kenya government police during the project implementation.
4	Corporate social responsibility activities by proponent	The locals suggested that the proponent should establish a secondary school, a health centre and a borehole in the area as a CSR activity.
5	Wayleave size and possibility of use of land after being compensated for the Wayleave	The ESIA expert reported that the Wayleave size is 20 by 20 metres thus 40 metres. He also insisted that building under the transmission line is illegal or planting trees under the same line. He explained that only short plants such as potatoes and beans can be planted on that land.

Min 4: Way Forward.

The Consultants requested the people present to follow-up on any communications and

Memorandum issued so that the final Environmental Impact Assessment Study Report put in their comments for further action, and that NEMA will also request for Public comments through the Newspapers. It was also said that the report would be available at the County

Environment office in Marsabit, where the residents and other stakeholders may go to review it and give their comments. The Consultant assured the residents that recommendations for the project will be made accordingly

Min 5: Adjournment

There being no other business for discussion the meeting was adjourned at 2:00 pm with prayer from the one of the locals.

B. Minutes of Meeting Held at Kargi Baraza Park

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE HELD ON 15TH NOVEMBER 2016 AT KARGI BARAZA PARK, KARGI LOCATION, LEISAMIS SUB COUNTY, MARSABIT COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Briefing and Sensitization
3. Discussion, concerns and address
4. Way forward
5. Closing

Minute 01: Introduction.

The area head chief called the meeting to order at 11:00am and requested a volunteer to pray. He then made the opening remarks and allowed the ENWAG team to introduce themselves to the attendants and after that, welcomed everyone to the meeting

Minute 2: Briefing and Sensitization

The audiences were made aware of the details of the project as follows;

- The line starts at Loiyangalani and ends in Marsabit town.
- Probable impacts of the project were listed to the PAPS, both positive and negative.
- The entry points of KETRACO, NEMA, ENWAG and KPLC among others were explained.
- The concepts of right of way of the proposed line and resettlement action plan were explained.
- The idea of land acquisition and compensation was explained.
- The structures expected to be put up so as to come with the lines like pylons were explained and the measures to be put in place to ensure the construction is safe.

Minute 03: Discussions, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community, local authority as well as the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The distance the power line will cover as it traverses through to its destination	The final designs are not yet done hence at this early stage it is not possible to tell the exact place where the line will pass through
2	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA report which will be put to place- ESIA expert
3	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
4	Valuation of communal land	Communal land will be compensated to the county government but individuals will be compensated for their affected structures
5	Risks of power line failure causing disaster	The transmission will be done by experts professionally to avoid such disaster
6	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
10	Jobs availability to the locals and CRS projects	Jobs will be availed to the locals in time of operation phase. CSR will depend on the contractor and agreement with the locals as the project moves on

Minute 04: Way forward.

The chief appreciated the participation of all members present and assured the consulting team cooperation though out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance agreed that the project is more beneficial thus a decision was made on a public consultation forum at Kargi Barazas Park, Kargi location in Laisamis constituency that the project should go on.

Minute 05: Adjournment.

There being no other business, the meeting was adjourned at 12:30 pm with a word of prayer.

C. Minutes of Meeting Held at Kambinye

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE HELD ON 15TH NOVEMBER 2016 AT KAMBINYE LOCATION, LEISAMIS COSTITUENCY, MARSABIT COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Briefing and sensitization
3. Comments, concerns and address
4. Way forward
5. Adjournment

Minute 01: Introduction.

The area assistant chief, Mohamud Ardele called the meeting to order at 1:00pm and requested a volunteer to pray. He then made the opening remarks and allowed the ENWAG team to introduce themselves to the attendants and after that, welcomed everyone to the meeting

Minute 2: Briefing and Sensitization

The audiences were made aware of the details of the project as follows;

- The line starts at Loiyangalani and ends in Marsabit town.
- Probable impacts of the project were listed to the PAPS, both positive and negative.
- The entry points of KETRACO, NEMA, ENWAG and KPLC among others were explained.
- The concepts of right of way of the proposed line and resettlement action plan were explained.
- The idea of land acquisition and compensation was explained.
- The structures expected to be put up so as to come with the lines like pylons were explained and the measures to be put in place to ensure the construction is safe.

Minute 03: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community, local authority as well as the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The distance the power line will cover as it traverses through to its destination	The final designs are not yet done hence at this early stage it is not possible to tell the exact place where the line will pass through
2	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA report which will be put to place- ESIA expert
3	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
4	Valuation of communal land	Communal land will be compensated to the county government but individuals will be compensated for their affected structures
5	Risks of power line failure causing disaster	The transmission will be done by experts professionally to avoid such disaster
6	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
10	Jobs availability to the locals and CRS projects	Jobs will be availed to the locals in time of operation phase. CSR will depend on the contractor and agreement with the locals as the project moves on

Minute 04: Way forward.

The chief appreciated the participation of all members present and assured the consulting team cooperation though out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

All members in attendance agreed that the project is more beneficial thus a decision was made on a public consultation forum at Kambinye sub location, Laisamis constituency that the project should go on.

Minute 05: Adjournment.

There being no other business, the meeting was adjourned at 2:30 pm with a word of prayer.

D. Minutes of Meeting Held at Bagasi

MINUTES OF PUBLIC CONSULTATION AND PARTICIPATION MEETING FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE HELD ON 15TH NOVEMBER 2016 AT BAGASI SUBLOCATION, KARGI LOCATION, LEISAMIS COSTITUENCY, MARSABIT COUNTY

IN ATTENDANCE

See the attached list.

