ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED KILIMO TEACHERS PIPELINE UPGRADING INTERVENTIONS BY NANYUKI WATER SERVICE PROVIDERS (WSP)

CONTRACT NO.KE-WSTF-406110-CS-INDV-ESIA-03



ESIA FINAL REPORT

Submitted by

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INTERNAL QUALITY CONTROL

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CERTIFICATION

We hereby certify that the content of this Environmental and Social Impact Assessment Report for ***Kilimo Teacher's pipeline Upgrading and realignment*** of the 45Km of DN20 to DN90 pipes by the Nanyuki Water and Sanitation Company is factual and that the content conforms to the provisions of the Environmental Management and Coordination Act Cap. 387 and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2003.

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EXECUTIVE SUMMARY

Introduction

The Kilimo Teachers project area is located about 2.5KM west of Nanyuki town. The Project involves Upgrading and realignment of DN20 to DN90 of the 45Km Kilimo Teacher's pipeline. The project activities include trenching for purposes of excavation of the dilapidated pipes, removal of the pipes, laying of the new pipes, backfilling and leveling of the ground and planting trees within the environs of the pipelines but a bit far from the pipeline. Due to the proximity to the city centre, the area has both flats and bungalow residential houses with a few commercial areas. Kilimo- Teachers is planned, with various access roads, murram and gravel roads with relatively flat topography. The project area accommodates a large population that either work in the town or have small scale businesses within the area. The Ministry of Water, Sanitation and Irrigation (MoWSI) is implementing the Water and Sanitation Development Project (WSDP) with a credit from the International Development Association (IDA) that aims at improving water supply and sanitation services in selected regions in Kenya through the Water Service Providers (WSPs). The project has been allocated funds through WSPs under the CLSG-11 program. The current piping supplies 55% of a possible 90% of water if the pipe network is improved.

This Environmental Social Impact Assessment Report is prepared in line with the Terms of Reference (TOR) for Consultancy Services for undertaking Environmental and Social Impact Assessment for the proposed interventions for Nanyuki Water and Sanitation Company. It is also prepared as per the Environmental Management Coordination Act CAP 387 provisions for submission to National Environment Management Authority so as to obtain an EIA license before the project commences. The key objective of the assignment is to undertake Environmental and Social Impact Assessment (ESIA) that will identify key environmental and social issues that could emanate from the proposed project and develop appropriate mitigation measures. This will support approval of the proposed intervention by the National Environmental Management Authority (NEMA).

Policy and legal framework

The study was carried out in accordance with the following policies: World Bank Operation and Safety Policies namely, OP/BP 4.01 (Environmental Assessment); OP/BP 4.04 (Natural Habitats); OP/BP 4.11 (Physical Cultural Resources); Involuntary Resettlement (OP 4.12); National Water Policy, 2000; Water Catchment Management Policies; National Environment Action Plan (NEAP), 1994; Forestry Act 2016, Wildlife Act 2019, The National Poverty Eradication Plan (NPEP), 1999.

Reference was also made to the following legal framework: Environmental Management and Coordination Act (EMCA), 1999 Revised in 2015; The Environmental Impact Assessment and Audit Regulations, 2003; Water Quality Regulations, 2006*;* The Agriculture Act (Cap 318); Water Act, 2002; and the Public Health Act (Cap 242).

Stakeholders engagement

The ESIA team mapped out the relevant stakeholders who are likely to be affected by the proposed project either directly or indirectly. A stakeholder analysis was conducted to determine their level of power and interest in order to know the best approach for engaging them and the significance of their input to the project. The stakeholders were engaged through Community meetings know as Public Barazas, Key Informant Interviews, Focus Group Discussions and Targeted meetings with line ministries. The outcome of this engagement is analysed in the Public Participation Chapter of this report.

Key Social and Environmental Risks and Mitigation Measures

Noise from construction activities and movement and operation of machinery.

Mitigation measures: Workers should wear protective equipment such as ear muffs, schedule noisy activities during daytime hours, and provide advance notice to affected communities.

- ✓ Vandalism and theft of infrastructure such as pipes and water meters

Mitigation Measures: providing good lighting, and regular patrolling of project sites; Use of local security personnel and village elders to patrol the project.

- ✓ Increased incidences of HIV/AIDs and STIs infections and Alcohol or Substance Abuse: The contractor should organise for awareness campaigns and including counseling for workers

- ✓ Economic displacement/disturbance on livelihood activities :

Mitigation measures: The section where there are kiosks should be the last to be excavated and the first to be backfilled; The contractor should inform the affected persons two weeks in advance before any construction works occur in the area;The agreed upon disturbance allowance should be given to the affected persons way before the construction works commence.

- ✓ Air pollution from dust and machinery emissions

Mitigation measures: Regularly spray water on dusty areas; All workers in the project should wear personal protective equipment such as dust masks and googles;Enforcement of speed limits for vehicles and maintaining and servicing equipment to reduce emissions.

- ✓ Occupational safety, and health issues

Mitigation: Provide workers with appropriate PPE, conduct regular safety training, and ensure compliance with occupational health standards.

- ✓ Wastage of water due to increased efficiency in water provision:

Awareness creation about water conservation practices and installation of water meter systems to monitor usage.

- ✓ Project Related Conflicts due to water allocation disparities

Mitigation measure:Engage stakeholders in inclusive consultations to ensure equitable water distribution and develop a transparent allocation policy.

Traffic congestion and road safety concerns during the pre-construction and construction phase of the project

Mitigation measure: have a traffic management plan with clear signage, designated detours, and safety personnel to direct traffic.

Waste generation from old pipe disposal:

Mitigation measures: segregate the pipes and dispose the ones that are spoilt; store the pipes that can be recycled or reused; level the ground to restore it to the original or improved state after construction

Proposed Environmental and Social Management and Monitoring Plans

The project attracts both positive and negative impacts in all project phases (construction through to decommissioning). However due to the dire need of water in the project area, there is environmental economic and social justification for the proposed project to proceed. A comprehensive environmental and social management plan (ESMP) has been developed to guide the entire project cycle. The ESMP provides the implementation framework and key actors to be involved in mitigating and monitoring of the potential impacts of the project on the environmental and socio-economic settings and for the monitoring of the project performance in accordance to the policy, legal and regulatory requirements.

During the construction of the project, the proponent will be responsible for the day to day management and supervision of the construction activities, the contractor will be directly responsible for issues on the construction, and the operation and maintenance department of NAWASCO will oversee the day to day running of piped water in the operational phase.

ESMP Summary and Implementation arrangements

The ESMP provides a summary of mitigation actions to be implemented during the construction and operation of this proposed water project. To ensure successful implementation, NAWASCO will ensure that the ESMP is adhered to

through communicating the ESMP to the contractor and other stakeholders and monitoring compliance. NAWASCO will identify an officer within the company who is trained in environment and social issues. With the help of WSTF, the identified person will be capacity built on how compliance to ESMP should be assessed during the project cycle to ensure the ESMP is well implemented. The contractor (s) will be required to develop and execute the ESMP, conduct regular monitoring, and report on compliance with mitigation measures on a weekly basis to NAWASCO. Both NAWASCO and contractor will need to engage with the local communities, listen to their concerns and provide guidance including a feedback mechanisms to address concerns related to the project.

The contractor adherence to ESMP will be audited by the identified NAWASCO E&S officer. The contractor will also be required to report fortnightly to NAWASCO on ESMP implementation. Monthly audit reports and incident reports especially on grievances should be reported to both the contractor and NAWASCO.

Project Cost

The project cost is estimated to be Fifteen Million, eight thousands six hundred and twenty Kenya shillings (Kshs. 15,008,620).

Conclusions and Recommendations

The conclusions and recommendations arising thereof are:

1. **Economic displacement**: There are 10 Persons Affected by the project who have informal structures along the pipeline. Thesepeople will have to close their businesses for at most 3 days during excavation and backfilling. The total amount of money needed to assist them due to economic displacement amounts to Ksh 98320.

2. **Reversibility/Irreversibility of the identified Impacts***:* The project is likely to do more good than harm when well executed with an elected project team. During the ESIA, key stakeholders including the local community and opinion leaders in the area were consulted for their views and inputs. It's the Consultant's

considered opinion that political good will and capacity building of the community is vital during all the phases of the project so as to enhance project sustainability. The foreseen environmental impacts can be prevented or reversed by use of environmental conservation measures and the mitigation measures proposed in the project study report.

3. **Geographical Extent of the Impacts***:* The foreseen negative impacts on the environment and community are subtle when compared with the positive impacts of rehabilitation of water supply infrastructure. The impacts are localised since the new piping structures are domiciled at the location of the dilapidated infrastructure.

4. Incorporation of tree planting will lead to improvement of the vegetation cover. Pollution, clearing of vegetation and land degradation impacts that may occur can be effectively alleviated if all the proposed mitigation measures are put in place. Possible conflicts caused by the water allocation may be controlled through setting of Peace/Grievances /conflict resolution committees. An outline of how the grievance redress should be done is annexed.

5. **Ecological survey**: An ecological study was done and there was documentation of flora and fauna of the area. Trees planting should be embraced along the pipe infrastructure.

6. **Occupational health hazards during construction and project operational phases***:* This could include accidents and any injuries to human health. Such impacts are significant and irreversible, and it is therefore critical that the project proponent puts in place all the proposed mitigation measures on occupational health and safety during construction while during operation, the community members should be capacity built on occupational health and safety. Construction workers should be provided with protective gears.

7. **Project Sensitization and Acceptability***:* The area experiences water scarcity and bearing in mind that there is a rapid growth of the area, with upcoming highrise buildings, the water demand has overshot by far the current water supply. During Community Public Participation and Interviews from local levels to the government offices, all the stakeholders and community are receptive of the project and promised total support. The project will reduce water scarcity,

reduce possible resource conflicts, alleviate poverty and open the area for development.

8. **Consistency with the Government Policy Objectives (Kenya Constitution 2010)***:* The proposed project is in line with the government's Bottom-up Economic Transformation Agenda (BETA) which advocates for inclusive development, stakeholders engagement and monitoring social and economic impacts of a project , Kenyan constitution 2010 and policies touching on water and sanitation.

9. **Compliance with the existing Legislation, Conventions, Treaties, Covenants and Standards***:* This project is not in contravention of any of the existing laws and standards. Further to this, the project proponent will ensure that the relevant laws and standards are upheld throughout the project cycle.

Other recommendations with respect to the proposed NAWASCO water development project include:

i. Water Abstraction permits should be sourced from WRA before the commencement of works

ii. The project should only commence once it is licensed by NEMA

iii. Construction works should be in line with relevant regulations, policies and laws

iv. Environmental audits should be undertaken and submitted to NEMA annually once the project is operational to ensure compliance with proposed mitigation in the ESMPs

v. The Operation and Maintenance of the water project should comply with the best water management practices and the principles of environmental management including the principles of sustainability, inter generational equity, prevention, precaution, polluter pays and public participation; and

vi. The Contractor and the staff from proponent are required to strictly adhere to the provided ESMP including the continuous evaluation and adaptation of this plan during project construction and operation.

In a nutshell, the project is a gamechanger with a potential to benefit the people of Nanyuki through supply of safe clean water for domestic purposes.

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LIST OF ABBREVIATIONS

ACC	Assistant County Commissioner
ASAL	Arid and Semi-Arid Lands
CECM	County Executive Committee Member
CBO	Community Based Organization
CSR	Corporate Social Responsibility
CC	County Commissioner
DCC	Deputy County Commissioner
DOSHS	Directorate of Occupational Safety and Health Services
EMCA	Environmental Management Coordination Act
EHS	Environmental Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Virus

KFS	Kenya Forest Services
KMD	Kenya Meteorological Department
KWS	Kenya Wildlife Services
LPG	Liquefied Petroleum Gas
MCA	Member of County Assembly
MD	Managing Director
MP	Member of Parliament
MoWSI	Ministry of Water, Sanitation & Irrigation
NEMA	National Environment and Management Authority
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
O & M	Operation and Maintenance
ODF	Open Defecation Free
NAWASCO	Nanyuki Water & Sewerage Company
OSHA	Occupational Safety and Health Act
PAPs	Project Affected Persons
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
SGR	Standard Gauge Railway
SOPs	Standard Operating Procedures

SSHP	Site Safety Health Procedures
STIs	Sexually Transmitted Diseases
ToR	Terms of Reference
WASREB	Water Services Regulatory Board
WHO	World Health Organization
WRA	Water Resources Authority
WRUA	Water Resources Users Association
WTP	Water Treatment Plant
WWTP	Waste Water Treatment Plant

CHAPTER 1. INTRODUCTION

1.1. General Introduction

Water scarcity in Nanyuki is a major problem caused by rapid urbanization due to exponential population growth, deforestation, conversion of naturally vegetated land to agricultural land and high-rise buildings and also climate change impacts. Dilapidated water Infrastructure leads to inadequate water supply and inefficient water provision patterns. Nanyuki town as a cosmopolitan town with an ever-growing population which besides the locals, include settlers, local military men, British Army and an all-year-round presence of guests and tourists has worsened the water scarcity crisis. Nanyuki has also become a popular town with many investors in the real estate market growing exponentially. Nanyuki is also a popular destination for domestic and overseas tourists who visit for vacations and getaways. The town is surrounded by game parks and reserves, world class hotels and the beautiful Mt. Kenya which offers a majestic view. The town is also hosts a range of Military men ranging from the Kenya Airforce, Kenya Army and the British Army Training Unit in Kenya (Batuk).

1.2. Project Background

The Conditional Liquidity Support Grant (CLSG) from the World Bank is a mechanism designed to provide financial assistance to countries in need, particularly during economic crises or other significant challenges that affect liquidity. In Kenya, this grant could be instrumental in stabilizing the economy, ensuring that essential services and development projects continue even during times of financial strain. The focus of CLSG-2 is to support the financial recovery of WSPs to pre-COVID levels or better. Only WSPs with potential to achieve financial recovery within a period of less than 12 months were eligible to receive the support. Under CLSG-2, the Water Services Regulatory Board (WASREB) developed criteria that was agreed to by the MoWSI, Water Sector Trust Fund (WSTF) and the World Bank for the selection of WSPs to benefit

from CLSG-2. Among the WSP that benefited from the funds was Nanyuki water and Sewerage Company which falls under cluster 3 projects along with Mandera and Isiolo.

In Nanyuki area water scarcity is a real problem to the people living in Nanyuki and impacting negatively on their livelihoods. Nanyuki town is rapidly growing and the current water demand is 18000m^3 per day. The current production capacity is 14000m^3 per day during the wet season and this drastically reduces during the dry season to production level of 8000m^3 per day. Water losses are at 30% due to the poor state of the pipes and the meters.

In the project site there is severe water scarcity for four months per year mainly in the months of January to March and August to September. NAWASCO is not able to meet the WHO guidelines of water provision which is 100 litres per person per day. WASREB recommends 60 litres per person per day but even that one has been hard to meet. The current amount of water provided by NAWASCO is 40 litre per person.

The main challenge of water provision are the small sized pipes relative to the consumers demand. The pipes also have leaks that aggravates the water loss in addition to water contamination through the leaks. The pressure is also very low leading to backflow of water the pipes.

The company has also been experiencing financial losses due to high electricity bills, non revenue water losses, burst pipes and high operation and maintenance costs. The customers meters are also very old and the unregistered number of units consumed.

The project scope is rehabilitation of dilapidated pipelines Namely: 45Km of Kilimo - Teacher's pipeline. This includes:

- ✓ Upgrading and realignment of Kilimo- Teachers pipeline (31.7Km) of various diameters from 90mm to 40mm of HDPE Pipe PN 12.5; and

✓ Customer connection service lines of 13.8km dia 20mm PPR Pipe PN 16The pipelines were laid in the 1960s and they are in a poor state.

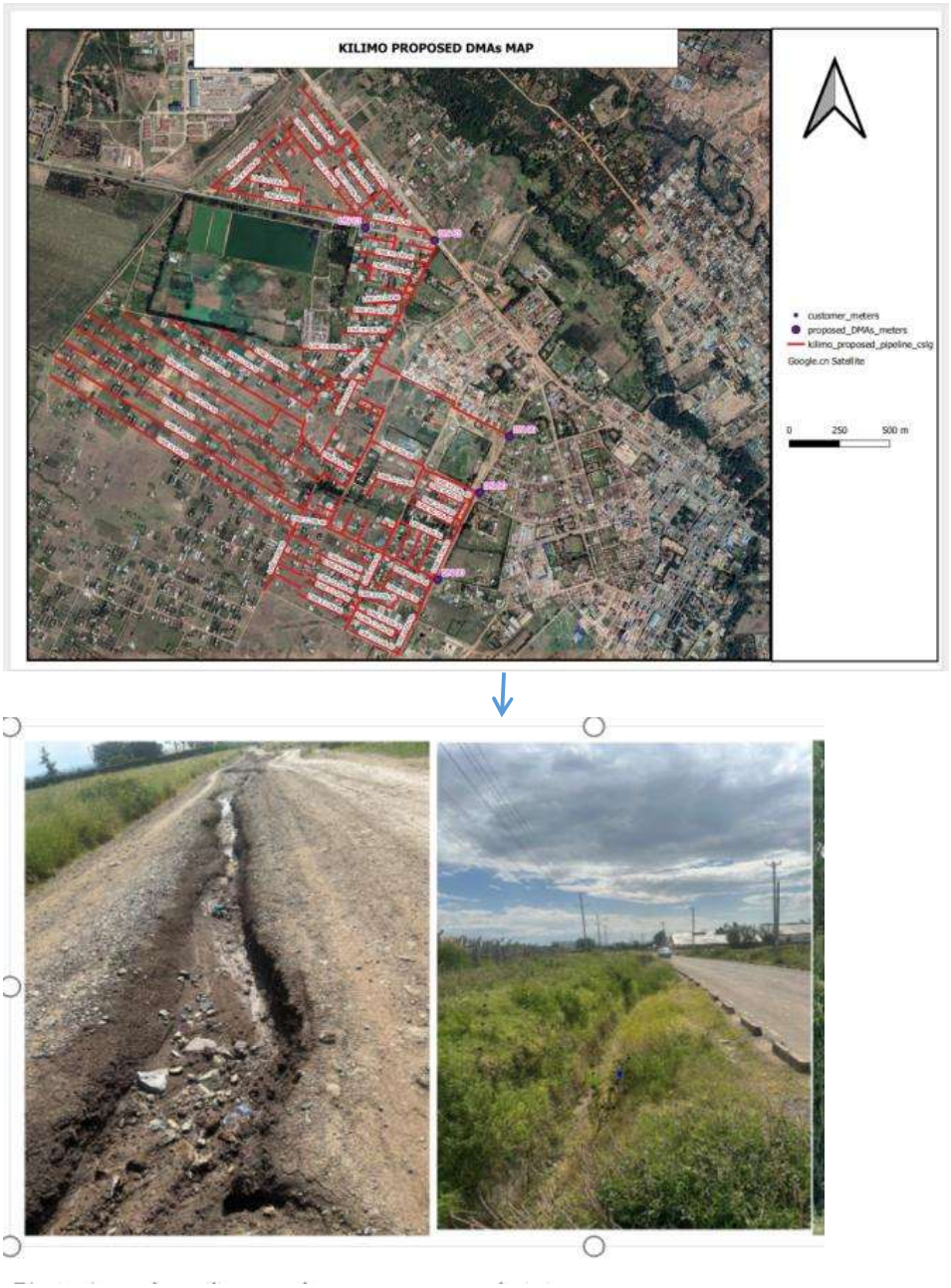


Photo 1 Kilimo piping route

This Environmental Social Impact Assessment Report conforms to the Terms of Reference (TOR) for the Consultancy Services to conduct an environmental and social impact assessment for proposed interventions by the Nanyuki Water and Sewerage Company. It complies with the Environmental Management

Coordination Act CAP 387 and is intended for submission to the National Environment Management Authority to obtain an ESIA license before project commencement. The primary objective is to conduct an Environmental and Social Impact Assessment (ESIA) to identify critical environmental and social issues and devise appropriate mitigation measures. This process aims to secure approval from the National Environmental Management Authority (NEMA) and development partners for the proposed interventions.

The Kilimo Water Project is situated 2.5Km West of Nanyuki town and due to the proximity to the town has experienced an upsurge of residential buildings both bungalows and multi-dwelling units. This has overstretched the water available for use since the area is predominantly a semi-arid area characterized by scarce water resources, evident from low precipitation, seasonal rivers, and minimal surface water availability. The region faces recurring droughts exacerbated by climate change, forcing residents to rely on often saline groundwater or travel long distances for fresh water, imposing significant economic and social burdens on communities. Against this backdrop, the project proponent have proposed a water supply improvement initiative to alleviate the area's chronic water scarcity for the urban population.

1.3. Project Description

The proposed project is geared towards upgrading and realignment of DN20 to DN90, 45Km Kilimo - Teacher's pipeline. The activities within the site will include:

- ✓ Temporarily closing water flow to affected areas.
- ✓ Digging trenches along the pipeline route using excavators or manual labor.
- ✓ Removal of Old Pipes and assessing for proper disposal or recycling.
- ✓ Laying and aligning the new pipes in trenches
- ✓ Jointing and welding to connect pipes
- ✓ Placing control valves, air release valves, and other fittings for efficient water distribution.

- ✓ Conducting hydrostatic tests to check for leaks and ensure pipeline integrity.
- ✓ Backfilling and landscaping of the area to replace the vegetation disturbed during excavation.
- ✓ Cleaning the new pipeline to remove debris and disinfecting it to meet health standards.
- ✓ Testing: Sampling and testing water for contaminants before public use.

1.4. Objectives of the Assignment

The specific objective of this Assignment was:

- ✓ To undertake Environmental and Social Impact Assessment (ESIA) for the upgrading intervention.
- ✓ To provide information that will identify key Environmental and Social issues and design appropriate mitigation measures.
- ✓ Comply with the Environmental Management and Coordination Act (1999) amended in 2015.
- ✓ Comply with the Environmental (Impact Assessment and Audit) Regulations, 2003, Regulations;
- ✓ Determine the sustainability of the project on environmental and social safeguards;
- ✓ Provide a baseline description of bio-physical and sociocultural environment of the project area;
- ✓ Assess potential impacts of the project on the bio-physical and sociocultural environment;

1.5. Project Justification

The proposed project will allow for increased water access through diversification of water sources. It will enhance water provision in Nanyuki town residents, businesses, and institutions and its environs due to an increase in pipe

sizes leading to an improvement of water pressure and reduction of water losses through replacement of leaking pipes.

Having adequate water in Nanyuki Town will support local economic activities such as kitchen gardening, hotel businesses, which depend heavily on water availability. Given the rapid growth of the town, water access will foster economic growth of the town which will lead to increased household incomes and improved standards of living. The improvement of water infrastructure will address the current water shortage in Nanyuki and enhance business opportunities. Nanyuki is a popular place for tourism activities and rapid urbanization and population growth has increased the strain on existing water resources with a demand of 18000m^3 per day against a current production capacity is 14000m^3 per day during the wet season and a dry season production of 8000m^3 per day.

The rehabilitation of the pipe systems will also solve the water losses that are currently at 30% due to the poor state of the pipes and water meters. Community members have been buying water from different vendors and the sources are not known thus the water may not be safe for human consumption leading to increased incidences of waterborne diseases such as Cholera and typhoid.

1.6. Purpose of the study

The implementation this project provides multiple benefits to both the targeted community and the country as well. These benefits include increased water supply, reduction of operational and maintenance cost, enhanced public health and economic development. More specifically, will help in improving accessibility of clean water to residents, ensuring consistent water supply and improved sanitation among residents. However, it is notable that the construction and operation processes may generate negative environmental and social impacts. Such negative effects if not properly managed may obscure the realization of benefits anticipated from the proposed development. It is therefore paramount that a comprehensive assessment of possible negative

impacts is undertaken to identify mitigation measures and safeguards that need to be instituted during the project period.

In an attempt to ensure that development provides optimal benefits without creating a significant social and environmental burden, the Government of Kenya has put in place wide range of policy, institutional, and legislative framework to address major causes of environmental degradation and negative impacts on ecosystems deriving from development programs. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is an obligation of the Kenya Government to conduct an Environmental and Social Impact Assessment (ESIA) on development projects such as the proposed one. The ESIA assesses the impacts of a proposed project before commencement of implementation. In addition to helping formulate environmental management framework, ESIA provides for public participation in the decision-making process within the proposed project.

CHAPTER 2. ESIA METHODOLOGY

2.1. Methodology Outline

Based on the understanding of the project objectives outlined in Nanyuki Water and Sanitation Company's Project ToR for Kilimo Project, the methodology was structured into broad areas which includes: Preparation Stage, Field Surveys (including household surveys), Preparation of ESIA report including the Environmental and Social Management and Monitoring Plans and Reporting Phases as described below. The Consultant executed this assignment using a consultative and participatory approach (focus group discussions, Key Informant Interviews, key stakeholders' analysis, gender and institutional analysis) and field surveys including photography and recording of observations. A comprehensive desk study of all the relevant project documents, Acts, guidelines and legislations was also done.

2.2. Methodology of ESIA Study

The approach to this exercise was structured to cover the requirements under EMCA, 1999 (Revised in 2015) as well as the EIA/Audit regulations as stipulated under the Gazette Notice No. 56 of 13th June 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan as well as commissioning. In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, public consultation (which included discussions with local administration and the community), photography, as well as discussions with the Proponent.

The key activities undertaken during the assessment were as follows:

i. Literature Review: A detailed review of available documentation;
ii. Consultations with the Proponent regarding the proposed project details, the site planning and implementation plan;
iii. Interviews and consultations with the local community benefiting from the water project
iv. Data collection and physical inspections of the proposed site;

v. Evaluation of the activities around the site and the environmental setting of the wider area through physical observations as well as from existing information in literature; and
vi. Reporting, review and submissions.

Below is a typical outline of the basic EIA steps that were followed during this assessment:

Step 1: Environmental Screening

This is the first stage where the proposed project is evaluated with the guidance of EMCA, 1999. From the ToR the client had highlighted that the project scope does not warrant a full ESIA study and the consultants verified the same during the screening Phase.

2.3. Screening Visit

Screening is the process of assessing the viability of a project for an Environmental and Social Impact Assessment (ESIA) and evaluating the extent of assessment required. A site visit to the Project area was undertaken on 5th to 8th June, 2024 and on 26th to 28th August. The preliminary findings established that a Comprehensive Project Report is required for the proposed project. The screening visit involved holding meetings with the management of the WSP and site visits to assess the proposed location of the projects. The outcome of this was a stakeholder engagement plan, revised data collection tools and an inception report.

During the site visit analysis of the project was done through walking and driving though the project area. The project involves improving water supply and distribution infrastructure mainly upgrading and realignment of DN20 to DN90, 45Km Kilimo - Teacher's pipeline.

The site analysis assessment revealed that an ESIA is mandatory for the proposed development. According to the Legal notice 31 of April 2019 on the EMCA, the project is classified as ***Medium Risk*** as per Section 3(c) water supply and

distribution infrastructure. This is because the project involves excavation, removal and replacement of pipes over a stretch of 45km in Kilimo Teachers area.

Step 2: Environmental Scoping

During the screening exercise, the Consultant established the key elements that require detailed investigation while conducting the ESIA. These issues include but not limited to: displacement and acquisition of land if any, project acceptability, agreements and Memoranda of understanding where the water infrastructure will be situated in schools, churches and mosques, vegetation clearance, water pollution, water quality, security of infrastructure, employment opportunities, catchment protection and occupational health and safety issues that will arise during construction of the project.

During the scoping exercise, preliminary physical assessment of the site and its surroundings helped to narrow down to the most critical environmental and social issues requiring attention for detailed evaluation. A comprehensive scoping exercise on the survey of the area was done from 10th to 21st June 2024 with NAWASCO team, local and government leaders. The whole length of the piping was surveyed. This was done to survey project area to develop impression of topography, flora and fauna, and also map out the sensitive sites within the project area and preliminary scoping for Environmental and Social impacts. The consultant team made observation of the settlement pattern and physical boundaries of the beneficiary area and initiated communication links with local leaders.

Step 3: Desk Study

A comprehensive literature review of relevant documents was continuously done during the ESIA report development period. This included County Integrated Development Plans for Laikipia, environmental legislation and regulations, International Conventions, Resources Management plans etc. The review provided an understanding of the terms of reference, environmental and

social status, demographic trends, land use practices, development strategies and plans as well as the policy and legal documents.

Step 4: Baseline Conditions

Physical inspections and observations in the study area constituted the exercise for collecting baseline information and this was done from 5th to 21st June 2024. A site visit was done again from 26th to 28th August to fill in the data gaps identified by the client.

Step 5: Consultations

Consultative Public participation was done from 10th to 21st June 2024. This was done concurrently with household surveys and Key Informant interviews, meeting with leadership of the area, gender analysis and Focus Group Discussions. The proposed development was evaluated with a view to establish the physical environment status, social and economic trends. The field assessment was also designed to establish potential positive and negative impacts through interviews, discussions and physical Consultative Public Participation was done through:

- Key informant Interviews with key stakeholders and opinion leaders
- Visit to the county offices in Laikipia, for discussion with line ministries. Meetings with relevant government offices were undertaken to establish the prevailing social and Environmental conditions in the area
- Focus Group Discussions segregated by Gender were held to assess the general public opinion with respect to the project. Issues that came up included social, economic benefits, safety, conflicts over resources and any other perceived impacts of the project to the welfare of the people.

2.4. ESIA Reporting Format

The structure of the project ESIA report is as follows:

Executive Summary: Gives an overall analysis of the full report

Chapter 1: Describes the ESIA Background, project description, project design, objectives and scope of works

Chapter 2: Describes the summary and detailed Methodology and Reporting Structure of ESIA Study.

Chapter 3: Presents the policy, legal, Institutional and regulatory framework including international Conventions, treaties and covenants. Special attention is paid to the African Development Bank Policies

Chapter 4: Describes the consultations and public participation. It includes outcomes of community sensitisation and participation meetings. The objectives, methodology and a summary of stakeholder's comments are presented in a table. The potential stakeholders' in the project and the roles they will play in the project are highlighted

Chapter 5: Describes the baseline environmental and social conditions in the project area in sufficient detail to enable an adequate assessment of probable environmental impacts. The baseline studies were desk based, but supported with secondary data and interviews with stakeholders including the results of Household surveys.

Chapter 6: Project Alternatives are explored including the "No Project option", and options that include alternative locations.

Chapter 7: Describes the Potential environmental and social impacts and mitigation measures at the construction, operation and decommissioning phases.

Chapter 8: Presents the Environmental and Social Management Plan (ESMP) showing the negative impacts, mitigation measures, and responsibility, monitoring means and frequency of monitoring.

Chapter 9: Presents the conclusions and recommendations of the ESIA study.

Chapter 10: References. This chapter highlights all the secondary data sourced for the project

Chapter 11: Appendices. This includes the Household survey questionnaire an attendance sheets for the meetings

2.5. Detailed Methodology

2.5.1. Study Task 1: Identification and Description of Guidelines and Standards

Task objective: To identify and describe the legal, policy and regulatory standards that ensure environmental quality at the national and local levels and ecological and socio-economic issues including compliance issues.

Methodology: In the process of identifying the regulations and the standards governing environmental quality, solid and liquid waste management, health and safety, protection of sensitive areas, land use and control at the national and local levels and ecological and socio-economic issues including compliance were considered. All institutions involved in development issues in the project area were consulted. The key institutions include the County Government offices in Laikipia, National Environmental Management Authority (NEMA), the Forestry Department, Kenya Wildlife Service, County Environmental Office, Water Resources Authority (WRA), County Irrigation Office, County Agricultural Office, NGOs and Local Leaders in Nanyuki. The EIA regulations issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999 will be applied.

The following Acts were considered in this study.

The following Acts were considered in this study.

- The Constitution of Kenya, 2010;
- The Environmental Management and Coordination Act, 1999;
- Wildlife (Conservation and Management) Act 2013;
- The Occupational Safety and Health Act, 2007;
- Work Injury Benefits Act (WIBA);

- The Penal Code (Cap. 63);
- The Public Health Act (Cap. 242);
- The Water Act 2016;
- National Environment Action Plan 2009 – 2013;
- The National Policy of Water;
- Physical and Land Use Planning Act, 2019
- Explosives Act, Cap 115
- Land Act 2012

World Bank Safeguard Policies

- OP/BP 4.01: Environmental Assessment -This emphasizes on the requirement of environmental and social impact assessment (ESIA) Before project development to identify environmental and Social impacts of a project;
- OP/BP 4.04: Natural Habitats - This is geared towards protecting of ecosystems and natural habitats during project construction and operation so as to ensure that projects do not significantly degrade or convert critical natural habitats;
- OP/BP 4.11: Physical Cultural Resources - Ensures that during project development culturally important sites and resources are not interfered with to protect the cultural heritage from the adverse impacts of projects.
- OP/BP 4.12: Involuntary Resettlement - Aims to avoid or minimize involuntary resettlement and provide compensation and assistance to displaced persons.

Some of the policies and papers referred to while undertaking the assignment include:

- National Environmental Action Plan (NEAP)
- Environmental and Development Policy (Session Paper No.6 1999)
- Structure plans and local physical development plans (LPDP)
- The National Poverty Eradication Plan (NPEP)
- The Poverty Reduction Strategy Paper (PRSP)
- International Conventions and Treaties

2.5.2. Study Task 2: Description of Baseline Environmental Setting and Mitigation Measures

Task objective: To describe environmental conditions and mitigation measures.

Methodology: With reference to ToR, the Consultant carried out an Environmental Impact Assessment for the proposed project and incorporated the proposed mitigation and management measures into the design. Environmental and Social Management Plans as well as self-audit monitoring plans would be necessary for sustainability of the project. The consultant carried out a due diligence to identify the significant environmental issues in the project areas. The consultant collected, collated and presented information on baseline characteristics of the existing environment within and around the proposed water supply infrastructure areas so as to assess the major issues and mitigation measures that need to be taken into account during construction, operation and decommissioning phases of the scheme. The consultant collected data on the physical and biological environment; analyzed safety, risks, and sanitation and waste management implications by the project. The process also ensured public consultations and participation throughout the EIA study process. . The consultant identified and analyzed alternatives and specified the assessment area. The study team distinguished between positive and negative impacts, direct and indirect impacts, immediate and long term impacts and identified irreversible impacts. This assisted in making appropriate recommendations and conclusions. Questionnaires, observations, interviews and photographs to collect data were used. Relevant secondary data from all environmental and social institutions in the project area was gathered. Assessment data collection tools to adequately gather the required information were prepared. These tools included but not limited to:

- ✓ Household questionnaire
- ✓ Key Informant Interview Schedules
- ✓ Focus Group Discussion Schedules

- ✓ Observation checklist
- ✓ Public consultation guide
- ✓ Digital Camera

The consultant used professional programmes such as MS Excel 2007, SPSS and STATA for data management. Data entry was conducted concurrently with data collection in the field. After the data entry, cleaning was done to ensure the data entered will be in the form that enabled the ease of analysis. All the data collected were analyzed using MS Excel, SPSS and STATA and other data analysis software that were deemed necessary. The consultant drew inferences from the qualitative data collected based on professional understanding and experience. The findings from the analysis of field data and document reviews guided the basis of the recommendations and conclusions made in the document. Different ESMPs for different project phases were developed.

2.5.3. Study Task 3: Description of Physical Environment

Task objective: To describe physical environmental conditions.

Methodology: Through literature survey, the study team collected, collated and presented information on:

- Climate
- Topography
- Drainage
- Geology
- Soil and soil erosion
- Water quality
- Wetlands, among others.

Assessment data collection tools to adequately gather the required information were prepared. Some of the tools used include but not limited to:

- ✓ Observation checklist
- ✓ Public consultation guide
- ✓ Digital Camera

2.5.4. Study Task 4: Description of Biological Environment

Task objective: To describe biological environmental conditions.

Methodology: The following data was collected, collated and presented information on:

- Flora and fauna types and their diversity
- Sensitive habitats
- Endangered species

- Protected areas etc.

The methodologies used include but were not limited to both quantitative (field sampling) and qualitative (desk-stop literature review) on biodiversity in rivers of the study area methods were employed. Assessment data collection tools to adequately gather the required information were prepared and they include:

- Observation checklist
- Public consultation guide
- Digital Camera

Field sampling / Ecological surveys:

Flora: There were very few terrestrial plants which were sampled within the project area through random and meander transect methodology. A desk review of aquatic fauna was done.

- ✓ Local knowledge /Indigenous knowledge was captured through household surveys.

2.5.5. Study Task 5: Identifying Occupational Safety and Health Concerns

Task objective: To identify, analyze and describe the occupational health and safety concerns that are likely to arise as a result of proposed development.

Methodology: Data on occupational safety and health concerns were collected, collated and given descriptions. This was used in conducting analysis on safety, risks health, sanitation and waste management implications brought about by the project.

Data collection tools for adequate gathering of the required information were prepared. These tools include but not limited to:

- ✓ Household questionnaire
- ✓ Observation checklist

- ✓ Public consultation guide
- ✓ Digital Camera

Analysis and description of all occupational health and safety concerns that are likely to arise as a result of construction and operations of the proposed facility was also done.

2.5.6. Study Task 6: Carry out Survey to Collect Data on Anticipated New Challenges

Task objective: To provide information on anticipated new challenges with the development of the proposed NAWASCO Water project.

Methodology: The Consultant collected both primary and secondary data and information related to:

- Flooding
- Water logging
- Water borne diseases
- Potential conflict over access and use of water resources

All significant social and environmental changes expected due to the proposed project were analyzed and described by the Consultant. These encompass environmental changes as a result of interaction between the proposed project and the environment that are likely too bring about changes in the baseline environmental conditions. The consultant prepared assessment data collection tools to adequately gather the required information.

2.5.7. Study Task 7: Analysis of Project Alternatives

Task objective: To evaluate project alternatives alongside the proposed development alternatives to select the most appropriate alternative.

Methodology: Analysis of the project alternatives in terms of site, technology, scale and route options was undertaken. The Environmental Impact Assessment

Study was used by the Consultant to identify and assess alternatives to the proposed development/project. The one with the least adverse impacts was selected based on less negative impacts and cost-benefit analysis.

2.5.8. Study Task 8: Specify Through Maps at Appropriate Scales and Boundaries of the Study Area for Assessment

Methodology: To Consultant with the help of the community identified the pipe rehabilitation and expansion and area.

2.5.9. Study Task 9: Identification of Potential Environmental Impacts that could Result from the Project

Task objective: To identify potential positive and negative environmental impacts that would result from project implementation.

Methodology: The Consultant distinguished and described positive and negative, direct and indirect and long term and immediate impacts resulting from the proposed NAWASCO Water Project. Any unavoidable or irreversible impacts was quantitatively described in the ESMP.

2.5.10. Study Task 10: Make Appropriate Conclusions and Recommendations

Task objective: To make appropriate and relevant conclusions and recommendations.

Methodology: Analysis and description of all concerns that are likely to arise as a result of construction and operations of the proposed facility were done. The consultant therefore made the necessary recommendations and conclusions on corrective and remedial measures to be implemented under the environmental management plan.

2.5.11. Study Task 11: Collect and Analyze Environmental Baseline Data and Identify Impacts of the Proposed Development

Task objective: To collect and analyze environmental baseline data and identify impacts of the proposed development.

Methodology: There was collection, analysis of baseline data, identification and evaluation of impacts of the proposed development option. There was an incorporation of the environmental mitigation measures and management plan in the preliminary and detailed design of the project up to the implantation stage. Some of the issues that the consultant addressed include:

- ✓ Impacts of the improved water supply;
- ✓ Conflicts that may arise due to water provision and rationing;
- ✓ Effects of the quality and quantity in the project area

2.5.12. Study Task 12: Socio-economic Situational Analysis

Task objective: To collect socio-economic data on the status of potential beneficiaries of the NAWASCO improved water supply.

Methodology: Socio-economic status was assessed through income levels, wealth, education, and occupation. Other data was on demographics (population in the area & demographic patterns); seasonal land use patterns, livelihood activities; existing social infrastructure (schools, churches, health facilities, social centers and halls, markets, shopping centers, etc.); employment; labor availability across seasons; historical and cultural heritage sites; communication networks and households whose lands is likely to be affected by the project. Data on economic production activities, consumption, and distribution of goods among household members was useful for depicting the likely impacts of the project on social economic status of households.