AGENDA

1. Introduction
2. Briefing and sensitization
3. Comments, concerns and address
4. Way forward
5. Adjournment

Minute 01: Introduction.

The area t chief, David T Wambille called the meeting to order at 3:00pm and requested a volunteer to pray. He then made the opening remarks and allowed the ENWAG team to introduce themselves to the attendants and after that, welcomed everyone to the meeting

Minute 2: Briefing and Sensitization

The audiences were made aware of the details of the project as follows;

- The line starts at Loiyangalani and ends in Marsabit town.
- Probable impacts of the project were listed to the PAPS, both positive and negative.
- The entry points of KETRACO, NEMA, ENWAG and KPLC among others were explained.
- The concepts of right of way of the proposed line and resettlement action plan were explained.
- The idea of land acquisition and compensation was explained.
- The structures expected to be put up so as to come with the lines like pylons were explained and the measures to be put in place to ensure the construction is safe.

Minute 03: Comments, Concerns and Address.

Murigi Wa Mwangi who is an ESIA consultant emphasized that the project is very friendly to the environment and the benefits of such a high voltage power line may not be felt directly but as a long term benefit where by the power will be more reliable and power shortages will reduce to minimal.

He also insisted that adequate awareness on the project should be made to the local community, local authority as well as the people who will affected by the project.

The locals however raised some issues that required clarification on the following.

	Community Concerns	Responses
1	The distance the power line will cover as it traverses through to its destination	The final designs are not yet done hence at this early stage it is not possible to tell the exact place where the line will pass through
2	How will the negative impacts of the project be handled?	There are mitigation measures to all the negative impacts well stated in the ESIA report which will be put to place- ESIA expert
3	Valuation of the land and properties	Land will be valued as per the current market rate and properties will be valued according to the resettlement framework policy
4	Valuation of communal land	Communal land will be compensated to the county government but individuals will be compensated for their affected structures
5	Risks of power line failure causing disaster	The transmission will be done by experts professionally to avoid such disaster
6	Transparency during the compensation implementation of the project	The ESIA consulting team promised transparency all through the project
10	Jobs availability to the locals and CRS projects	Jobs will be availed to the locals in time of operation phase. CSR will depend on the contractor and agreement with the locals as the project moves on

Minute 04: Way forward.

The chief appreciated the participation of all members present and assured the consulting team cooperation though out the exercise.

The community members agreed to fill a questionnaire which would inform the ESIA report for equal participation of the community.

The community members promised to cooperate with the surveyor and valuer when that time comes for their properties which are within the way leave to be valued for compensation.

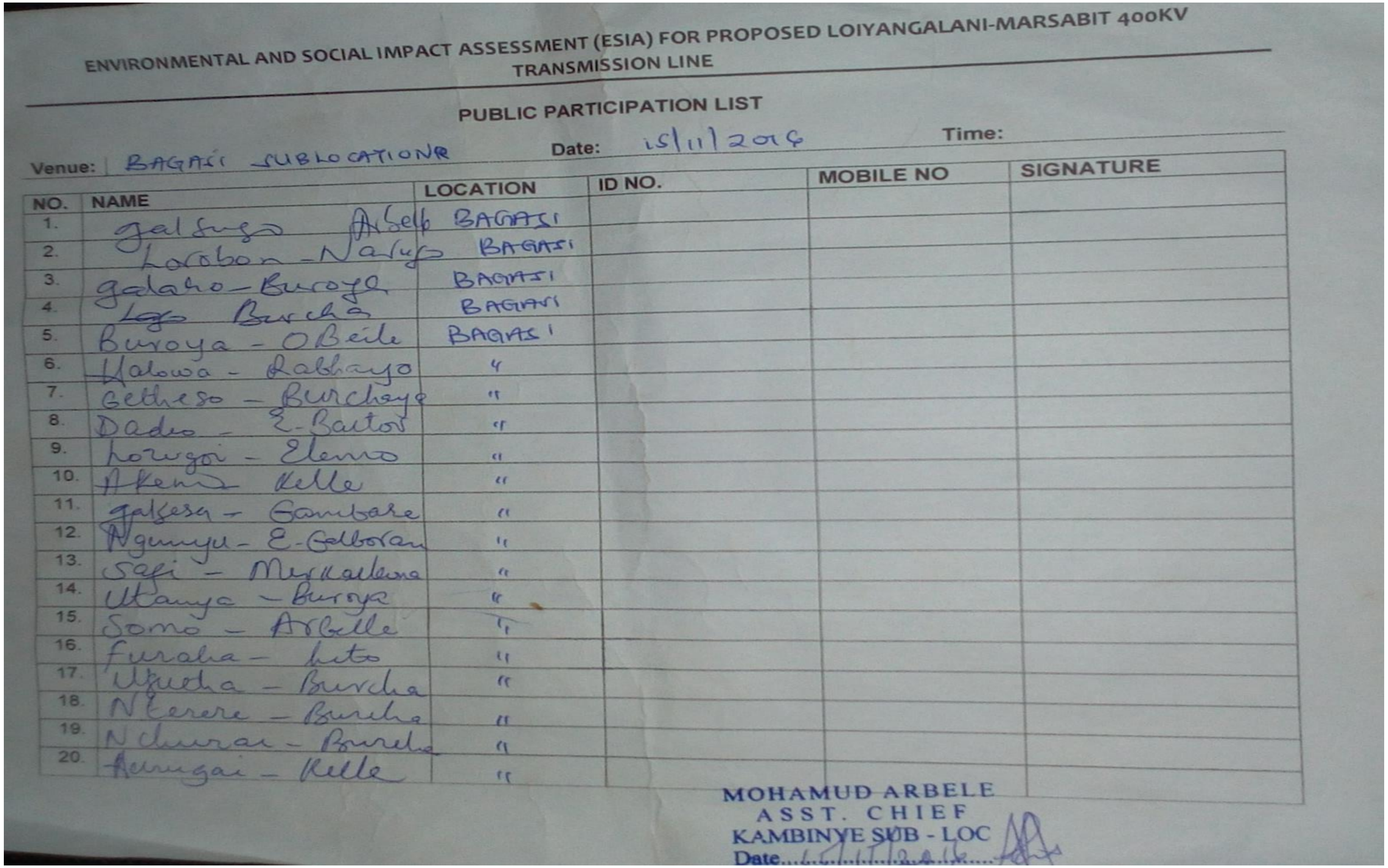
All members in attendance agreed that the project is more beneficial thus a decision was made on a public consultation forum at Bagasi sub location, Laisamis constituency that the project should go on.