Social economic survey was also intended to reveal existing social inequalities in water provision sector. Reciprocal relationships were assessed by looking at

social organizations, and members interests/likely role in management of water resources. Social interactions that could threaten the project such as possible conflict and unhealthy competition were investigated.

The survey utilized the household information contained in 2019 Kenya National Population and Housing Survey to develop a sampling framework. A 5% household sample is considered adequate for development projects. The sample size data is further enhanced through focus group discussions, Key Informant Interviews and community meetings popularly known as Barazas.

The beneficiary community are urban households. In the 2019 Census, the average population of households in Nanyuki municipality was 3. 4 persons per household against a national figure of 3.9 persons.

2.6. Sampling Framework

The consultant used a sample of 5% of the targeted population. According to Cochran (1977), a sample size of 5% is satisfactory provided it is truly representative of the whole. This representation is achieved through random or stratified sampling techniques hence reflecting the diversity and characteristics of the entire population. Kothari (2004) argues that if the sample is random and large enough approximately 5% of the total population it can still provide reliable estimates and valid inferences about the population parameters. It is therefore notable that the most critical factor in sampling is not the size but the study design. In this assessment, the consultant adopted a multi -level sampling design which entailed clustering the project area based on the proposed project site. Random sampling within these clusters was then used to select the respondents. The first household was done randomly after which two homes were skipped. If the first household was to the right, the next one was to the left. This ensured true representation of the targeted project beneficiaries. In Kilimo area there are 1727 households benefiting from NAWASCO water. An average household in Nanyuki urban area has a minimum of 3 residents and at times visitors so an average of 4 people. Other people were found to be dwelling in multi-dwelling units. Efforts were made to invite landlords and land ladies for

the community meetings. A total of 97 respondents were reached to through households surveys. The other respondents were reached through chief barazas and through gender disagreggated focus group discussions.

	Summary No of Accounts/ Households	No of Accounts
	Kilimo Teachers	1727
	5% of households	86

2.6.1. Study Task 13: Gender Analysis

Task objective: To investigate existing socio economic inequalities in access to water and other community resources, and the likely impact of the project on men, women and children.

Methodology: Through survey questions and focus group discussions, the following were investigated:

- ✓ Gender stratification, social economic roles and responsibilities
- ✓ Potential impacts of the project on youth and gender empowerment/marginalization
- ✓ Likely impact of water improvement on gender
- ✓ Potential impact of the project on women's/men's health

2.6.2. Study Task 14: Stakeholder Analysis

Task objective: To identify and assess key people, groups of people and institutions that could lay claim on the water project and suggest how diverse interests would be considered. The aim of the analysis is stakeholder management which entails identifying, recognizing and acknowledging the stakeholders; determining their influence and interest; establishing communication and engaging them.

Methodology: Stakeholders were subjected to discussions guided by the following questions:

- ✓ What interests do stakeholders have in the outcome of NAWASCO? Is it positive or negative?
- ✓ What motivates the stakeholders mostly?
- ✓ What information do stakeholders want from the project?
- ✓ How do stakeholders want to receive information? What is the best way of communicating messages to them?
- ✓ What is the stakeholder's current opinion of the project? Is it based on good information?
- ✓ Who influences the opinion of stakeholders about the project? Are some of these influencer's important stakeholders in their own right?
- ✓ If stakeholders are not likely to be positive, what will win them around to support NAWASCO Water Supply project?
- ✓ Who else might be influenced by their opinion? Do these people become stakeholders in their own right?

2.6.3. Study Task 15: Social Aspects and Beneficiary Participation

Beneficiary participation: Beneficiary participation is an important component in the process, it is vital to ensure ownership and hence sustainability. The Consultant incorporated beneficiaries in a consultative public participation exercise.

Enhancing beneficiary and stakeholder participation in the development process for the proposed NAWASCO Water development project:

1. Local leaders project orientation and consultative meetings

Elected local leaders, religious, administrative and the community have an important role to play in the mobilization of the community to participate in

the development of the project. During the inception phase, the consultant held a community meeting involving local administration, community leaders and opinion leaders to explain about the proposed project. This gave an early opportunity for the leaders to give their views and inputs on the proposed water project as a way of deepening local ownership of the process.

2. Community sensitization meetings

Community sensitization meetings were held in all the project areas with the following objectives:

i. To explain to the community and create awareness on the proposed project development in general and in particular the scope of the project; development approach; expected benefits to the community and the local economy; anticipated roles and responsibilities of the community and other stakeholders; role of consultant and role of the client.

ii. To discuss with the community matters relating to project , ascertain the land tenure in the area and matters that may concern the community.

iii. To discuss with the community on the likely social and environmental impacts of the project and how these will be addressed if they occur.

iv. Getting feedback from the communities on their views and expectations on the project, issues of concern to them and their proposals on how these issues could be effectively addressed.

3. Compilation of socioeconomic survey data

Data from the socio-economic survey entered and cleaned in an excel spreadsheet and analysed using SPSS software package. The graphs and charts generated from the analyses were pasted on a word document for interpretation.

2.6.4. Study Task 16: Requirements for Public Consultation

The Consultant(s) organized a community meeting in Kilimo area. The baraza was attended by key stakeholders with representation of the youth, women

and men. The consultants ensured that the views of interested parties were taken into consideration especially requests and comments regarding environmental issues as reflected in this report. Other methods used include FGDs and KII.

Documentary evidence for the list of participants with their signatures, the minutes and pictures have been provided. The methods, locations and frequency of public consultation were proposed by the Consultants assisted by the client based on site suitability for the beneficiaries.

2.6.5. Study Task 17: Institutional Capacity of the Implementation Agency

The Consultant had meetings with NAWASCO to discuss the project and get highlights on their capacity to manage the project and the basis of selection of the current projects, guide them on the documents needed during ESIA and make recommendations where appropriate.

Task objective: The aim of institutional assessment was to identify the institutions responsible for sustainable operation of the water supply systems and to carry out a capacity needs assessment.

Methodology: Institutions were identified and consulted to determine their role and functional capacity in managing water resources for domestic and irrigation.

Table 2-1: Sample template for institutional analysis

Institution name	Mandate and policy	Potential role in project implementation and management	Capacity strengths	Capacity gaps	Proposed areas of capacity development

Compilation of the Report: The Consultant has prepared the report as per the format in the ESIA guidelines of 2003.

Public disclosure: Disclosure of the ESIA needs and possible project documents was done throughout the ESIA study time, Focus group discussions and community meetings.

CHAPTER 3. POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1. Background

This chapter reviews into detail the current policy, legal and regulatory framework governing environmental quality, solid and liquid waste management, health and safety, protection of sensitive areas, land use and control at the local, national and international levels in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999.

3.2. LEGAL FRAMEWORKS

3.2.1. The Constitution of Kenya, 2010

The Constitution of Kenya is the supreme law of the Republic Kenya. It ensure persons and all State organs understand the comprehensive rights and responsibilities regarding environmental conservation and natural resource management. Article 42 is on fundamental rights and states that every Kenyan has the right to a clean and healthy environment. The environment should be protected for present and future generations through legislative and other measures. Article 69 on states responsibilities ensures sustainable exploitation, utilization, management, and conservation of natural resources. Aim to maintain a minimum of 10% tree cover across Kenya's land area. Protect biodiversity, indigenous knowledge, and genetic resources. Promote public participation in environmental management and conservation. Implement systems for environmental impact assessment, audit, and monitoring. Eliminate activities that endanger the environment.

Part II, Chapter 5 on additional environmental provisions ensures land use and management benefit local communities. Protect community land from state encroachment. Safeguard rivers, forests, and water bodies by law. Guarantee equitable access to land. Secure all lawful land rights. Enforcement and Redress (Article 70) ensures that any person whose right to a clean and healthy environment is threatened can seek redress through the courts.

Relevance to the Project

The Constitution of Kenya emphasizes the importance of sustainable and responsible environmental management in development projects. According to Article 69, project proponents are required to collaborate with government bodies and others to safeguard and preserve the environment. In this context, NAWASCO as a water service provider in Nanyuki must adhere to constitutional provisions to promote sustainable development. Additionally, projects should prioritize the sustainability of local livelihoods and biological resources within their operational areas, respecting communities' and individuals' constitutional rights to seek legal redress for the protection of their rights.

3.2.2. Environmental Management and Coordination Act, 1999 (Amended 2015)

The Environmental Management and Coordination Act (EMCA), enacted in 1999 and amended in 2015, forms the core legal framework for environmental management in Kenya. It supersedes conflicting environmental regulations and emphasizes the rights and responsibilities related to environmental conservation. Key provisions include; Right to Clean Environment, EMCA guarantees every person the right to a clean and healthy environment and ensures judicial enforcement of this right. Duty to Safeguard the Environment, Citizens are obligated to protect and enhance the environment under the Act. Environmental Impact Assessment (EIA), Part VI mandates that any new program, activity, or operation undergo an EIA. The National Environment Management Authority (NEMA) reviews EIA reports and issues licenses accordingly. Specific Regulations, Legal Notice 150 (2016) under EMCA includes water resources infrastructure among activities requiring an EIA. Protection of Water Bodies, Section 42 prohibits interference with rivers, lakes, and wetlands without permission from NEMA's Director General. Such permission is contingent upon the findings of an EIA. Protected Areas. The Act authorizes the Minister of Environment to designate lake shores, wetlands, coastal zones, and riverbanks as protected areas, imposing necessary restrictions to prevent environmental degradation. Regulatory Framework, The Environmental (Impact Assessment and Audit)

Regulations, 2003 detail procedures for conducting EIAs and Environmental Audits (EAs).

Relevance to the Project: Nanyuki water and Sanitation Company intends to enhance water supply and sanitation services. As per Legal Notice 150 of EMCA 1999, this project falls under Medium Risk Projects, 3-C (Water Resources and Infrastructure including water supply and distribution infrastructure). The project had to undergo an environmental and social impact assessment study and this ESIA report has been developed from the study findings.

3.2.3. The Water Act, 2016

The purpose of this Act is to provide for the regulation, management and development of water resources and water and sewerage services in line with the Constitution. Water act typically encompass regulations and provisions concerning water supply, sanitation, and water resource management. They establish standards for water quality, safety, and conservation. These laws address responsibilities of water suppliers, sanitation facilities, and measures to protect water resources from pollution and overuse. Additionally, water acts provide a legal framework for licensing, enforcement, and dispute resolution related to water rights and environmental conservation. Overall, they aim to ensure public health, sustainable water use, and environmental protection.

Relevance to the Project : The project intends to increase the water supply in Nanyuki Town Laikipia County. Relevant permits must be acquired/renewed at all times in compliance with the law and consequent notification of the relevant authorities under the Act.

3.2.4. Public Health Act, 2012

The Public Health Act (Cap. 242) stipulates in Part IX, Sections 8 and 9, that no individual or institution is allowed to create conditions that may endanger human health or cause nuisance. Any discharge of noxious matter or wastewater into watercourses is explicitly considered a nuisance. Furthermore, Part XII, Section 136, categorizes accumulations of water, sewage, rubbish, refuse, and

other fluids that encourage the breeding of pests as nuisances. This legislation primarily concerns sanitation, hygiene, and overall environmental health and safety.

Relevance to the Project: During the construction phase of the project, all construction materials and waste generated by workers must be disposed of in a manner that protects the health of residents in the project area. The proponent is required to strictly follow these guidelines and implement suitable measures to meet these obligations.

3.2.5. Sustainable Waste Management Act (2022)

Kenya's Sustainable Waste Management Act, enacted on July 6, 2022, established a comprehensive legal framework for sustainable waste management, aiming to ensure the constitutional right to a clean and healthy environment. The Act mandates extended producer responsibility, requiring producers to manage the entire life cycle of their products to minimize environmental impact. The Act advocates for the establishment of the Waste Management Council to coordinate national strategies and promote inter-county partnerships. Penalties are prescribed for non-compliance, including fines and imprisonment, to enforce adherence to sustainable practices. During the project, wastes that are generated will be sorted and those that can be recycled will be recycled or reused.

3.2.6. Physical and Land Use Planning Act, 2019.

An Act of Parliament to make provision for the planning, use, regulation and development of land and for connected purposes. This Law provides for the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level; and the administration and management of physical and land use planning in Kenya, amongst other things. The Law mandates that any person engaged in the physical and land use shall foster principles for the overall public good, for instance the physical planning and use shall promote the sustainable

use land and that the shall integrate economic, social and environmental needs of present and future generations.

Relevance: ***Consultation and public participation has been done in the project area and no community member has so far raised a grievance concerning the land use because the project will occur along existing pipeline.***

3.2.7. Work Injury Benefits Act, 2007

The Act mandates employers to secure and uphold an insurance policy covering liabilities arising from work-related injuries and diseases contracted during employment. Section 10 outlines the compensation procedures for work-related injuries. Subsection (1) specifies that employees disabled or deceased due to work accidents are eligible for compensation.

Relevance to the Project:The project proponent will need to observe the provisions of this Act during the course of the project especially during construction works.

3.2.8. Land Act, 2012 (Revised 2015)

The Lands Act was initially enacted in May 2012 and underwent revision in 2015. Its purpose is to review, consolidate, and rationalize land laws, establishing a framework for sustainable management and use of all land categories. The act governs the administration and management of public and private lands, covering leases, charges, compulsory acquisition, easements, and related rights. According to Section 61 of the Kenyan constitution, land is classified into three categories: Public land, this includes all government land not yet transferred to private ownership, territorial sea and seabed, all public roads whether officially designated or not, and any land not classified as private or community land under the Constitution. Additional lands can be designated as public through Acts of Parliament.

Community land, this refers to land vested in and held by communities identified based on ethnicity, culture, or shared community interests. Unregistered

community land is managed in trust by county governments on behalf of the communities. Private land, this encompasses land registered and owned under freehold tenure, land held under leasehold tenure, and any other land legally declared as private under an Act of Parliament.

Relevance to the Project : The proposed project will be built within the public lands and Water Service Providers land in the project area. The new pipe will be within the old piping systems and thus there is no displacement of persons or need for land easement.

3.2.9. The Penal Code (Cap. 63)

Section 191 of the Penal Code stipulates that anyone who intentionally contaminates water intended for public use, such as springs or reservoirs, making it unsuitable for its normal purposes, commits an offense. Similarly, Section 192 of the same law states that creating or causing pollutants in the air of any place to a degree harmful to the health of individuals residing in nearby homes or conducting business nearby, or those passing through public areas, constitutes an offense.

Relevance to the Project: The project intends to supply water to Nanyuki Town /Municipality residents. The proponent is tasked to provide clean water free from any contamination at all times during the operation phase.

3.2.10. County Government Act No. 17, 2012

This act outlines the responsibilities of County governments. Part II of the Act grants County governments authority over functions specified in Article 186 of the Constitution, such as county roads, water and sanitation, and health. Part XI of the Act assigns the County government the duty of planning and facilitating development in collaboration with the national government. This approach has been adopted to ensure that interventions align harmoniously with the provisions of the Kenyan Constitution.

Relevance to the Project: The Project once commissioned will be managed by the NAWASCO as a *WSPs for operation and maintenance in accordance with the Act. Throughout the project cycle, the proponent will ensure that there is accessibility of project information to public members in a timely and clear manner. Participation in decision making concerning the project will be inclusive through mechanisms such as stakeholder consultations and equitable representation including marginalized groups, such as women, youth and persons with disabilities. Inclusive Feedback Mechanisms will be used in the project including suggestion boxes and emails for citizens to provide feedback, complaints, and recommendations.*

HIV and AIDS Prevention and Control Act, 2006

This legislation prohibits any form of discrimination, direct or indirect, against individuals based on their HIV or AIDS status, whether actual or perceived. Specifically, no individual can be required to undergo an HIV test as a condition for employment or to maintain their employment status.

Relevance to the Project : All employees, suppliers and contractors in this project shall be treated fairly and without discrimination in accordance to the provisions of this Act. Awareness creation and counselling will be done A code of conduct for workers will be developed by the contractor team and signed by all workers. There shall be a clause deterring illicit sexual relationships and sexual harassment and abuse.

3.3. POLICY FRAMEWORKS

3.3.1. The National Environmental Policy, 2013

The Policy outlines key provisions concerning ecosystem management and the sustainable utilization of natural resources. It recognizes the significant pressures exerted by human activities on natural resources, particularly in crucial ecosystems such as forests, grasslands, and arid and semi-arid lands. Moreover, the policy aims to establish an integrated approach to environmental management, enhancing the legal and institutional frameworks to facilitate

effective coordination. It also advocates for the promotion of tools for environmental management.

Relevance to the Project: *This ESIA study will develop an environmental and social management and monitoring plan to mitigate the impacts that may result during the construction and operation phases of the project. This tool is aimed at promoting coordination of environmental management of the project such that sensitive ecosystems are not destabilized by the subsequent project activities.*

3.3.2. Sustainable Waste Management Policy 2021

The National Sustainable Waste Management Policy outlines the benefits of managing waste as a resource in Kenya, including economic, social, and environmental advantages. The policy recognizes that sustainable waste management is critical to delivering on Kenya's constitutional right to a clean and healthy environment, achieving sustainable development goals. Kenya's Sustainable Waste Management Policy aims to address the growing challenges of waste management in the country by promoting environmentally sound waste handling, reduction, recycling, and disposal*. During construction all wastes generated will be hoarded together and disposed in NEMA designated areas.*

3.3.3. Extended Producer Responsibility (EPR) (2021)

Extended Producer Responsibility (EPR) Regulations in Kenya are designed to hold producers accountable for the entire life cycle of their products, including post-consumer waste management. These regulations form part of the broader Sustainable Waste Management framework and aim to reduce the environmental impact of products, especially those that are non-biodegradable or hard to dispose of, such as plastics, electronics, and packaging materials. Extended Producer Responsibility (EPR *During the project cycle, any materials sourced should be the ones with a long lifespan and where possible the ones that have a return process provision.*

3.3.4. The National Water Policy, 2021

The overall goal of the policy is to guide the achievement of sustainable management, development, and use of water resources in the country. The overall objective of the policy is to provide a framework that is dynamic, innovative, and effective for re-engineering the water sector.

Relevance to the project: This policy will guide Nanyuki water service providers to implement strategies specific to their local challenges. It encourages initiatives such as improving infrastructure, promoting efficient water use, and integrating environmental considerations. Each provider adapts these guidelines to enhance water access, quality, and resilience in their respective regions, contributing to the overall goal of re-engineering the water sector nationally.

3.3.5. The National Land Policy, 2009

Chapter 4 of the land policy emphasizes proactive environmental management principles. It addresses issues such as natural resource degradation, soil erosion, and pollution through measures like waste management, including treatment and recycling. The policy mandates environmental assessments and audits for all potentially impactful land developments, with corrective actions as necessary. Public participation is highlighted for effective environmental monitoring. Additionally, the policy promotes the polluter pays principle to hold polluters financially accountable for cleaning up pollution and encourages the adoption of cleaner production technologies by industries.

Relevance to the Project :The National Land Policy mandates environmental assessments and audits for all impactful land developments, promoting public participation in monitoring. Applying these principles to water providers in Nanyuki involves ensuring sustainable water management practices, minimizing pollution through effective waste management and recycling, and engaging local communities in environmental monitoring efforts.

3.3.6. The Kenya National Policy on Gender and Development 2019

The Kenya National Policy on Gender and Development (NPGD), spells out a policy approach of Gender mainstreaming and empowerment of women and clearly states that it is the right of women, men, girls and boys to participate in and benefit equally from the development process.

The policy provides direction for setting priorities to ensure that all ministerial strategies and their performance frameworks integrate gender equality objectives and indicators and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality

Relevance to the Project: The issues of women and youth will be given prominence in the project. During the stakeholders and community engagement, issues affecting youth and different gender in water provision will be taken into consideration. Matters concerning hiring of staff to be involved in the implementation of the project will not be gender discriminative. Moreover, the project will be of benefit to women and girls who are tasked with fetching water from far flung sources in the project area

3.3.7. The Kenya Vision 2030

The Kenya Vision 2030 is a national development plan spanning 2008 to 2030, originating from the Economic Recovery Strategy for Wealth and Employment Creation. It aims to elevate Kenya to a middle-income economy with sustained annual growth of 10%. This vision emerged after the GDP growth rate dropped sharply from 7% in 2007 to 1.7% in 2008 due to post-election violence. Key objectives include transforming urban areas to support a well-housed population within environmentally-secure developments. This involves enhancing infrastructure such as roads, street lights, water, sanitation, storm water drains, and footpaths. Environmental conservation is prioritized to bolster the economic pillar of the vision.