Minute 05: Adjournment.

There being no other business, the meeting was adjourned at 4:00 pm with a word of prayer.

Appendix III: Attendance lists

A. Meeting at Bagasi sub-location



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

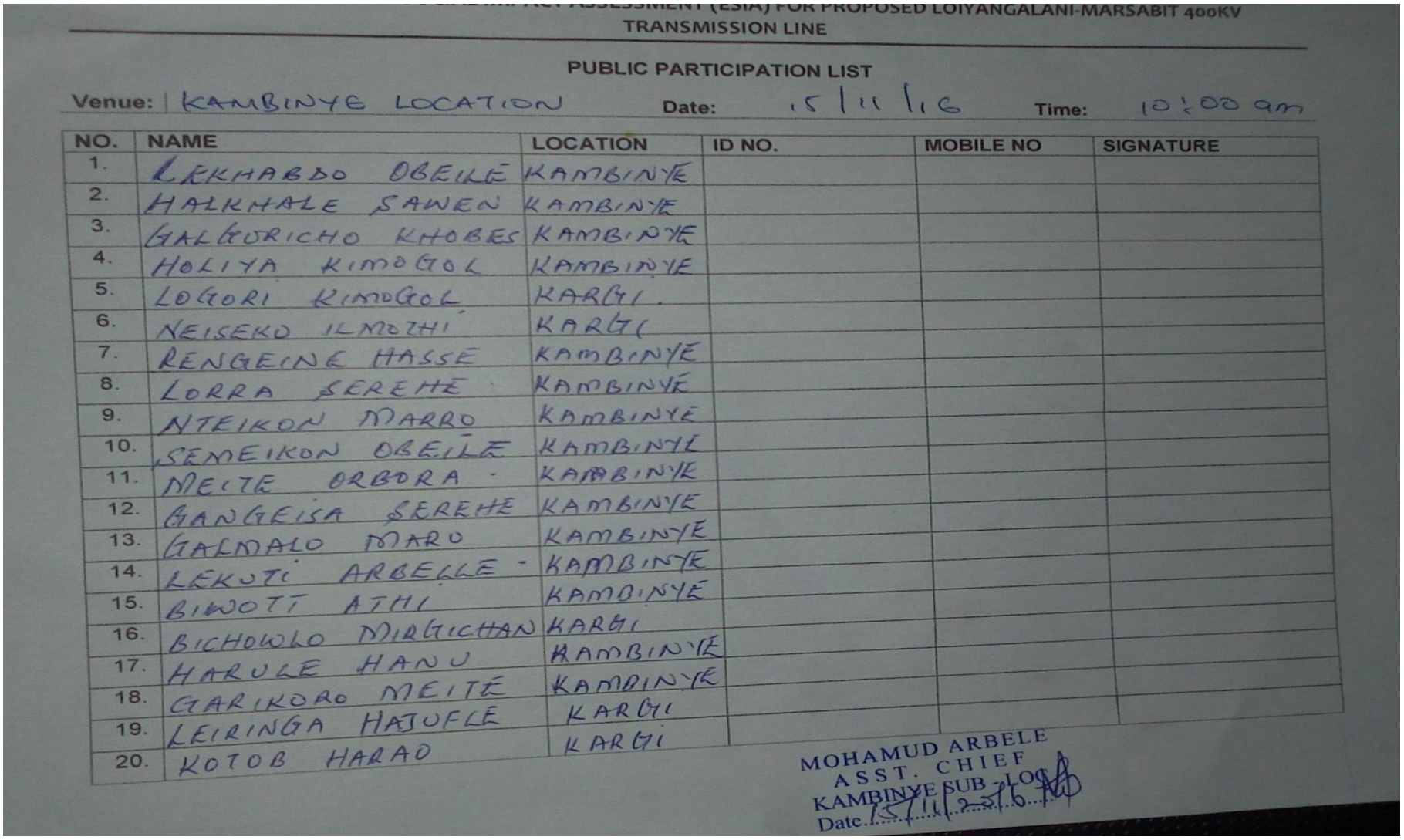
PUBLIC PARTICIPATION LIST

Venue: BAGASI SUBLOCATION Date: 15/11/2016 Time:

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Galsuga Arbelle	BAGASI			
2.	Lorobon - Nalugo	BAGASI			
3.	Galaho - Buroya	BAGASI			
4.	Lago Burcha	BAGASI			
5.	Buroya - OBeile	BAGASI			
6.	Halowa - Rabbayo	"			
7.	Gelheso - Burchaye	"			
8.	Dado - E-Bartos	"			
9.	Lorugoi - Elemo	"			
10.	Akeno Kelle	"			
11.	Galgesa - Gambare	"			
12.	Ngunyu - E-Galboran	"			
13.	Safi - Merkallena	"			
14.	Utanya - Buroya	"			
15.	Somo - Arbelle	"			
16.	Furaha - Lito	"			
17.	Ujucha - Burcha	"			
18.	Nterere - Burcha	"			
19.	Nchurai - Burcha	"			
20.	Aerugai - Kelle	"			

MOHAMUD ARBELE
ASST. CHIEF
KAMBINYE SUB - LOC
Date 15/11/2016

B: Meeting at Kambinye location



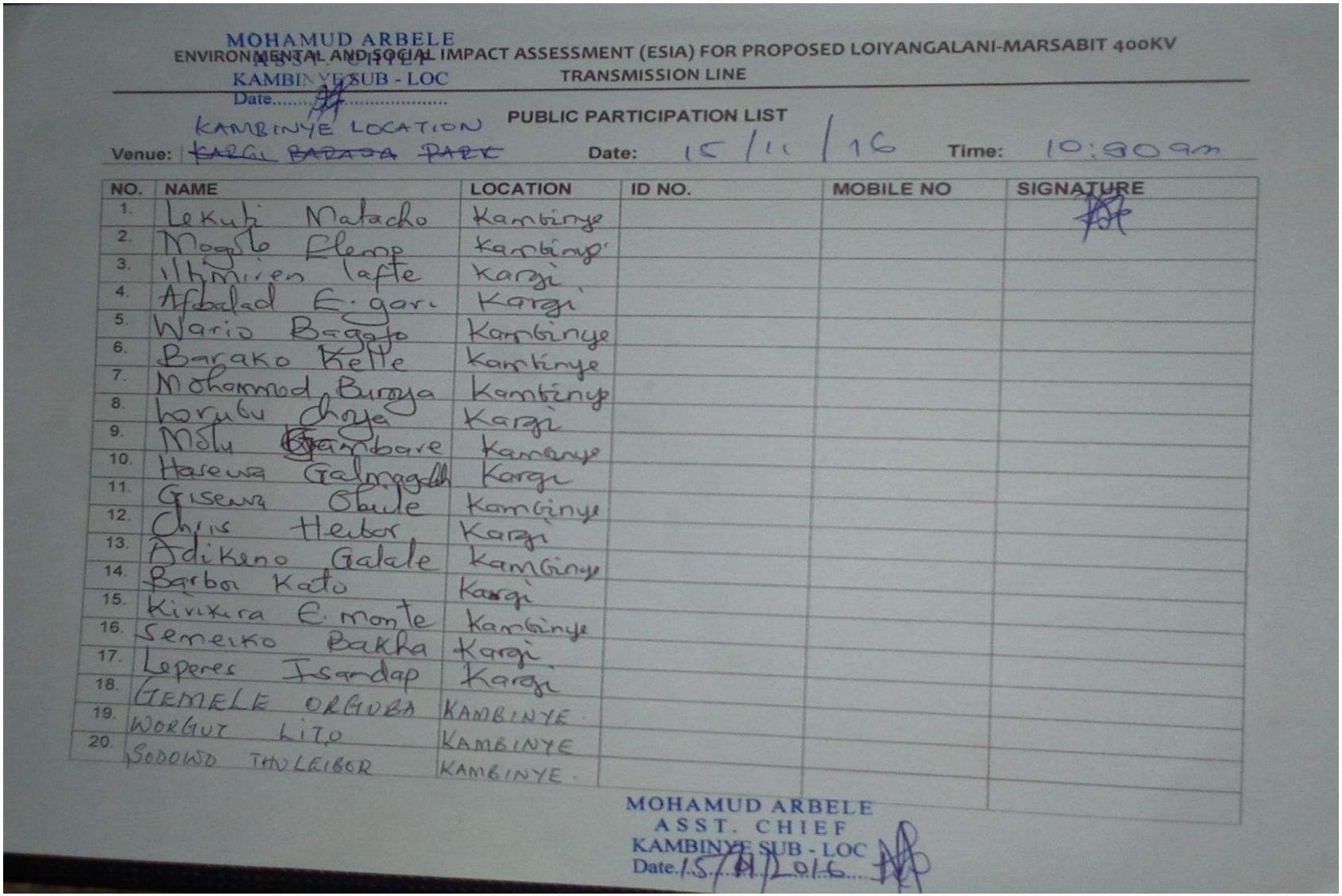
TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: KAMBINYE LOCATION Date: 15/11/16 Time: 10:00 am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	LEKHABDO OBEILE	KAMBINYE			
2.	HALKHALE SAWEN	KAMBINYE			
3.	GALGORICHO KHOBES	KAMBINYE			
4.	HOLIYA KIMOGOL	KAMBINYE			
5.	LOGORI KIMOGOL	KARGI			
6.	NEISEKO ILMOTHI	KARGI			
7.	RENGEINE HASSE	KAMBINYE			
8.	LORRA SEREHE	KAMBINYE			
9.	NTEIKON MARRO	KAMBINYE			
10.	SEMEIKON OBEILE	KAMBINYE			
11.	MEITE ORBORA	KAMBINYE			
12.	GANGEISA SEREHE	KAMBINYE			
13.	GALMALO MARO	KAMBINYE			
14.	LEKUTI ARBELLE	KAMBINYE			
15.	BIWOTI ATHI	KAMBINYE			
16.	BICHOWLO MIRGICHAN	KARGI			
17.	HARULE HANU	KAMBINYE			
18.	GARIKORO MEITE	KAMBINYE			
19.	LEIRINGA HAJUFLE	KARGI			
20.	KOTOB HARAD	KARGI			