Relevance to the Project: The proposed project intends to improve water supply and service delivery in Nanyuki (an upcoming urban areas) through construction of water supply infrastructure. This initiative is part of the process in achieving the goals of Vision 2030 for Nanyuki residents. The proponent should also endeavor to protect the environment in supporting the economic pillar of the vision.

3.4. INSTITUTIONAL FRAMEWORK FOR ENVIRONMENT MANAGEMENT

In Kenya, environmental management is primarily governed by the Environmental Management and Coordination Act (EMCA) of 1999. This legislation has instituted various institutions tasked with regulating and monitoring environmental issues. The Ministry overseeing environmental management is headed by the Ministry of Environment. This Ministry oversees several other bodies and authorities, all detailed within the EMCA 1999 framework.

3.4.1. Ministry of Environment, Climate Change and Forestry

The Ministry's mandate is to oversee the monitoring, protection, conservation, and sustainable management of the environment and natural resources. This includes ensuring their responsible exploitation to support socio-economic development, alleviate poverty, enhance living standards, and maintain a clean environment. The mission and primary goal are to promote effective governance in safeguarding, restoring, conserving, developing, and managing the environment and natural resources for fair and sustainable development.

3.4.2. National Environment Management Authority (NEMA)

The National Environment Management Authority (NEMA) in Kenya serves as the primary administrative body responsible for coordinating environmental management activities and implementing governmental environmental policies. NEMA's pivotal role includes granting Environmental Impact Assessment (EIA)

approvals and diligently monitoring projects to prevent environmental degradation.

NEMA's core functions encompass:

- Providing advice to the Government on legislative measures and international agreements pertaining to environmental management.
- Conducting and coordinating research, investigations, and surveys, and disseminating findings to inform environmental policies.
- Promoting the integration of environmental considerations into development policies, plans, programs, and projects to ensure sustainable utilization of environmental resources and enhance the quality of life in Kenya.
- Coordinating environmental management activities across various agencies to ensure coherence and effectiveness.
- Assessing Kenya's natural resources, their utilization, and conservation efforts.
- Developing protocols and safeguards to prevent environmental accidents such as floods, landslides, and oil spills, and implementing remedial measures when necessary.
- Mobilizing and monitoring financial and human resources dedicated to environmental management.
- Identifying projects and programs that require environmental audits or monitoring under regulatory frameworks.
- Monitoring and evaluating activities, including those conducted by lead agencies, to enforce adherence to environmental management objectives and provide early warnings of potential environmental emergencies.

3.4.3. National Environmental Council (NEC)

The body was created under section 4(3) of EMCA 1999, comprising the Cabinet Secretary of the relevant Ministry as the chairperson, the Principal Secretary, delegates from public universities, research institutions, NGOs, the Director General of NEMA, and a variable number of members as decided periodically by the Cabinet Secretary of the line Ministry.

3.4.4. National Environmental Tribunal (NET)

The tribunal is provided for under Section 125 of the Act. Its core purpose is to preside over 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 license or by a local community upon the grant of an EIA license 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.

3.4.5. National Environmental Action Plan Committee

The committee, formed under Section 37 of the Act, has several key responsibilities. One of its primary duties is to develop a comprehensive five-year national environment action plan. This plan includes an analysis of Kenya's natural resources, detailing their distribution, quantity, and diverse uses.

Additionally, the committee is tasked with proposing legal and fiscal incentives to encourage businesses to integrate environmental considerations into their planning and operations. Furthermore, it establishes guidelines for the planning and sustainable management of the environment and natural resources. Once approved by Parliament, the national environment action plan becomes mandatory for all government bodies to adhere to.

3.4.6. Standards and Enforcement Review Committee (SERC)

The Standards and Enforcement Review Committee (SERC) operates within the framework of NEMA, as stipulated in Section 70 of the Environmental Management and Coordination Act (EMCA) of 1999. Its primary function is to develop environmental standards, analytical methods, and guidelines for inspection, monitoring, and advising on mitigation measures. The Chairmanship of SERC is held by the Principal Secretary under the Cabinet Secretary. The composition of SERC members is detailed in the third schedule of EMCA 1999.

3.4.7. National Environmental Complaints Committee

The National Environmental Complaints Committee (NECC) in Kenya is responsible for investigating complaints or allegations related to environmental conditions and suspected instances of environmental degradation. Additionally, the NECC engages in public interest litigation on behalf of citizens concerning environmental issues. It consists of seven members appointed by the Cabinet Secretary for Environment and Natural Resources. The committee is chaired by an individual eligible for appointment as a judge of the High Court of Kenya. Other members are nominated by the Attorney-General, the Council of County Governors (Secretary), the Law Society of Kenya, and representatives from the business community.

3.4.8. County Environment Committees

Section 29(1) of the Environmental Management and Coordination Act (EMCA) 1999 stipulates that the Cabinet Secretary is mandated to officially establish County Environment Committees for NEMA through a notice published in the gazette. These committees play a crucial role in supporting NEMA in its responsibility of ensuring effective environmental management at the county level.

3.5. INSTITUTIONAL STRUCTURE OF THE WATER SECTOR

The following administrative agencies are responsible for regulation of water and sanitation development in Kenya.

3.5.1. Ministry of Water, Sanitation and Irrigation (MoWSI)

Its the ministry overseeing water in Kenya, manages policy formulation, sector coordination, monitoring, and supervision to ensure efficient water and sewerage services nationwide. It also focuses on sustaining water resources and developing them for irrigation, commercial, industrial, power generation, and other purposes. The Ministry's mission is to support national development by advocating and facilitating integrated water resource management to improve

water availability and accessibility. Key technical departments within the Ministry include Water Services, Water Resources, Water Storage and Land Reclamation, and Irrigation and Drainage.

3.5.2. Water Sector Trust Fund (WSTF)

The Water Sector Trust Fund supports the improvement of water services in areas lacking adequate access by providing financial assistance for:

Encouraging community involvement in managing water services actively

- ✓ Investing in infrastructure for community water schemes in underserved regions;
- ✓ Developing community capacities and initiatives;
- ✓ Funding water service activities prioritized in the Government's Water Services Strategic Plan;
- ✓ Promoting awareness and disseminating information on community-based water service management.

3.5.3. Water Resources Authority (WRA)

Water Resources Authority is a state corporation established under the Water Act 2016, serves as the primary agency for water resources management in the nation. Its mandate includes several critical functions, notably the issuance of water use permits. The Authority is entrusted with ensuring the sustainable management of the country's water resources through:

i. Regulation and safeguarding of water resource quality against detrimental impacts,
ii. Classification, monitoring, and allocation of water resources,
iii. Implementation of policies and strategies pertaining to water resource management,
iv. Formulation of principles, guidelines, and procedures for water allocation,
v. Development of strategies for catchment-level management, including the establishment of catchment area advisory committees.

3.5.4. Water Services Regulatory Board (WASREB)

The Board's primary responsibility is to regulate water and sewerage services in Kenya, collaborating closely with the public. Its mandate includes:

i. Regulating the provision of water and sewerage services, encompassing licensing, quality assurance, and issuing guidelines for tariffs, pricing, and dispute resolution.
ii. Overseeing the implementation of policies and strategies concerning water services, including licensing of Water Services Boards and approval of their appointed Water Services Providers.
iii. Monitoring the performance of Water Services Boards and Water Services Providers to ensure effectiveness and efficiency.
iv. Establishing procedures for handling customer complaints related to water and sewerage services.
v. Informing the public about the performance of the water sector to enhance transparency and accountability.
vi. Providing expert advice to the Minister responsible for water affairs to support informed decision-making.

3.5.5. Water Works Development Agencies (WWDA)

The WWDAs, formerly Water Service Boards (WSBs) are responsible for the development, maintenance, and management of national public water works within their area of jurisdiction. The 2016 Water Act provides for WWDAs handing over national public works they have commissioned to the county government, joint committee, or authority of the county government if the waterworks' assets exclusively rest geographically within their jurisdiction. The WWDA are tasked with efficiently and economically providing water and sewerage services in their respective jurisdictions. According to this Act, the Authorities are mandated to:

- Appoint and contract Water Service Providers (WSPs).
- Develop facilities, prepare business plans, and set performance targets.

- Strategize for the efficient and economical provision of water and sewerage services within their areas of jurisdiction.
- Manage Central Government facilities as assets.
- Enhance the capacity of water service providers to improve efficiency, accountability, and responsibility in water supplies.
- Monitor and supervise the provision of water and sewerage services by WSPs.

3.5.6. Water Services Providers (WSP)

These are state owned utilities or water companies that have been since commercialized to enhance their performance and efficiency while aiming to achieve financial autonomy, accountability and strategic investment.

3.5.7. Sectoral Integration

Sectoral Integration in Kenya aims to ensure sustainable development and a healthy environment for all citizens. The National Environmental Council (NEC) assigns key responsibilities to NEMA, including setting national environmental goals, directing policy, and coordinating efforts among governmental bodies, local authorities, private sectors, NGOs, and other entities involved in environmental protection. Additionally, stakeholders such as the Ministries of Water and Irrigation, Environment and Natural Resources, Health and Sanitation, Lands, Housing and Urban Development, Transport and Infrastructure, along with Laikipia County administrations, play crucial roles in fostering these objectives.

3.6. NATIONAL AND COUNTY PLANS AND STRATEGIES

3.6.1. The Kenya National Water Master Plan 2030

The Kenya National Water Master Plan 2030 has a special focus on enhancing water sanitation and irrigation systems. It aims to provide clean drinking water through infrastructure development and sanitation practices to prevent waterborne diseases.

Relevance to the project: The overall goal of Kilimo teachers water project is to improve access to clean and safe water for domestic purposes.

3.6.2. The National Water Harvesting and Storage Management Policy 2020 - 2025

The National Water Harvesting and Storage Management Policy 2020 - 2025 addresses water sanitation and irrigation within the context of sustainable water management. It emphasizes on ensuring there is clean water for consumption and hygiene. The policy establishes regulatory frameworks, promotes capacity building, and encourages research and innovation in water management.

Relevance to the project: The overall goal of cluster 3 projects is to improve access to clean and safe water making water provision sustainable for domestic purposes.

3.6.3. The County Government Act (2012)

This is a key legislative framework in Kenya designed to operationalize the system of devolution established by the Constitution of Kenya, 2010. The Act provides for the establishment of county governments and outlines the structure, functions, and powers of these governments to promote democratic governance and service delivery at the local level.

Relevance: plays a key role in the development of water projects in Kenya, aligning with the decentralized system of governance. Specifically it ensures there is Devolution of Water Management Functions, planning, implementing, and managing water projects to ensure their citizens have access to clean water and public participation.

3.7. COUNTY STRATEGIES

3.7.1. Laikipia County Policies And Strategies

3.7.1.1. Laikipia County Water Master Plan For 20 Years (2022 to 2042)

In the Laikipia water master plan, the government identified some strategies to improve water provision through specific initiatives including the rehabilitation of 231 dams and pans, development of 130 boreholes, five mega-dams, and 15 privately developed dams as well as increasing bulk water supply schemes across the county.The government also committed to connect 40,000 households to water.

Relevance to the project: Replacement of dilapidated pipes will improve water provision in the area.

3.7.1.2. The Laikipia County Water Services Bill, 2021

The County Assembly of Laikipia has committed to provide the legal and institutional framework for management of water resources, water harvesting, provision of water and sewerage services in the county.

Relevance to the project: Improvement of dilapidated water infrastructure in the County will ensure that water provision in the County is improved.

3.7.1.3. Laikipia County Integrated Development Plan 2023 To 2027

The CIDP 2023 to 2027 has laid among its priority provision of safe, secure and sustainably managed water. The sector targets include;

- ✓ Improving access to clean and safe Increase piped water access from the current 33% to 37% by 2027;
- ✓ Reduce average distances to water points from 4 Km to 3 Km by 2027;and
- ✓ Improve water supply by water companies from 60% to 70% by 2027.

The plan of action for water supply includes proposals for the development and maintenance of water infrastructure, such as boreholes, water pans, and dams. The expansion and rehabilitation of existing water supply systems are also key priorities.

3.8. INTERNATIONAL CONVENTIONS AND TREATIES

A treaty is a binding agreement under International Law concluded by subjects of International Law, namely states and international organizations. Treaties can be called by many names including; International Agreements, Protocols, Covenants, Conventions, Exchanges of Letters, Exchanges of Notes, etc. However, all of these are equally treaties and the rules are the same regardless of what the treaty is called. Treaties can be loosely compared to contracts; both are means of willing parties assuming obligations among themselves, and a party to either that fails to live up to their obligations can be held legally liable for that breach.

Kenya is a signatory as well as a party to various international conventions, treaties and protocols relating to the environment and aimed at achieving sustainable development. According to the Registrar of International Treaties and other Agreements in Environment (UNEP 1999), there are 216 treaties, 29 of which are of interest to Kenya. The country is a signatory to 16 such agreements, which range from use of oil, protection of natural resources and protection of the atmosphere.

Protection of Natural Resources

There are 12 agreements of significance to Kenya under this category which the country has signed and ratified. This section reviews a number of treaties that are triggered or met by the proposed project.

3.8.1. Convention of Biological Diversity

This global convention was held to foster conservation and sustainable use of biological resources, to preserve their diversity for posterity. Kenya is a signatory

to this convention, having ratified it in 1994. The provisions of this Convention have since been integrated in the laws of Kenya, climaxed by the development of the Kenya National Biodiversity Strategy and Action Plan in 2000 by the Ministry of Environment and Natural Resources.

Relevance: Where existing pipelines are being replaced the project will trigger this convention as it requires clearing of ground cover and minimal loss of biodiversity. However, clearing of ground cover and other plants will be done within the convention's requirements and guidelines.

3.8.2. African Convention on the Conservation of Nature and Natural Resources

It was held on 15 September, 1968 in Algiers. The convention sought to awaken the continent on the need to preserve natural ecosystems and employ sustainable use of natural resources of economic importance, particularly the soil, water, flora and fauna.

Relevance: In the project area, all the endemic and indigenous trees will be mapped and where it is logically possible to spare them during construction, they will not be interfered with.

3.8.3. Sustainable Development Goals

The Sustainable Development Goal that is most relevant to the Proposed cluster 3 Development Project is Goal 6 which targets to ensure availability and sustainable management of water and sanitation for all.

Relevance: All the Water Services Providers will ensure that there is provision of water to a water scarce project area where water shortage has led to some areas being underdeveloped.

3.9. THE WORLD BANK SAFEGUARDS

The World Bank has well set safeguard policies aimed at ensuring the organization's funded projects adhere to environmental and social protection. Relevant safeguards triggered for this project include;

OP/BP 4.01 (Environmental Assessment)

The World Bank implements policies for borrowing countries to ensure sustainability and environmental integrity in its development projects. Environmental assessments play a crucial role in this process, including various tools such as environmental impact assessment (EIA), regional or sectoral assessments, strategic environmental and social assessments (SESA), and others like environmental audits and management plans. Projects proposed to the World Bank undergo environmental screening to determine the appropriate level of assessment based on factors like project type, location, and potential environmental impacts. They are classified into three categories:

- Category A: Projects with significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These may affect broader areas beyond the project site, requiring a detailed EIA.
- Category B: Projects with potential adverse impacts on human populations or environmentally important areas, though less severe than Category A. Mitigation measures are feasible, and impacts are generally site-specific and reversible.
- Category C: Projects with minimal or no adverse environmental impacts. These require basic screening, and no further environmental assessment is typically necessary.

Environmental assessments at the World Bank aim to identify, avoid, and mitigate potential negative environmental effects of projects, ensuring sound decision-making and sustainability. The Kilimo Teachers Water project, for instance, falls under Category C due to its minimal environmental impact and absence of permanent displacement of affected people.

OP/BP 4.04 (Natural Habitats)

The natural habitats policy aims to promote sustainable development by safeguarding and restoring natural habitats and their ecological functions. Projects supported by the World Bank must prioritize biodiversity conservation and the environmental benefits that habitats provide to communities. The policy imposes strict restrictions on damaging natural habitats in projects funded by the Bank, except in cases involving limited, localized riverine aquatic systems, where interaction with significant habitats is minimal. ***This project to a small extent triggers this safeguard since it da few herbs and shrubs including Vachellia drepanolobium will be cut.***

OP/BP 4.11 (Physical Cultural Resources)

The purpose of this policy is to safeguard Physical Cultural Resources (PCR) from harm or destruction. These resources encompass archaeological, paleontological, architecturally significant, and religious sites such as graveyards, burial sites, and areas of unique natural value. While initial assessments indicate no identified physical or cultural resources will be impacted by the project, it is the Contractor's responsibility to be aware of the "Chance Finds Procedures." These procedures are to be followed in the event of discovering materials of potential archaeological, historical, paleontological, or cultural significance during excavation:

√ Immediately cease work upon discovering any materials that may hold cultural value. Inform the Project Manager and notify the relevant authorities especially the National Museums of Kenya;

√ Use plastic covers to protect artifacts and take measures to stabilize the area if necessary, ensuring proper artifact protection.

√ Prevent and penalize unauthorized access to the artifacts.

√ Resume construction activities only upon authorization from the relevant authorities such as National Museums of Kenya.

While no cultural resources have been identified in the screening stage of Environmental and Social Impact Assessment (ESIA) study, the proponent must include a Chance Finds Procedure clause in all project contracts to ensure compliance in the event that during pipes expansion some artifacts are discovered. In case there is a chance find, the procedure highlighted in National Museums and Heritage Act (2006) will be followed whereby there will be suspension of activities, the project proponent informs the relevant authorities, particularly the National Museums of Kenya (NMK) and the National Environmental Management Authority (NEMA), there will be assessment and documentation; measures are taken to protect the find from damage, theft, or unauthorized handling, the authorities determine whether the find should be preserved and project activities resume after clearance by the relevant authorities.

Involuntary Resettlement (OP 4.12)

The aim of this policy is to prevent or minimize, whenever possible, the necessity of exploring alternative project designs that may lead to resettlement. It specifically applies when land is involuntarily acquired or access to legally designated parks and protected areas is restricted. The policy strives to avoid involuntary resettlement or, when unavoidable, to reduce its negative social and economic impacts through compensation and resettlement measures.

This safeguard is triggered to a small extent in this project. This is because much as the pipelines are located within the public land along a road reserve, there are 10 people who have constructed informal small scale business premises such as temporary kiosks. There is no involuntary acquisition of land or assets. However there is economic displacement. The affected persons and assets have been inventoried and the economic losses that will be incured. The consultants recommended a disturbance allowance for the PAPs for the 3 days when the

area will be subjected to excavation and backfilling. The allowance was based on the profit made per day of wok by the PAP

CHAPTER 4. BASELINE CONDITIONS

4.1. Physical Characteristics

Nanyuki is a town in central Kenya, located in Laikipia County that lies northwest of Mount Kenya and is positioned on the Equator, The coordinates for Nanyuki are approximately 0.0113°N latitude and 37.0723°E longitude.



Figure 1 Map of Kenya showing Position of Nanyuki Town

4.1.1. Topography

The altitude of Laikipia County ranges from above sea level at Ewaso Nyiro basin in the North to a 2,620 m above sea level around Marmanet forest, Mukogodo and Ol Daiga Forests in the eastern part of the County.

The County consists mainly of a plateau bordered by the Great Rift Valley to the West, the Aberdares Ranges to the South and Mt. Kenya to the South East.

4.1.2. Drainage

The main drainage feature in Laikipia is Ewaso Nyiro North basin with its tributaries having their sources in the slopes of the Aberdares and Mt. Kenya. These tributaries include Nanyuki, Timau, Rongai, Burguret, Segera, Naromoru, Engare Narok, Moyok, Ewaso Narok, Pesi and Ngobit rivers. The flow of these rivers matches the County's topography, which slopes gently from the highlands in the South to the lowlands in the North. The rivers largely determine the livelihood patterns in the County.

4.1.3. Wetlands

Laikipia county has two major swamps in the County namely; Marura Swamp which runs along the Moyot valley in Ol-Pajeta Ranch and the Ewaso Narok Swamp around Rumuruti town. The swamps are a major source of livelihoods for the community since cultivation occurs along those swamps. The swamps are far from the project area,

4.1.4. Agricultural activities

The South Western part of the County has the highest potential for forestry and mixed farming due to its favorable climatic conditions. The eastern and northern parts of the County are suitable for grazing while the plateau lying in the central and the northern parts of the County is suitable for ranching. The swamps require appropriate management as encroachment for human settlement and agricultural production poses serious threat to their existence.

4.1.5. Climatic Conditions

4.1.6. Rainfall

The County experiences a relief type of rainfall due to its altitude and location. The annual average rainfall varies between 635mm and 1,210mm. The areas nearest to the slopes of Mt. Kenya and the Aberdares Ranges record a higher annual rainfall. Doldol that receives the lowest rainfall recorded an average of 635.9mm of rainfall between 2017 and 2021, while highest rainfall, recorded an

average of 1,210.9mm of rainfall during the same period. Nanyuki recorded an average of 761mm.The area experiences two rain seasons: long rains between March and May and short rains between October.

4.1.7. Temperatures

The annual average temperatures of the County ranges between 9.8° C and 24.48° C . The relief and trade winds result to cooler conditions in eastern side which is near Mt. Kenya and hotter in the low-lying areas in the North. The western and southern parts of the County have cooler temperatures with the coolest month being April and the hottest month being February.

4.1.8. Sunshine and wind

The average duration of sunshine is between ten and twelve hours daily. The average wind velocity is 7.94km/hr in a general East to West direction.

4.1.9. Ecological characteristics

4.1.9.1. Flora

The area around Kilimo project has human settlements and agricultural activities have been established. On farm tree growing and agroforestry activities near Kilimo Teachers were witnessed in the area including exotic tree species like *Eucalyptus saligna* and *Grevillea robusta*, as well as cultivated crops such as maize, beans, and vegetables. The area also has scattered tree and shrub species such as *Euphorbia candelabrum*, *Balanites aegyptiaca* (Desert Date) and *Commiphora spp.* The plants growing in this area naturally are drought resilient.

The area also has grass species such as *Cenchrus ciliaris* (African foxtail grass) and *Pennisetum mezianum* (Napier grass) are prevalent and important for grazing livestock.

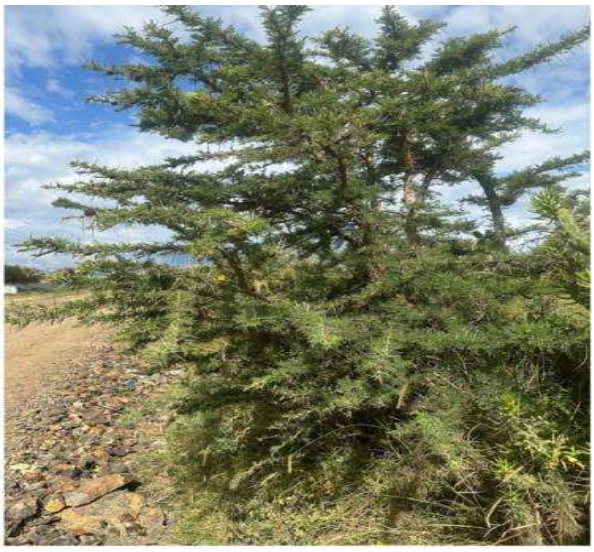


Photo 2 Acacia drepanolobium

4.1.9.2. Fauna

The project area falls within a human settlement ecosystem. Domestic animals found in the area include Therefore the fauna found in the area includes bird species, small reptiles like lizards, toads and frogs . However, the larger Nanyuki area is surrounded by areas of conservation activities and wildlife sanctuaries namely:

- ✓ Mount Kenya National Park: A UNESCO World Heritage site, home to diverse wildlife and unique flora.
- ✓ Ol Pejeta Conservancy: Known for its conservation efforts, particularly for rhinos and chimpanzees.
- ✓ Solio Game Reserve: Famous for its black and white rhino populations.
- ✓ Aberdares National Park: Located nearby, it supports a wide range of wildlife including elephants, buffaloes, and leopards.

Key wildlife found in the protected areas include: African Elephant (*Loxodonta africana*), Lion (*Panthera leo*), Leopard (*Panthera pardus*), African Buffalo (*Syncerus caffer*), Wildlife commonly seen in the savannah and grasslands include: Zebra *(Equus quagga* and *Equus grevyi*): Both the plains zebra and the

endangered Grevy's zebra can be found in the region, Giraffe (*Giraffa camelopardalis*): Frequently seen in open savannahs and grasslands. Rhinoceros: Both black and white rhinos are protected in conservancies like Ol Pejeta and antelopes and Gazelles such as impalas, elands, and Thomson's gazelles are common.

Birds: Crowned Crane (*Balearica regulorum*): Often found in wetlands and grasslands;Secretary Bird (*Sagittarius serpentarius*): Seen in open grasslands, African Fish Eagle (*Haliaeetus vocifer*): Found near water bodies, Ostrich (*Struthio camelus*): Common in open savannahs and sunbirds.

Reptiles and Amphibians: Monitor Lizards (Varanus spp.): Common in various habitats including near water bodies and chameleons, frogs and toads.

4.1.9.2.1. Aquatic Life

From literature review, the rivers and man-made dams have Tilapia (*Oreochromis niloticus*), Catfish *(Clarias gariepinus*) and mudfish *Protopterus spp.*

4.1.9.3. Agriculture

In Kilimo area crop farming is done on small scale. This is because, crop Farming in Nanyuki area is not a lucrative enterprise because of the other competing interests such as real estates development and tourism. However the area has fertile soils that can support the cultivation of crops such as maize, beans, potatoes, vegetables, and fruits. Around the town area, these crops are grown for subsistence purposed. The region is also known for flower farming, with flowers being exported to international markets.



Photo 3 Maize farming at Kilimo Area

4.1.9.3.1. Livestock Rearing

Cattle: Beef and dairy cattle can do well because the cool climate is ideal for dairy farming, and several dairy farms produce milk and other dairy products.

Fodder farming at Kilimo Area



Photo 4: African foxtail grass (*Cenchrus ciliaris*) and Napier grass (*Pennisetum purpureum*)



Photo 5 Animals freely grazing at Kilimo area

Sheep and Goats: These are raised for meat, wool, and milk.

Poultry: Chicken farming for eggs and meat is common.



Photo 6 Ducks in the project area

4.1.10. Tourism

The larger Nanyuki area is in the centre of conservation areas owned by the government. Privately owned and also community owned conservancies. The residents of the area engage in tourism and ecotourism activities such as:

- ✓ Wildlife Safaris: Ol Pejeta and the Mount Kenya National Park;
- ✓ Mountaineering: Nanyuki serves as a gateway for climbers heading to Mount Kenya.
- ✓ Eco-Tourism:
- ✓ Conservancies: Ol Pejeta
- ✓ Wildlife Research: Research activities
- ✓ Business activities: Shopping malls, green groceries, supermarkets, boutiques, hairdressing and barber shops and markets cater to the local population and tourists.
- ✓ Real Estate and Construction development: The town is growing very fast and demand for business premises is driving the town towards construction of highrise buildings
- ✓ Transport and Communication: Nanyuki town has a high number of residents who work in other towns such as Meru and Nyeri, These people need a regular transport system. Transport using minibuses and taxi services is popular.
- ✓ The boda boda industry is among the fastest growing industry employing many youth.



Photo 7 Boda Boda transport a thriving economic activity in many areas

4.2. RESULTS ENVIRONMENTAL AND SOCIOECONOMIC SURVEY

4.3. Overview

This Chapter identifies, discusses and gives a critical analysis of both positive and negative impacts associated with the proposed Nanyuki Water Service Provider development project. The project cycle is divided into three (3) main phases based on activities. These include construction, operation and de-commissioning phases. Impacts associated with the construction phase are short term while the impacts associated with the operation are long term.

Questionnaires, observations, interviews and photographs were used for data collection. A cross-sectional approach was used to collect socio-economic data once, from a sample of respondents. Relevant secondary data from all environmental and social institutions in the project area was gathered. Assessment data collection tools to adequately gather the required information was prepared, such as household questionnaires; KII and FGD schedules; observation checklists; public consultation guides; digital camera.

4.4. Objectives of the Study

- To collect socio-economic data on the status of potential beneficiaries of NAWASCO water supply project with a focus on income, wealth, education, and occupation; demographics (population in the area & demographic patterns); seasonal land use patterns, livelihood activities; existing social infrastructure

(schools, churches, health facilities, social centers and halls, markets, shopping centers, etc.); employment; labor availability across seasons; historical and cultural heritage sites; communication networks and households whose lands is likely to be affected by the project.

- To collect data on economic production activities, consumption, and distribution of goods among household members and existing social inequalities in resource ownership and access
- To collect data on social capital and reciprocal relationships
- Gender analysis: to investigate existing social economic inequalities in access and control of household and community resources, and the likely impact of the project on men, women and children.

4.5. Methodology

Social survey data was collected using a closed and open ended questionnaire (see annex). A cross-sectional approach was used to collect data once from a sample of 97 households. Through focus group discussions, the study elicited information on gender stratification, social economic roles and responsibilities, access and control of household resources; potential impacts of the project on division of labour; potential impacts of the project on gender and likely impact of water distribution improvement

4.6. Study Area and Sample Size

The study was conducted within Kilimo, Temu, Baraka and Emmanuel within Nanyuki municipality. Data were collected in the following villages: Most of the respondents (87%) were from Laikipia East since most of the pipes are within the urban centre. The others were drawn from 8% from Marura, 4% from Nanyuki and 1% from Laikipia North.

4.7. BIODATA/ DEMOGRAPHIC CHARACTERISTICS

Most of the respondents sampled during the survey were female accounting for 59% of the interviewees, the males were at 41% . This is not surprising since most males migrate to towns in search of jobs and carry along their wives who are mostly house wives.

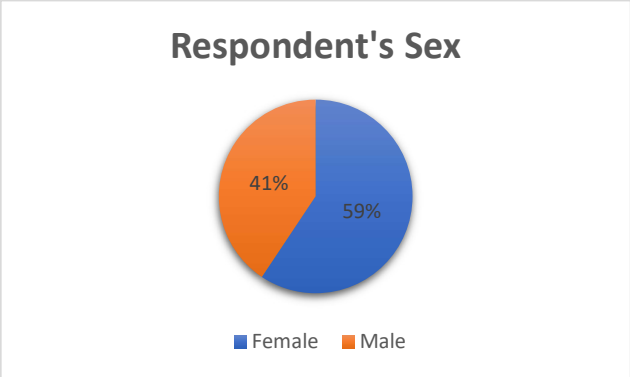


Figure 2 Respondents gender

4.7.1. Respondent's Age as per the Last Birthday.

The highest number of respondents at 31.3% were between 36 Years to 45 Years followed at 25% by 26 Years to 35 Years and 45 Years to 55 Years at 21.9% . The other age groups occupied 7.3% for 18 Years to 25 Years, 9.4% for 56 Years to 65 Years and 5.2% for above 66 Years. This is because most of the people living in urban areas are the youthful who migrate to towns seeking employment.

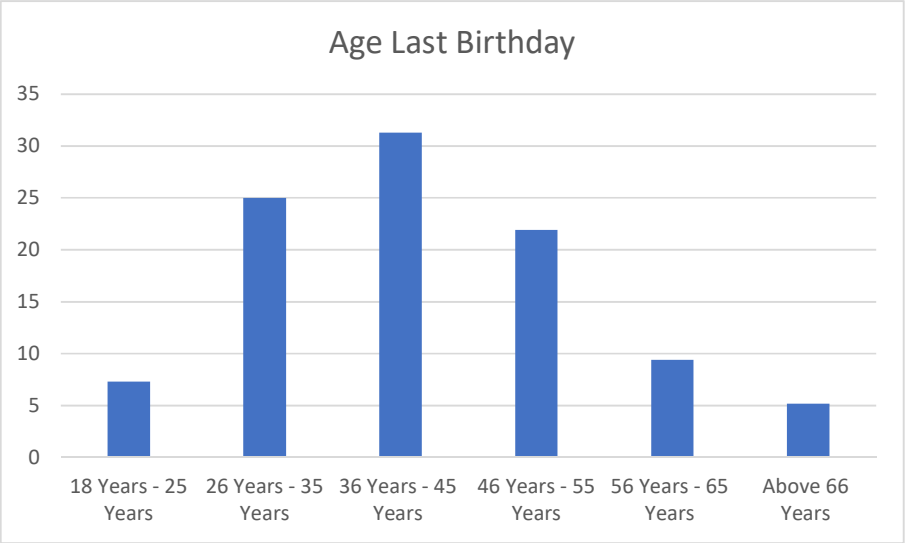


Figure 3 Age of respondents

4.8. Household Members

Adults

Most respondents' households (95%) have below 5 adult members and 5% have between 5 to 10.

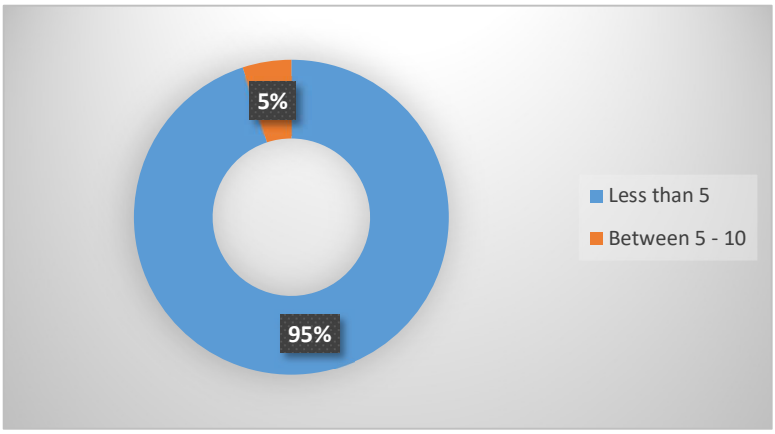


Figure 4 Adult members in a household

Household members (children).

Most of the sampled households (81%) had below 5 children. This average concurs with KNBS report 2019 that indicates that the average number of members in a Kenyan households is 3.9.

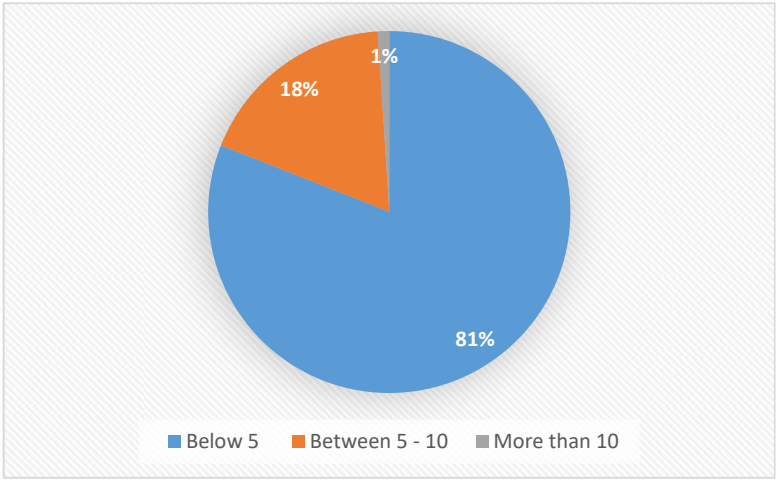


Figure 5 Number of Children in a Household

4.9. Formal education

In this study, 95% of the sampled respondents can read and write. According to the 2019 Kenya Population and Housing Census, Kenya's overall literacy rate for individuals aged 15 and above was approximately 83%. However, the Nanyuki area is an urban area with accessible educational facilities making the literacy levels high.



Figure 6 Respondents who have formal education

4.9.1. Education Level

Most of the respondents (40.6%) had Upper Secondary education, 24% University, 12.5% Technical/Vocational College, 8.3% Upper Primary, 6.3% Lower Primary, 6.3% Lower Secondary, 1% No formal school and 1% Non-formal literacy. Nanyuki is a fast growing area with a lot of immigrants from other counties looking out for job opportunities thus the high literacy levels.

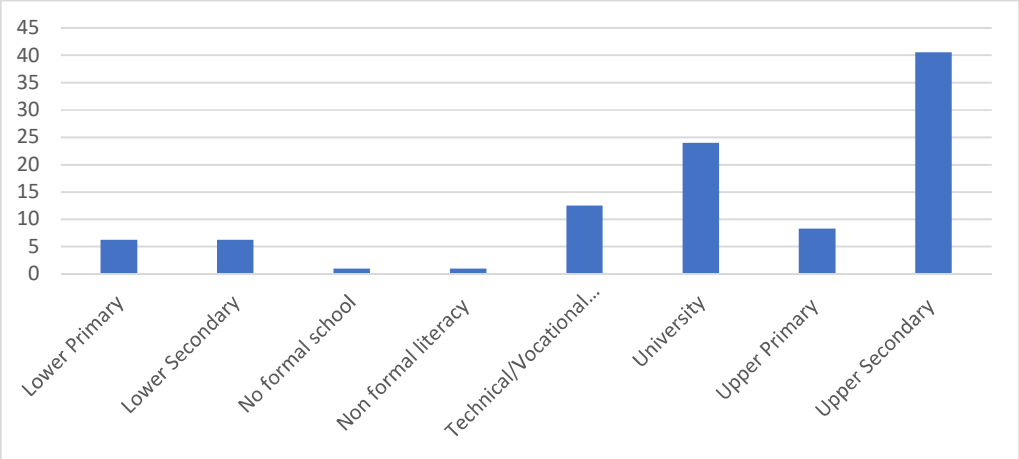


Figure 7 Respondents Education Level

4.9.2. Spouse's Education Level

A high number (33.3 %) of the respondent's spouses indicated they had Upper Secondary education level, 10.4% Lower Primary, 6.3% Lower Secondary, 9.4% No Formal School, 1% Teacher Training School, 6.3% Technical/Vocational College, 21.9% University, 8.3% Upper Primary.

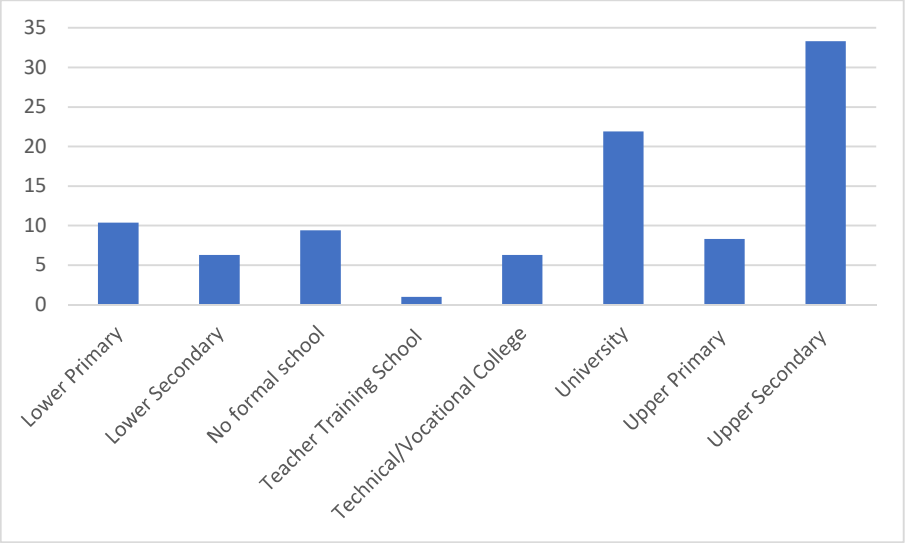


Figure 8 Education level of respondent's spouses

4.9.3. Children's Education level.

Majority (33 %) of the respondents children had Lower Primary education, 28.1% Upper Primary, 5.2% Lower Secondary, 17.7% Upper Secondary, 19.8% University, 6.3% Technical/vocational, 7.3% Non-Formal Literacy and 1% Apprenticeship in the field of mechanics and electricity fittings.