MOHAMUD ARBELE
ASST. CHIEF
KAMBINYE SUB-LOC
Date 15/11/2016



MOHAMUD ARBELE
ASST. CHIEF
KAMBINYE SUB - LOC
Date.....

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

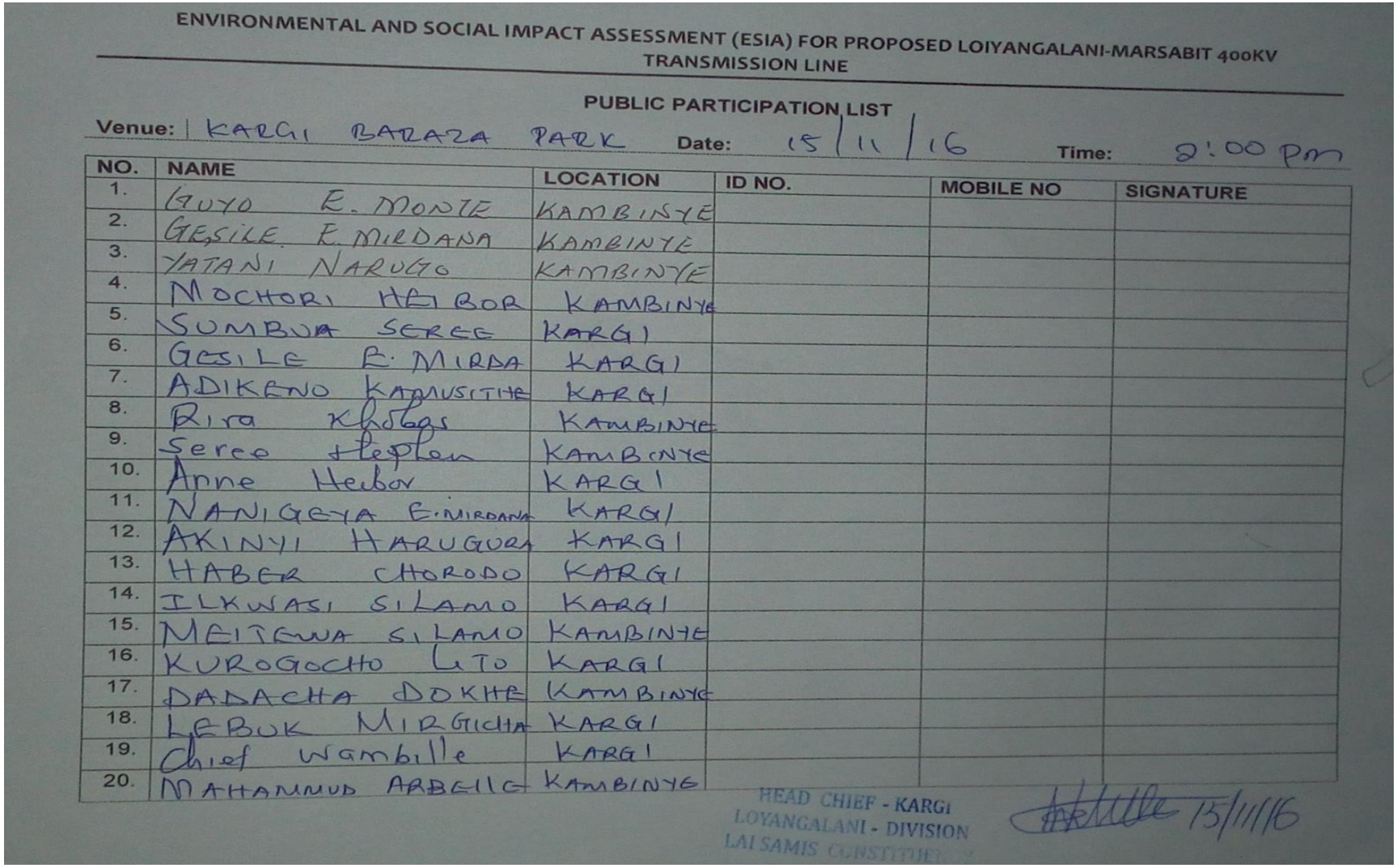
KAMBINYE LOCATION

Venue: ~~KARGI BARAZA PARK~~ Date: 15/11/16 Time: 10:30am

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Lekuti Matacho	Kambinye			
2.	Mogolo Elemp	Kambinye			
3.	Ilhmiren lafte	Kargi			
4.	Afbalad E. gari	Kargi			
5.	Wario Baggalo	Kambinye			
6.	Barako Kelle	Kambinye			
7.	Mohammed Burqya	Kambinye			
8.	Horubu Choya	Kargi			
9.	Molu Kambare	Kambinye			
10.	Hasewa Galmagalla	Kargi			
11.	Gisewa Obule	Kambinye			
12.	Chris Hebor	Kargi			
13.	Adikeno Galale	Kambinye			
14.	Barbo Kato	Kargi			
15.	Kirikura E. monte	Kambinye			
16.	Semeiko Bakha	Kargi			
17.	Leperes Isandap	Kargi			
18.	GEMELE ORGUBA	KAMBINYE			
19.	WORGUT LITO	KAMBINYE			
20.	SODOWO THULEIBOR	KAMBINYE			

MOHAMUD ARBELE
ASST. CHIEF
KAMBINYE SUB - LOC
Date.15/11/2016

C: Meeting at Kargi baraza park



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

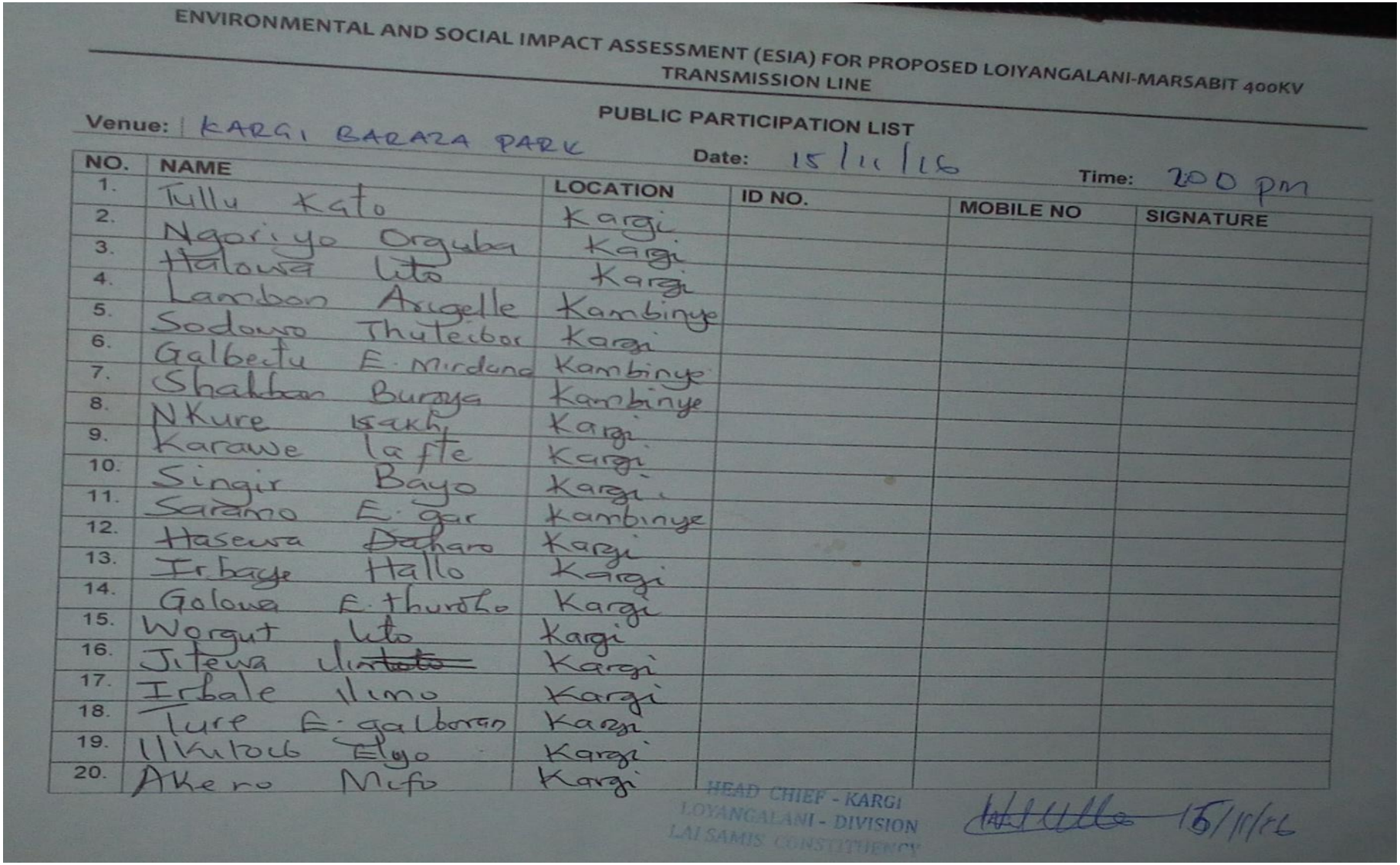
PUBLIC PARTICIPATION LIST

Venue: KARGI BARAZA PARK Date: 15/11/16 Time: 2:00 PM

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	GUYO R. MONTE	KAMBINYE			
2.	GESILE E. MIRDANA	KAMBINYE			
3.	YATANI NARUGO	KAMBINYE			
4.	MOCHORI HEI BOR	KAMBINYE			
5.	SUMBUA SEREE	KARGI			
6.	GESILE E. MIRDA	KARGI			
7.	ADIKENO KAMUSITHE	KARGI			
8.	Rira Khobgs	KAMBINYE			
9.	Seree Hleplon	KAMBINYE			
10.	Anne Heibor	KARGI			
11.	NANIGEYA E. MIRDANA	KARGI			
12.	AKINYI HARUGURA	KARGI			
13.	HABER CHORODO	KARGI			
14.	ILKWASI SILAMO	KARGI			
15.	MEITEWA SILAMO	KAMBINYE			
16.	KUROGOCHO LETO	KARGI			
17.	DADACHA DOKHE	KAMBINYE			
18.	LEBUK MIRGICHA	KARGI			
19.	Chief Wambille	KARGI			
20.	MAHAMMUD ARBELLE	KAMBINYE			