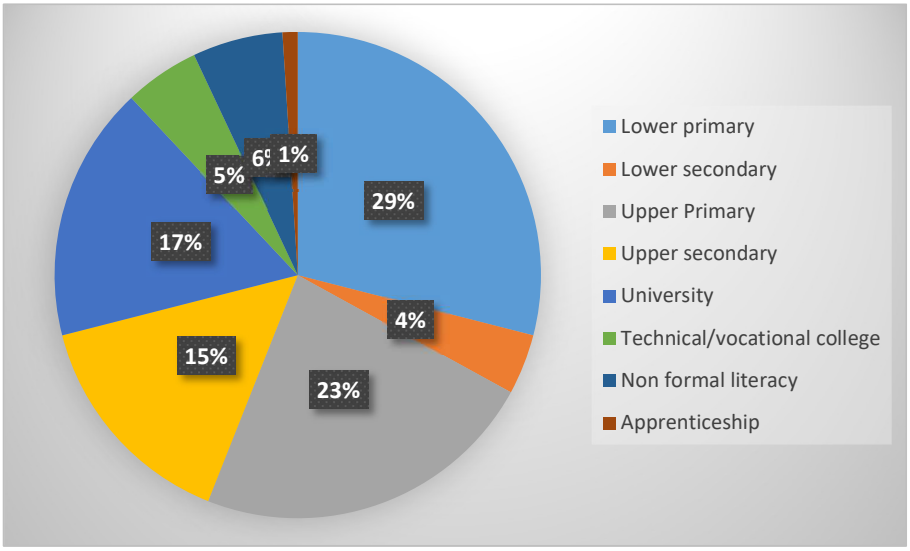


Figure 9 Education level of children in a household

4.10. Occupation and Sources of Livelihood

4.10.1. Socio-economic activities

19.8% of the respondents are in Business/Trading,16.7% are casual domestic laborers, 14.6% are crop farmers followed by Teaching and construction at 13.5%. The motorcycle (boda boda) industry recorded a low number of respondents. This was surprising since it's a robust business in the urban areas. This may be because most of the them had already left for work when houses were sampled. However the various categories of respondents profile agree with an urban set up.

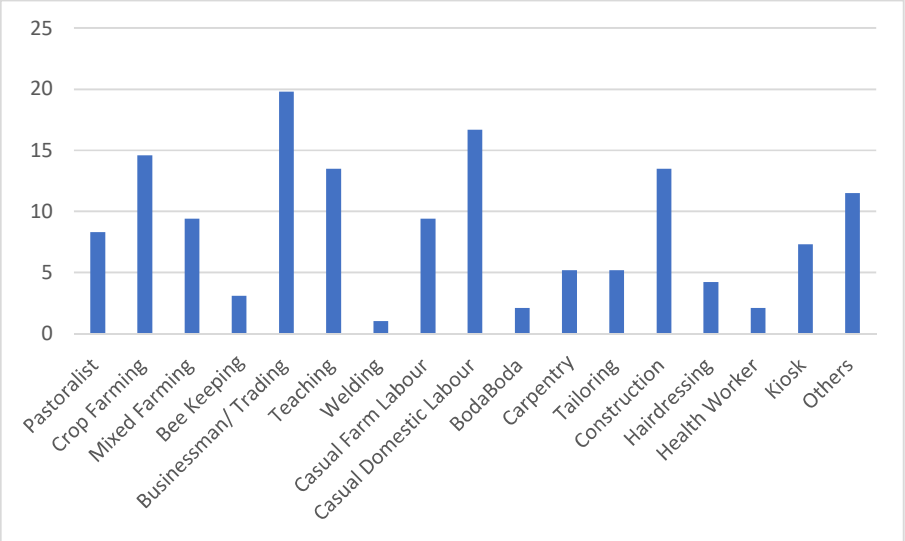


Figure 10 Socio-economic activities

4.10.2. Household Incomes when all sources are considered

The study revealed a heterogeneous nature of income levels with most of the respondents (28%) falling under the category of those who earn Ksh 20,001 – 50,000 , 5,000 income per month at 18% followed by those earning Ksh 50,000 to 100,000 per month at (12%).

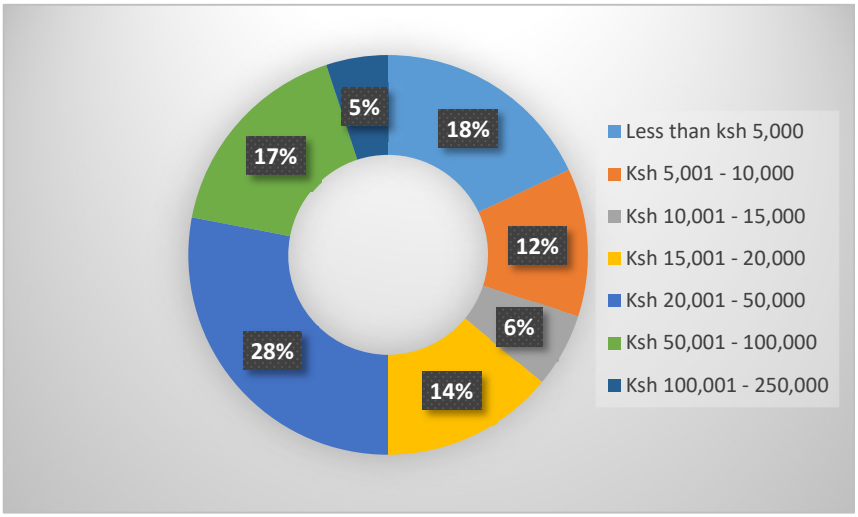


Figure 11 Household Incomes from all Economic Activities

4.10.3. Income from agricultural activities per year

Most of the respondents earn less than Ksh 20,000 from agricultural activities per year. The low income from agriculture could be because the project area is in an urban set up where agricultural activities are limited to the outskirts of town.

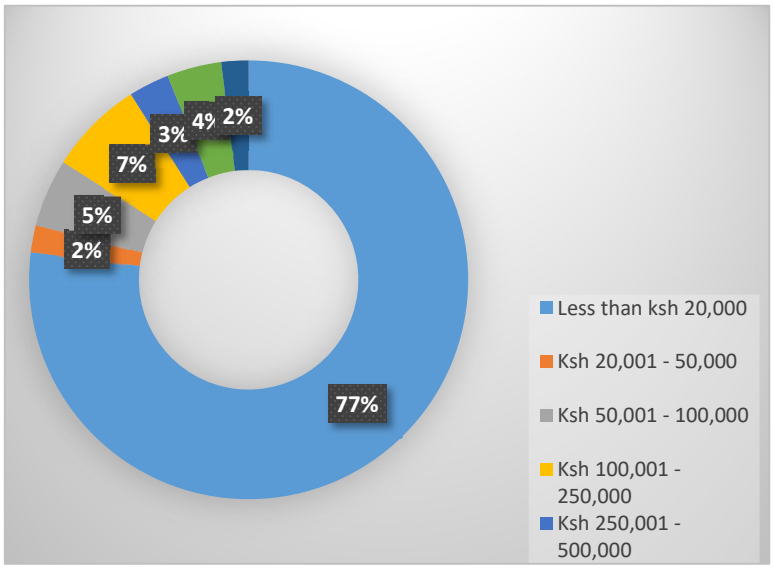


Figure 12 Income from Agricultural Activities

4.10.4. Monthly expenditure

In this study, 44% of the respondent's monthly expenditure falls under the Ksh 20,001 – 50,000 category. This agrees with the income levels.

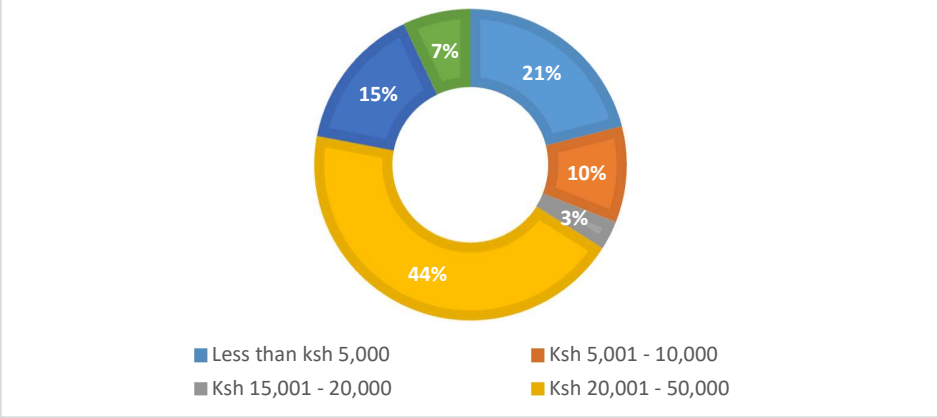


Figure 13 Monthly Expenditure

4.10.5. Types Of Household Expenditure

Most (28%)of the household expenses were on footing education expenses such as school fees, uniforms , school transport and books. This was closely followed by medical expenses at 20%, fuel and travel both at 7%water at 11% food budget,

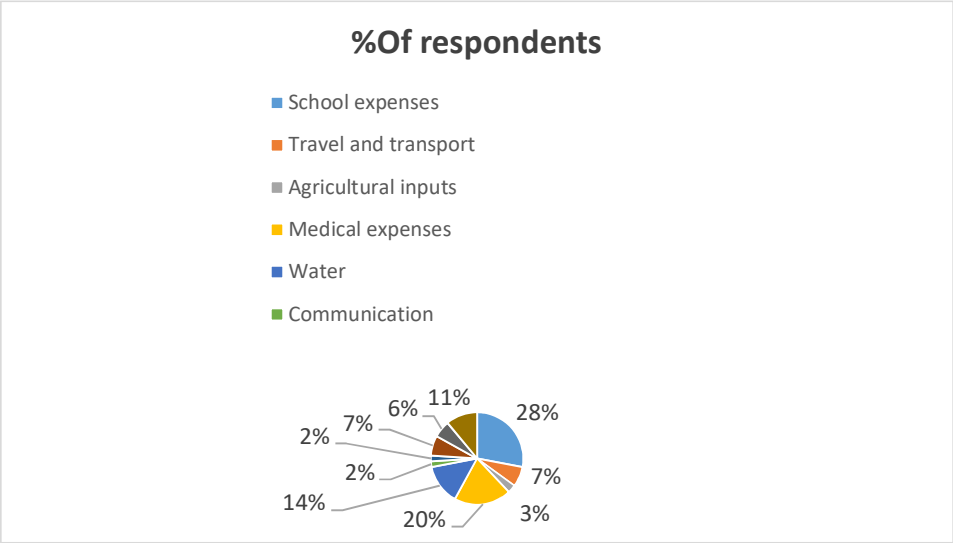


Figure 14 Types of Household Expenditure

4.11. Food Security

4.11.1. Households Dietary Habits

The common meal in most of the households was maize at 20%, rice and vegetables each 16%, beans 19%, meat 14%, milk 10%. The dietary profile agrees with what is staple in Nanyuki and in Laikipia County in general.

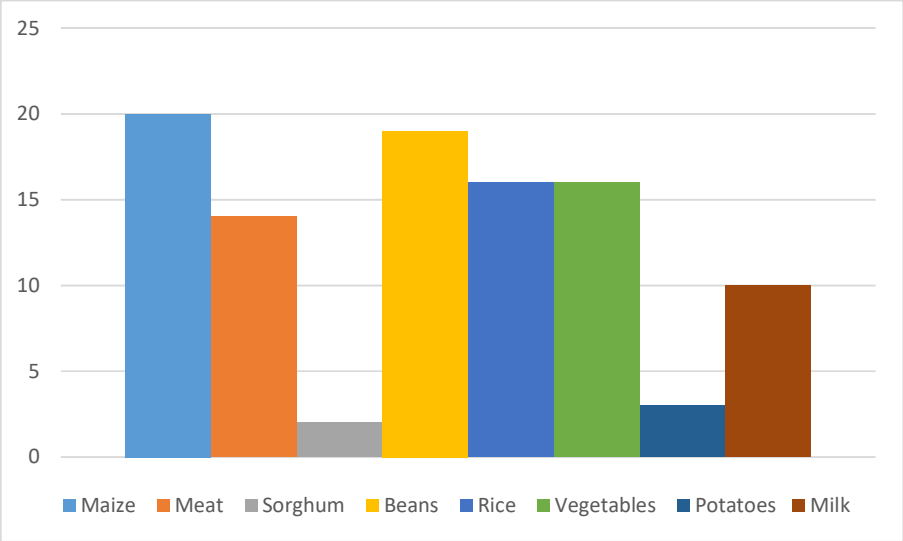


Figure 15 Common Food Items

4.11.2. Sources of Food

Most (68 %) of the respondents indicated that they buy the food they consume, 31.3% grow it themselves and only 1% receive food aid from the government or NGOs. The statistics agree with what happens in urban centres.

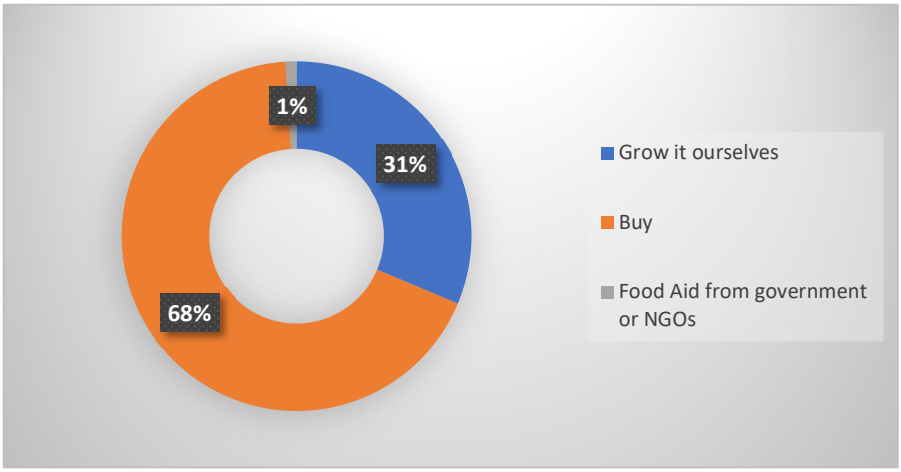


Figure 16 Sources of Food

4.12. Housing

4.12.1. Length of stay in the current area

42.7% of the respondents have lived in the area for 1-5 years, 22.9% for 5 – 10 years, 16.7% and 16.7% for 6 – 12 months and 10+ Years and 1% for less than 6 months

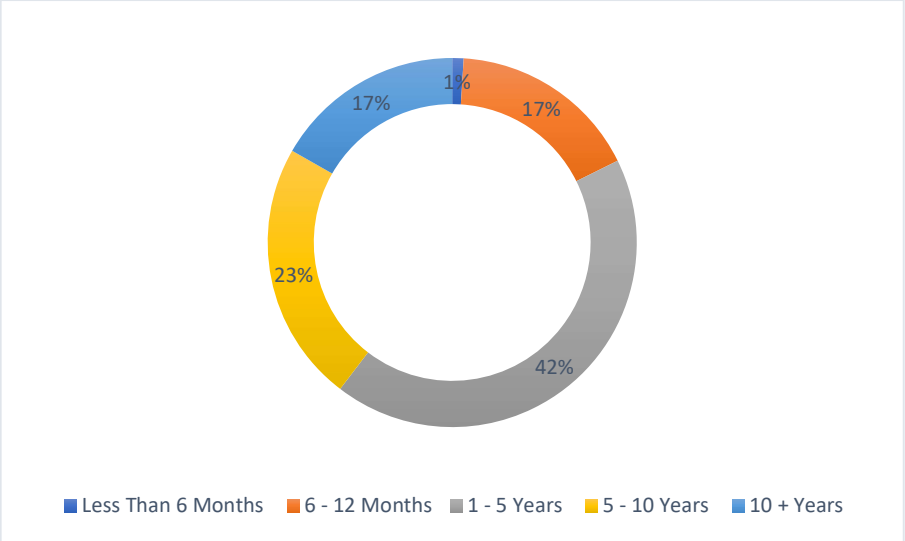


Figure 17 Length of stay in the current area

4.12.2. House Ownership

In the project area, 45.8% of the respondents indicated they owned the place they live in, 26% live in rented places, 25% are owned by their husbands and 2.1% are hosted by relatives. The high number of persons who own the houses in the urban area is not surprising since most of the landlords and landladies are interested in the outcome of the water project thus stayed around to respond to the questionnaires administered.

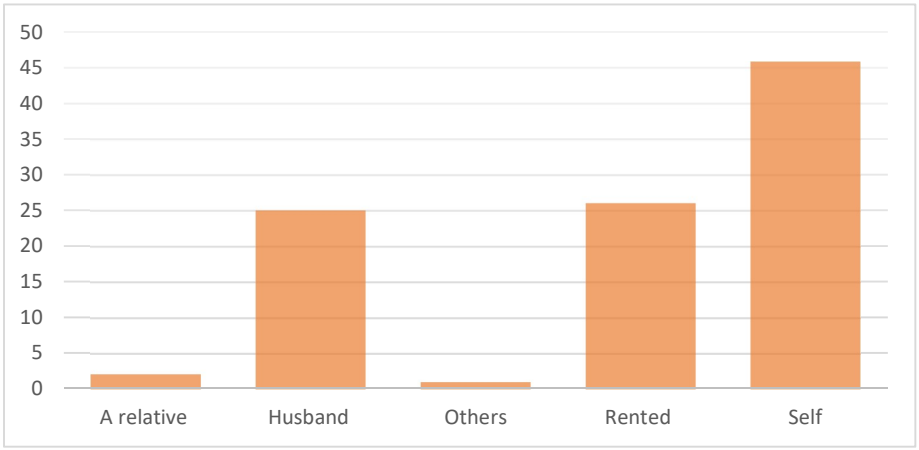


Figure 18 Length of stay in the current area

4.12.3. Materials used in Constructing the House

50% of the respondent's house's walls are made of stones, 29.2% are made of timber, 12.5 unburnt bricks, 6.3% of burnt bricks, and 2.1% of iron sheets.

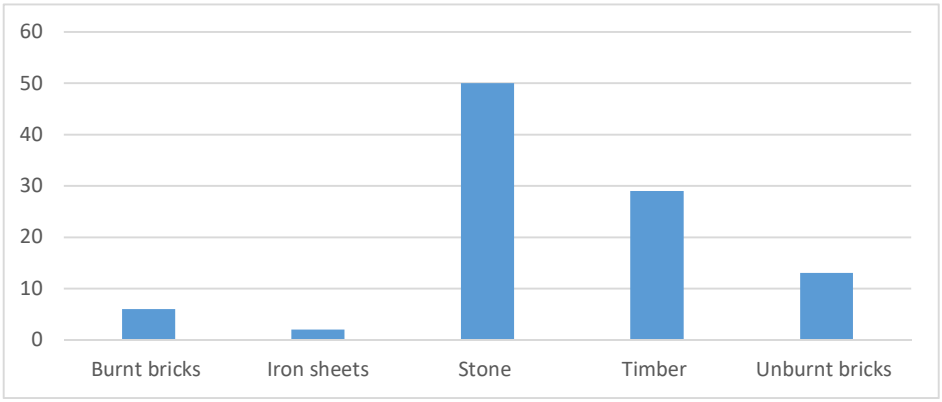


Figure 19 Materials used in Constructing the House

4.12.4. House Roofing Materials

All respondent's house roofs were made of iron sheets.

4.12.5. House Flooring Materials

Majority (87.6%) of the respondent's house floors were made of concrete slabs and 12.4% were made of Earth/clay.