HEAD CHIEF - KARGI
LOYANGALANI - DIVISION
LAI SAMIS CONSTITUEN

15/11/16



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: KARGI BARAZA PARK Date: 15/11/16 Time: 2:00 pm

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	Tullu Kato	Kargi			
2.	Ngariyo Orgubu	Kargi			
3.	Halowa Uto	Kargi			
4.	Lambon Asugelle	Kambinye			
5.	Sodowo Thuteibor	Kargi			
6.	Galbetu E. Mirduna	Kambinye			
7.	Shahban Burraya	Kambinye			
8.	NKure Isakh	Kargi			
9.	Karawe Lafte	Kargi			
10.	Singir Bayo	Kargi			
11.	Sarano E. gar	Kambinye			
12.	Hasewa ~~Daharo~~	Kargi			
13.	Irbaye Hallo	Kargi			
14.	Golowa E. thuroto	Kargi			
15.	Worgut Uto	Kargi			
16.	Jitewa ~~Uintoto~~	Kargi			
17.	Irbale Ilmo	Kargi			
18.	Ture E. galboran	Kargi			
19.	Ilkuloo Elyo	Kargi			
20.	Akero Mufo	Kargi			

HEAD CHIEF - KARGI LOYANGALANI - DIVISION LAISAMIS CONSTITUENCY

15/11/16

TRANSMISSION LINE

PUBLIC PARTICIPATION LIST

Venue: KARGI BARAZA PARK **Date:** 15/11/2016 **Time:** 2:00 pm

NO.	NAME	LOCATION	ID NO.	MOBILE NO	SIGNATURE
1.	KURUKO BULLO	KARGI	20875621	0708730937	
2.	PETER H RABHAYO	KARGI	24073901	0719408533	
3.	IBRAHIM BUROYA	KARGI	0631708	0703757572	
4.	FRANCIS KHOBOCHA LITO	KARGI	30007369	0707864495	
5.	AMINA HARAO	KARGI	170585	0791540936	
6.	DERACHE E. Middana	KARGI	02321128	0711510151	
7.	Woraut E. Fecha	KARGI	[illegible] 32581412	NO	
8.	Makhaleva Thuraro	KARGI	28045112	0703151012	
9.	Waitavo Matacho	KARGI	384146[illegible]5	0710341209	
10.	Support H. Bulyar	KARGI	28024144	0703571018	
11.	Abdisalan Buroya	KARGI	32327025	0705521738	
12.	samuel Bagaid	KARGI	35044997	0718[illegible]	
13.	Hesewa Essiafecha	KARGI	23339261	N/A	
14.	Thuile Galoro	KARGI	38261512	—	
15.	Hafsa Galoro	KARGI	32841721	0708739950	
16.	Dacha Kokhe	KARGI	06273028	0727002990	
17.	BARAKA BUROYA	KARGI	24064109	0717564341	
18.	WILLIAM MALIMO GALORO	KARGI	28633882	0708731950	MALIMO
19.	FRANCIS KHOBOCHA.	KARGI	3000 7369	0707864495	LITO
20.	LUGAYO HARAO	KARGI	3216[illegible]	0707321631	

HEAD CHIEF
LOYANGALANI - DIVISION
LAI SAMIS CONSTITUENCY

15/11/16

Appendix IV: Sample household questionnaires for the proposed Loiyangalani Marsabit400kv transmission line

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	15/11/2016.	**Sub location**	KARGI
Name of Respondent:	KHARCHAYA E GOBANAI	**Location**	KARGI
Mobile No.	–	**Sub-county**	LAISAMIS.
ID No.	—	**County**	MARSABIT.

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent 1. Male ~~2.~~ Female	How old are you (yrs)? 1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs ~~4.~~ 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	What is your marital status? ~~1.~~ Married 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	What is the highest level of education you attained? 1. Primary 2. Secondary 3. Post-secondary 4. University ~~5.~~ Never Attended (99) Others (Specify)	How many years have you been residing here? 1. Less than 1year 2. 1-5years ~~3.~~ 6-10years 4. Over 10years	How many Household members do you have? 1. Less than 3 2. 4 -6 ~~3.~~ 7 and above	Do you have any member of your household who is disabled or orphaned? 1. Yes ~~2.~~ No

1

SECTION BINCOME & LIVELIHOOD

B1	B2	B3	B4	B5	
Do you own any land? 1. Yes 2. No	If Yes, how many acres? 1. Less than 2 acres 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. Above 10 acres	Land ownership 1. Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming 2. Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate?	
				1	Maize
				2	Beans
				3	Tea
				4	Potatoes
				5	Cassava
				6	Vegetables
				99	Others (Specify)

B6		B7	B8	B9
If 2 in B4, which animals do you keep?		What is your average monthly income? (Ksh.)	Is there any cultural heritage or historic monument near the village?	Is your house connected to the following:
1. Goats		1. Less than 10,000 2. 10,001 – 20,000 3. 20,001 – 30,000 4. Over 30,000	1. Yes 2. No If yes, specify	1. Electricity 2. Water
2. Sheep				
3. Cattle				
4. Camels				
99. Others				
			N/A	NO.

2

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

- Affect the graging land.

THE END

3

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	15/11/2016	**Sub location**	Kambiya
Name of Respondent:	Baroya Silamo	**Location**	Karyi
Mobile No.	N/A	**Sub-county**	Laisamis
ID No.		**County**	Marsabit

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent 1. Male 2. Female	How old are you (yrs)? 1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	What is your marital status? 1. Married 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	What is the highest level of education you attained? 1. Primary 2. Secondary 3. Post-secondary 4. University 5. Never Attended (99) Others (Specify)	How many years have you been residing here? 1. Less than 1year 2. 1-5years 3. 6-10years 4. Over 10years	How many Household members do you have? 1. Less than 3 2. 4 -6 3. 7 and above	Do you have any member of your household who is disabled or orphaned? 1. Yes 2. No

1

SECTION BINCOME & LIVELIHOOD

B1	B2	B3	B4	B5
Do you own any land? 1. Yes 2. No	If Yes, how many acres? 1. Less than 2 acres 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. Above 10 acres	Land ownership 1. Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming 2. Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate? 1 Maize 2 Beans 3 Tea 4 Potatoes 5 Cassava 6 Vegetables 99 Others (Specify)

B6	B7	B8	B9
If 2 in B4, which animals do you keep? 1. Goats 2. Sheep 3. Cattle 4. Camels 99. Others	What is your average monthly income? (Ksh.) 1. Less than 10,000 2. 10,001 – 20,000 3. 20,001 – 30,000 4. Over 30,000	Is there any cultural heritage or historic monument near the village? 1. Yes 2. No If yes, specify	Is your house connected to the following: 1. Electricity 2. Water NO

2

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

Benefit cause it create employment to the people

THE END

3

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR PROPOSED LOIYANGALANI-MARSABIT 400KV TRANSMISSION LINE

Household Questionnaire Guide

We have been contracted by the proponent to conduct an **Environmental and Social Impact Assessment** Study for the above proposed Project. This questionnaire will help us obtain information that will be used to identify potential socioeconomic impacts of the proposed project and hence propose adequate mitigation measures to be adhered to during project implementation.

Date:	15/11/2016	**Sub location**	Kambiriye
Name of Respondent:	Bichiligo Heibor	**Location**	Kargi
Mobile No.	0726744852	**Sub-county**	Laisamis
ID No.		**County**	Marsabit

SECTION A: DEMOGRAPHIC DATA

A1	A2	A3	A4	A5	A6	A7
Gender of respondent 1. Male 2. Female	How old are you (yrs)? 1. < 18 yrs 2. 18 – 25 yrs 3. 26 – 35 yrs 4. 36 – 45 yrs 5. 46 – 60yrs 6. Above 60yrs	What is your marital status? 1. Married 2. Widowed 3. Divorced 4. Separated 5. Never Married (99) Other (Specify)	What is the highest level of education you attained? 1. Primary 2. Secondary 3. Post-secondary 4. University 5. Never Attended (99) Others (Specify)	How many years have you been residing here? 1. Less than 1year 2. 1-5years 3. 6-10years 4. Over 10years	How many Household members do you have? 1. Less than 3 2. 4 -6 3. 7 and above	Do you have any member of your household who is disabled or orphaned? 1. Yes 2. No

1

SECTION B INCOME & LIVELIHOOD

B1	B2	B3	B4	B5	
Do you own any land? 1. Yes 2. No	If Yes, how many acres? 1. Less than 2 acres 2. 2.1 – 3.0 3. 3.1 – 5.0 4. 5.0 – 10.0 5. Above 10 acres	Land ownership 1. Owned (with title deed/lease) 2. Rented 3. Community land 4. Squatter 5. Other	What is your main source of income? 1. Farming 2. Livestock keeping 3. Employment 4. Trading/Businessman	If 1 in B4, which crops do you cultivate?	
				1	Maize
				2	Beans
				3	Tea
				4	Potatoes
				5	Cassava
				6	Vegetables
				99	Others (Specify)

B6		B7	B8	B9
If 2 in B4, which animals do you keep?		What is your average monthly income? (Ksh.)	Is there any cultural heritage or historic monument near the village?	Is your house connected to the following:
1. Goats		1. Less than 10,000	1. Yes	1. Electricity
2. Sheep		2. 10,001 – 20,000	2. No	2. Water
3. Cattle		3. 20,001 – 30,000	If yes, specify	
4. Camels		4. Over 30,000		NO
99. Others				

2

SECTION C: PROPOSED PROJECT

C1	C2	C3
Has the proposed project been mentioned to you before? 1. Yes 2. No	Will you agree to allow the power transmission line pass through your land? 1. Yes 2. No 3. No comment	What is your opinion about implementation of the project? 1. Agree 2. Disagree 3. No comment

In your view, what are the likely environmental impacts (benefits or negative impacts) of the proposed project in the area?

It brings benefit to the community

Cause it create employment to the many people

THE END

3

Appendix V: Selected photos

A. Kargi and Kabinye plates






B. Hula Hula plates