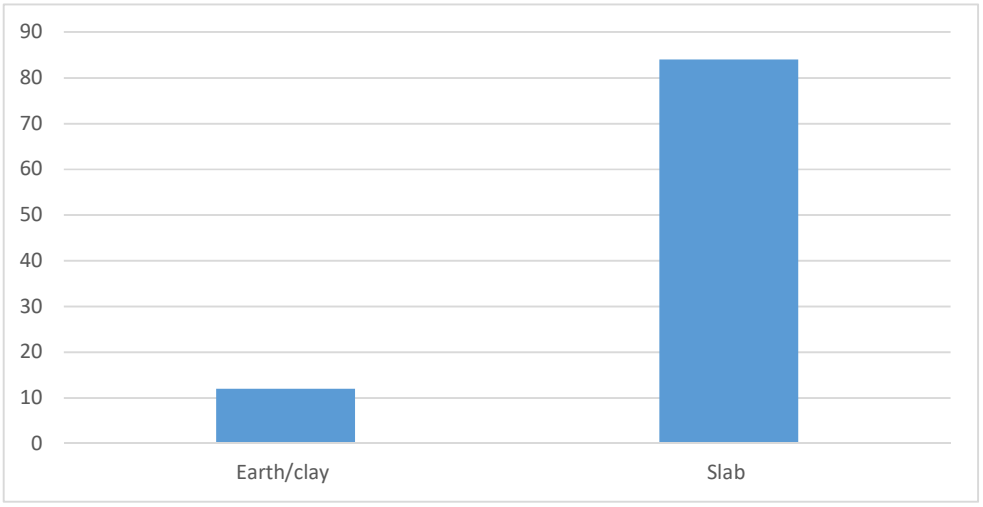


Figure 20 House Flooring Materials

4.12.6. General condition of the house.

In this study, 58.3 % of the respondent's houses were in good condition, 25% were very good, 10.4% were neither bad nor good, 3.2% were bad and 3.1% were very bad.

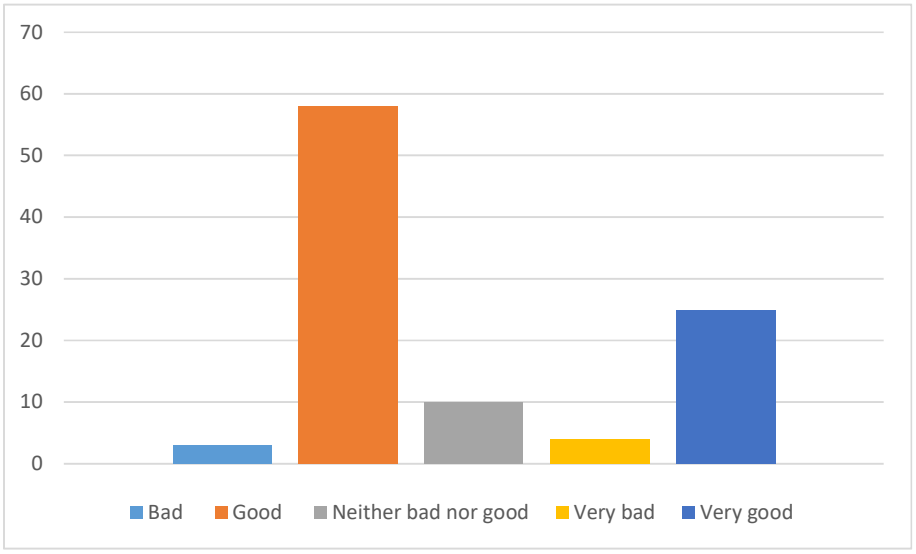


Figure 21 General condition of the house.

4.12.7. Other Uses of the House other than Habitation

Apart from dwelling in the current house, majority (89.6%) of the respondents indicated that they also use the house for storage, 6.2% for other reasons, and 4.2% share with animals.

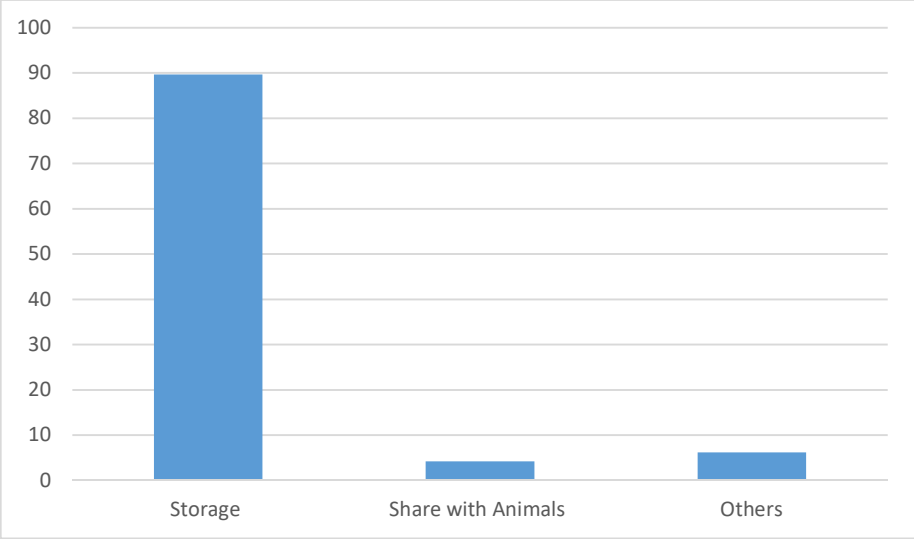


Figure 22 Other Uses of the House other than Habitation

4.13. ENERGY

4.13.1. Energy Sources for Cooking

41% of the respondents use Gas/LPG for cooking, 32% use charcoal, 22% use firewood, and the rest use paraffin, electricity, and biogas.

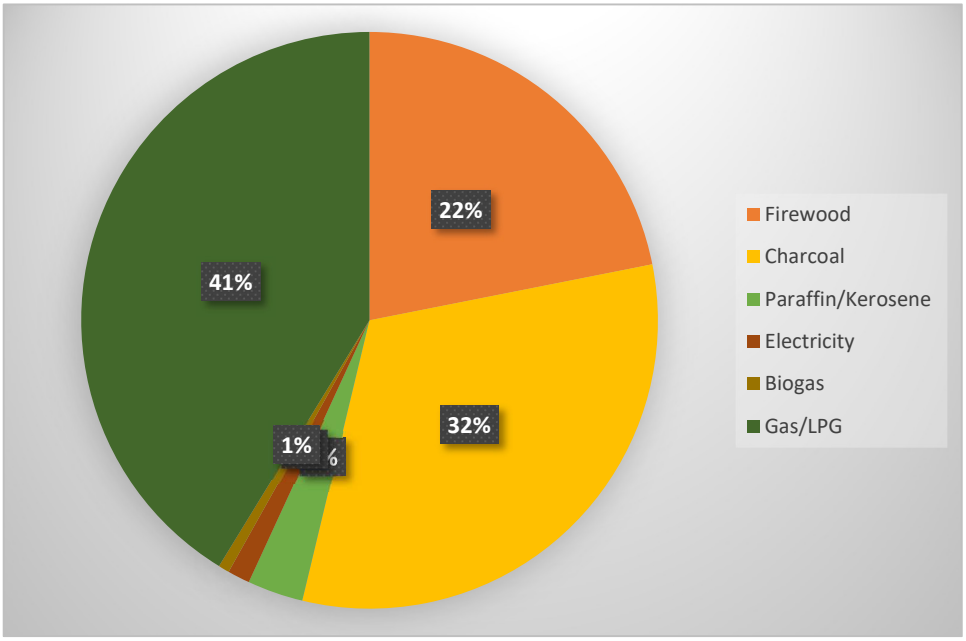


Figure 23 Energy Sources for Cooking,

4.13.2. Sources of Energy for Lighting

Majority of the respondents, 86% use electricity for lighting, 5% use batteries/dry cells as well as paraffin/kerosene, and the rest use solar, biogas, and candles.

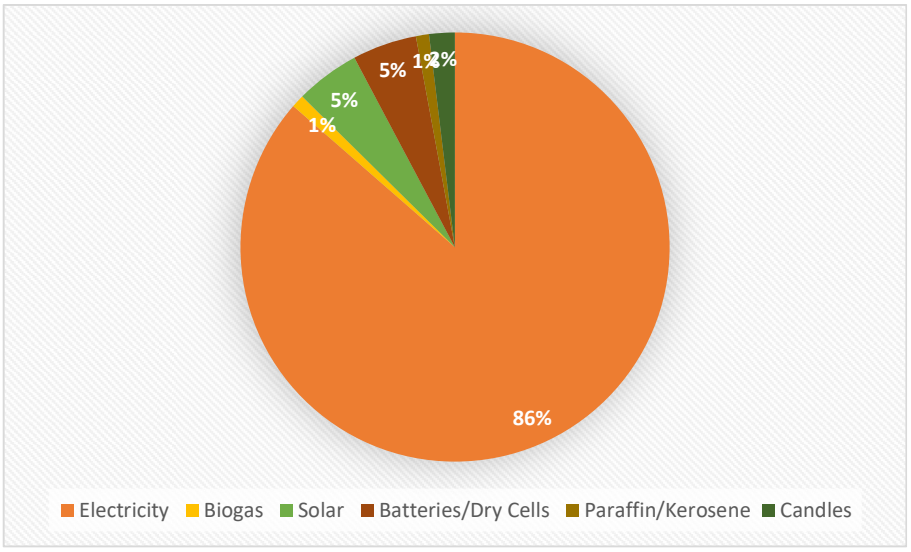


Figure 24 Sources of Energy for Lighting

4.13.3. Sources of energy for Electronic gadgets/sound

Majority of the respondents (87%) use electricity for their electronic gadgets/sound, 9% use batteries/dry cells, and 4% use solar.

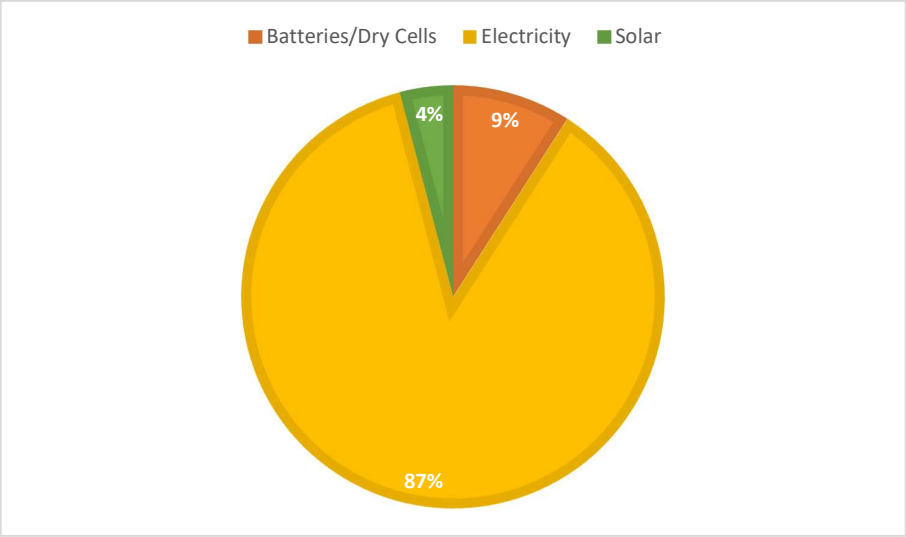


Figure 25 Sources of energy for Electronic gadgets/sound

4.13.4. Electricity Coverage

Majority (93%) of the respondents have electricity in their homestead with only 7% not having.

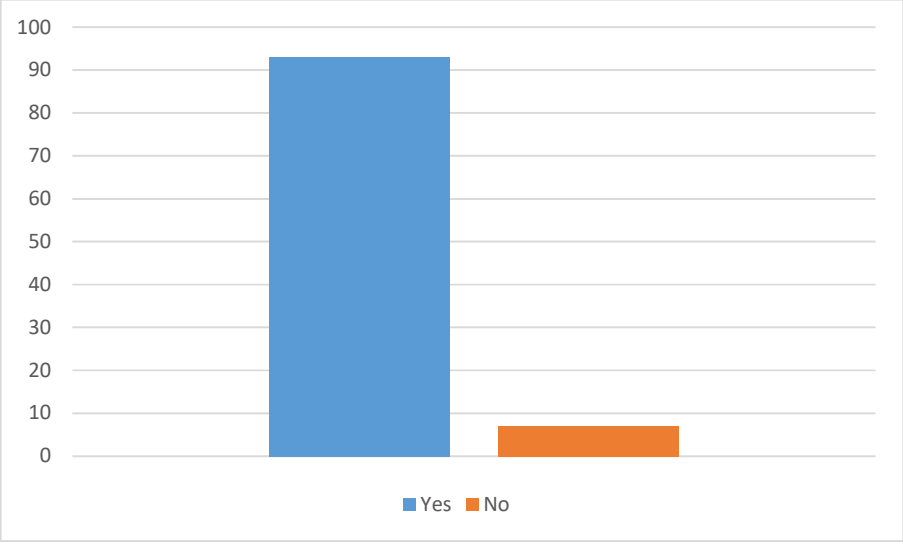


Figure 26 Electricity Coverage

4.14. Health

4.14.1. Disease incidences in the past one month

Majority (72%) of the respondents had not been ill or had an accident in the last 1 month while 28% been either ill or had an accident in the past 1 month.

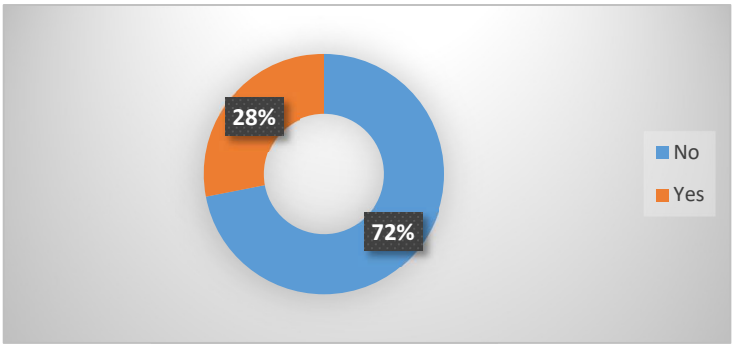


Figure 27 Disease incidences in the past one month

4.14.2. Common diseases and incidences of illnesses

At the time of the study, 42% of the respondents reported to have been ill from flu/cough, 18% from diarrhea, and 15% from malaria.

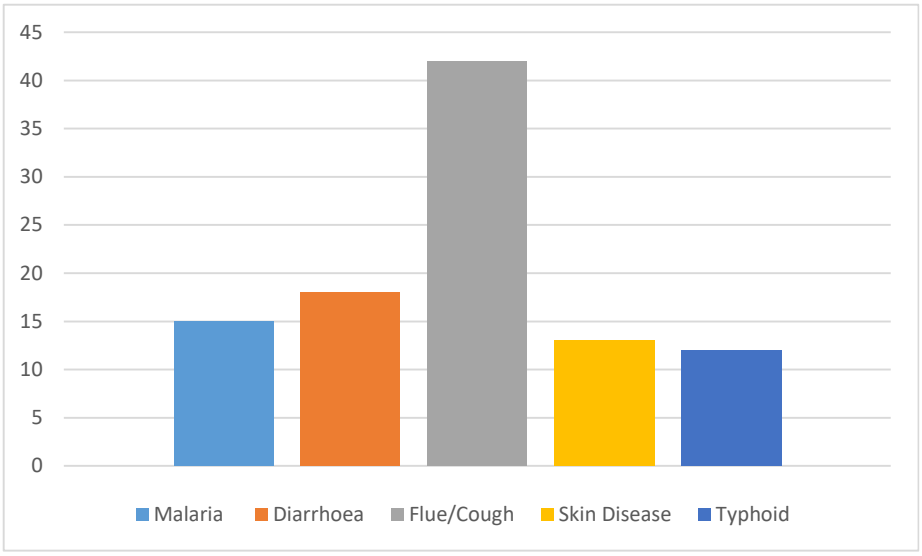


Figure 28 Common diseases and incidences of illnesses

4.14.3. Common Water Borne Diseases

Three common waterborne diseases experienced in the household over the last year t the time of study were assessed, 42% of the respondents had suffered from diarrhea over the last year, 24% from Malaria, 19% from Typhoid and 15% from Amoeba. These incidences may be due to water scarcity or consuming water that is not safe for human use.

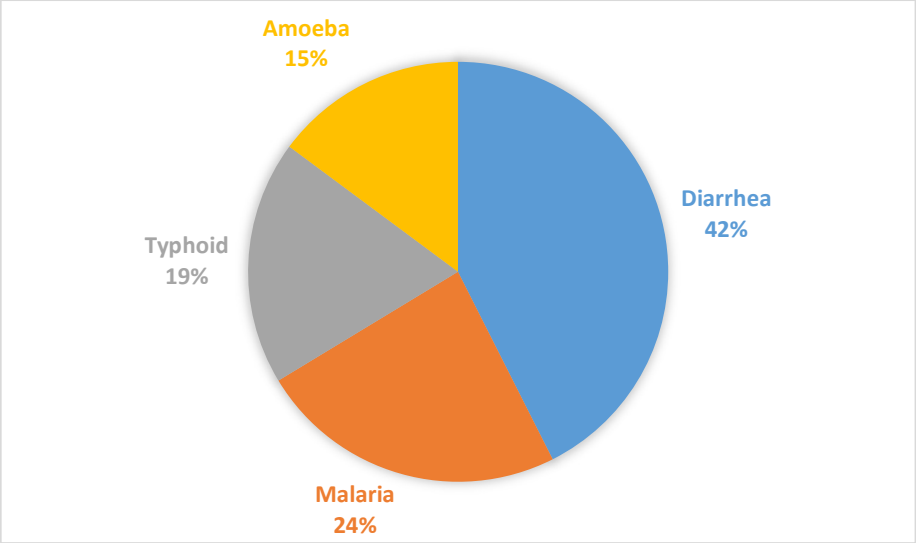


Figure 29 Common Water Borne Diseases

4.14.4. Available health facilities

Most families 76% of the respondents attended at government/health centers, 10% at pharmacies, 5% at NGO hospitals and private clinics, and 4% at private clinics.

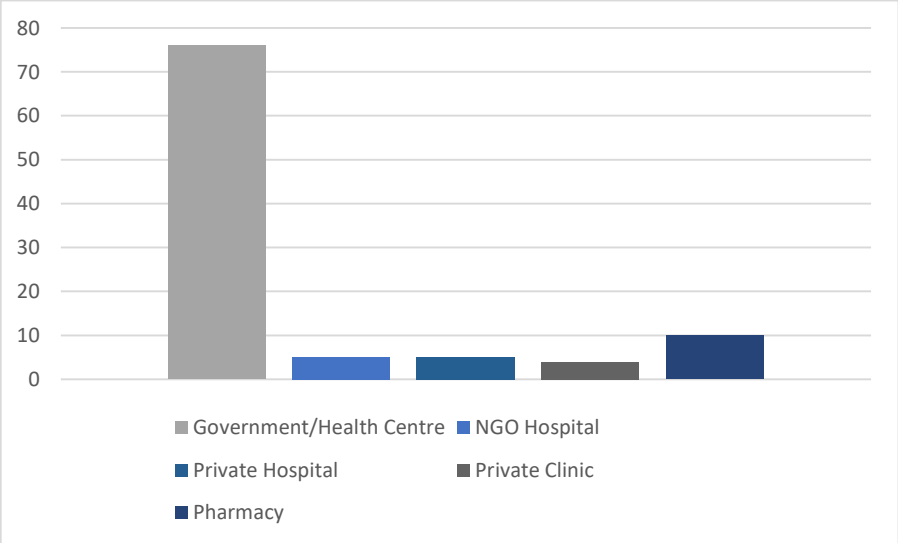


Figure 30 Available health facilities

4.14.5. Medical Personnel in the healthy facility

47% of the respondents who visited various healthcare facilities were attended to by doctors, 39% by nurses, 8% by clinical officers, and 6% by pharmacists.

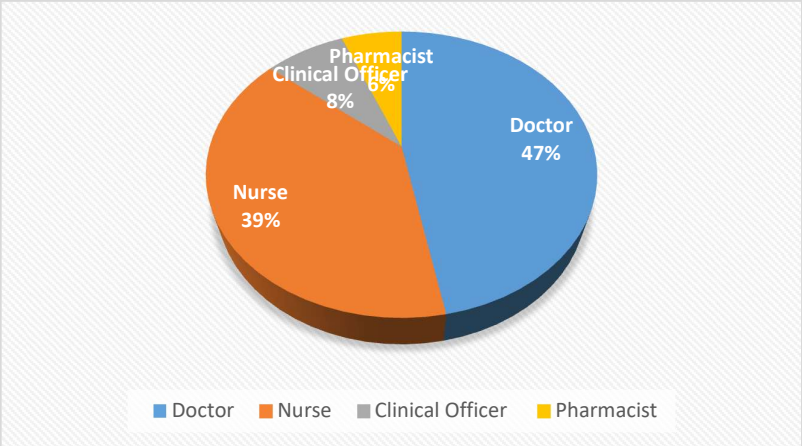


Figure 31 Medical Personnel in Hospital

4.14.6. Distance to the nearest health center in kilometers

Majority (87%) of the respondents travel between 1km – 5km to the nearest health center, 7% between 6km – 10km, 3% between 11km – 15km and 3% between 16km – 20km.

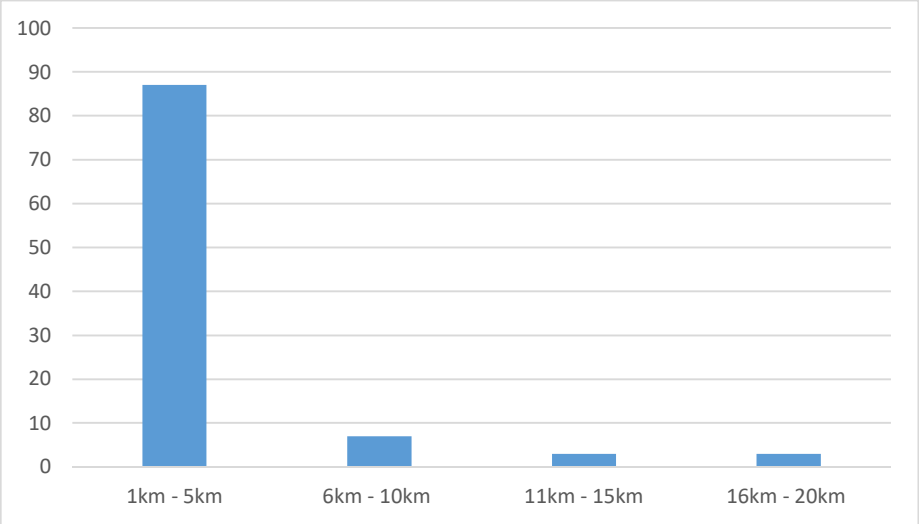


Figure 32 .Distance to the nearest health center in kilometers

4.14.7. Time taken the nearest health facility in minutes

Majority (51%) of the respondents travel between 15 – 30 minutes to reach the nearest health facility, 27% 1 – 2 hours, 19% 30 minutes – 1 hour, and 3% below 15 minutes.

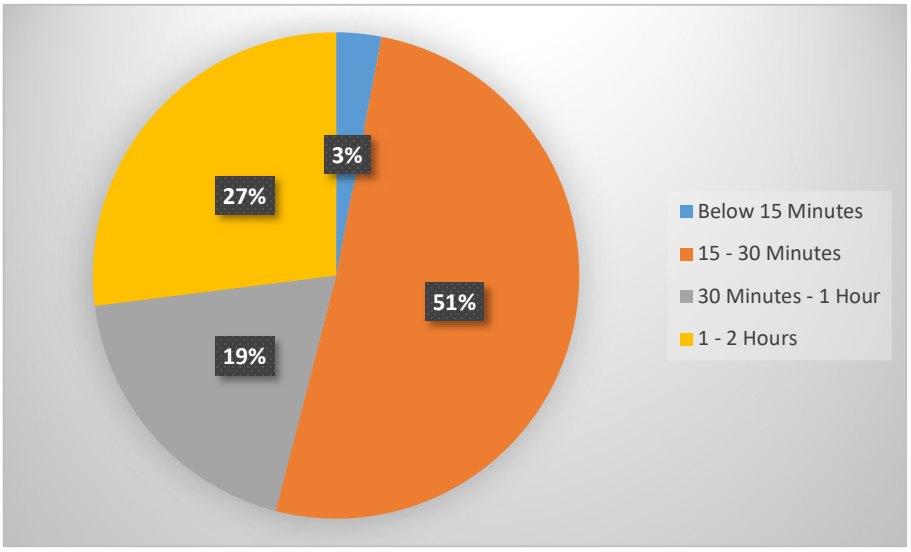


Figure 33 Time taken the nearest health facility in minutes

4.14.8. Satisfaction Levels with the Health Facilities

At the time of the study, majority (49%) of the respondents indicated that they were satisfied and 24% were very satisfied,with the services offered at the health facilities, 25% were not satisfied, and 2% are indifferent.

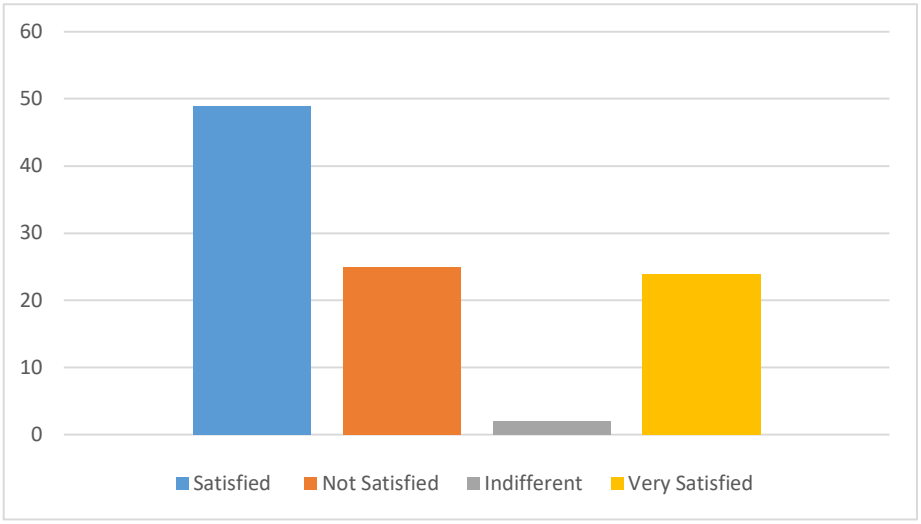


Figure 34 Satisfaction Levels with the Health Facilities

4.14.8.1. Reasons for dissatisfaction with health facilities

The reasons for dissatisfaction included: 43% of the respondents were not satisfied with the services offered because there are no drugs, 26% because of delays in being attended to, 25% because services are very expensive, 5% because doctors/nurses are not friendly and 3% because the health facilities are far.

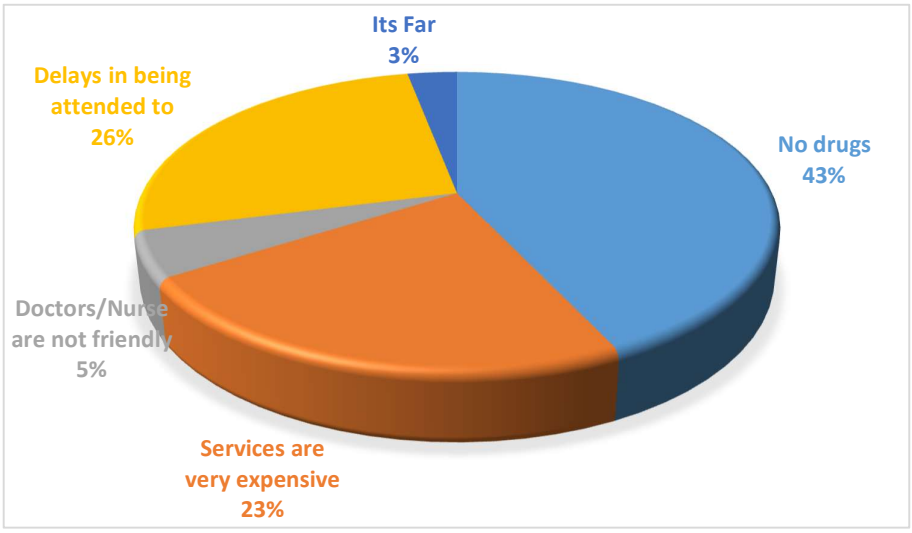


Figure 35 Reasons for dissatisfaction with health facilities

4.14.9. HIV / AIDS awareness

When asked whether they were aware of any HIV/AIDS campaign strategies in the area, 93% of the respondents are aware of the HIV/AIDs campaign.

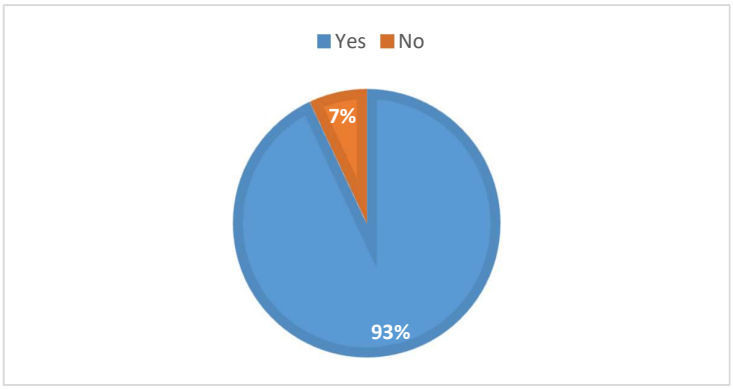
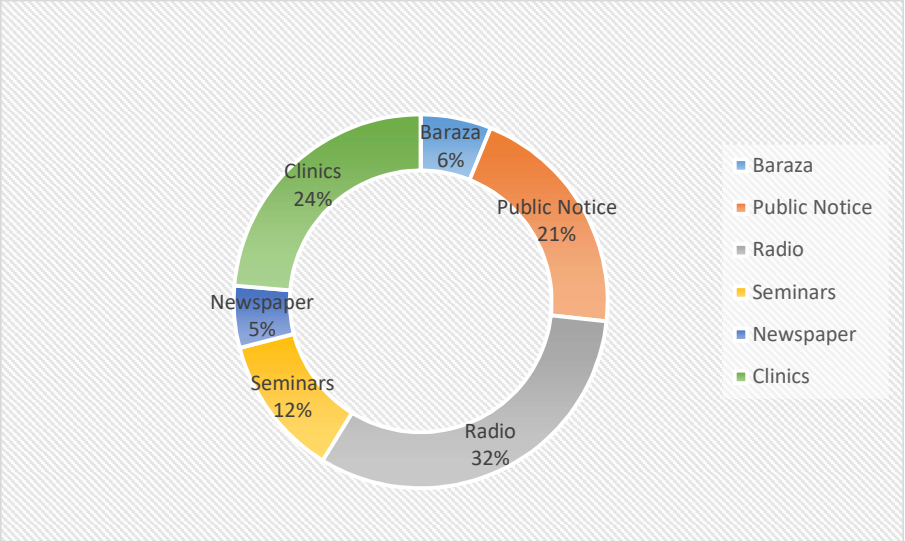


Figure 36 HIV/AIDS Awareness

4.14.9.1. Medium of the HIV/AIDS Campaigns

Majority (32%) of the respondents received the HIV/AIDs campaign through radio, 24% through clinics, 21% through public notice, 12% through seminars, 6% through baraza and 5% through newspaper.



4.14.9.2. Knowledge of HIV/AIDS means of contraction and its effects

Majority (98%) of the respondents are knowledgeable of the HIV/AIDS means of contraction and its effects.

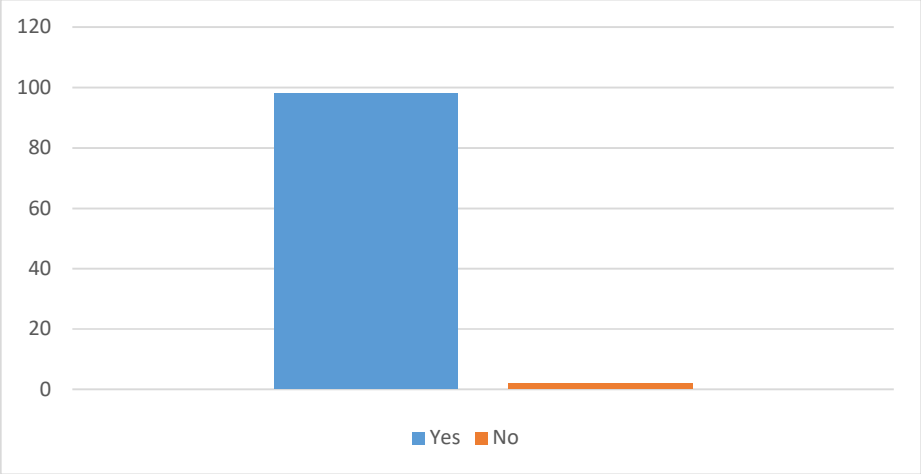


Figure 37 Knowledge of how AIDS is contracted

4.14.10. Transmission and Prevention of malaria

The study sought to know if the respondents knew how Malaria can be controlled. Majority (63%) of the respondents indicated that they have access to mosquito nets.

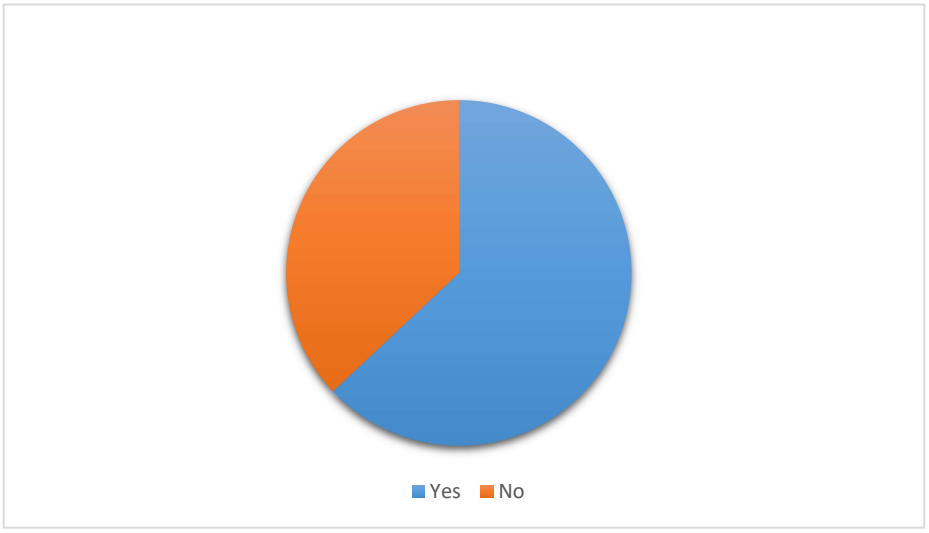


Figure 38 Knowledge of Malaria Transmission

4.14.10.1. Use of mosquito nets

Majority (93 %) of the respondents who use mosquito nets in their household use mosquito nets for all HH members and 7% use for children below 5 years.

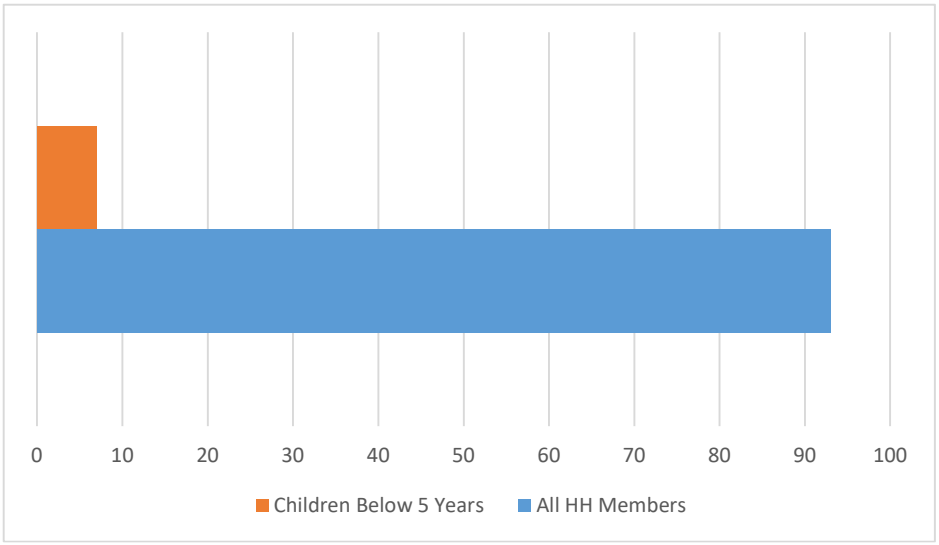


Figure 39 Use of Mosquito nets

4.14.10.2. Other actions taken to control mosquitoes

Majority (54%) of the respondents indicated that they do nothing to control mosquitoes, 22% of the respondents use mosquito repellent to control

mosquitoes, 13% through clearing bushes, and 6% through drainage of stagnant water.

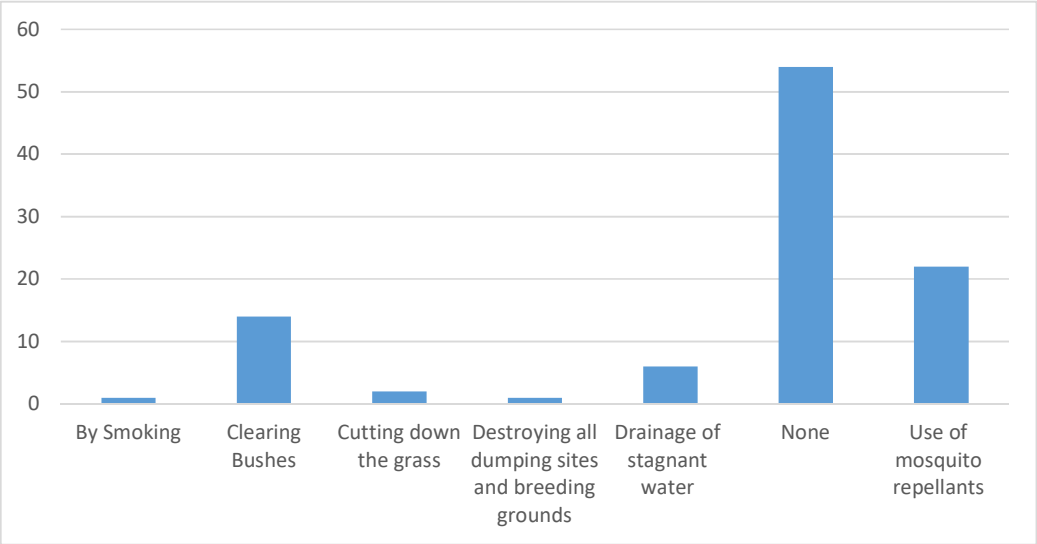


Figure 40 Other actions taken to control mosquitoes

4.14.11. Other disease-carrying vectors in your area

In this study 84% that they are not aware of any, 11 % of the respondents pointed out tsetse flies, 3% sandflies, 1% rodents and 1% fleas.

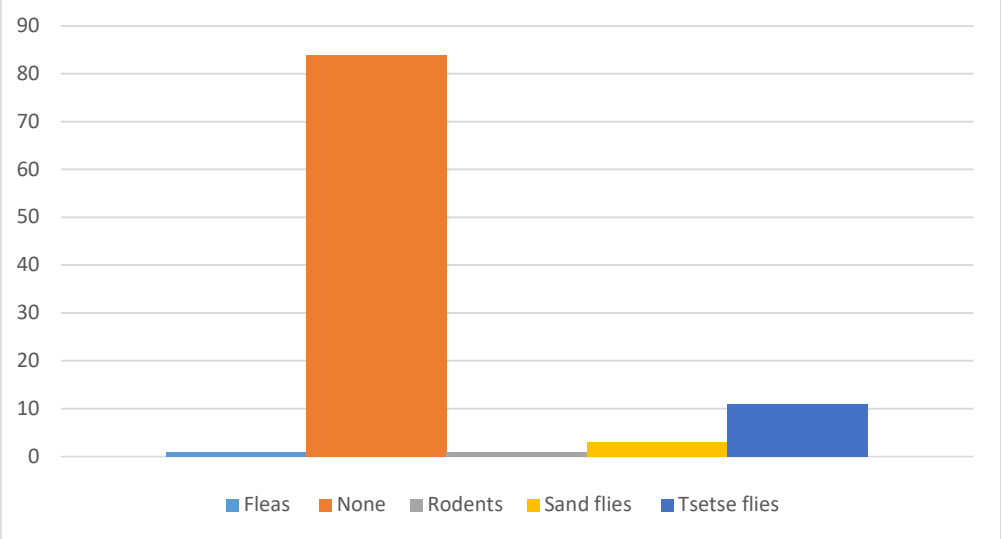


Figure 41 Other disease-carrying vectors in your area

4.15. Water Access, Facilities and Sanitation

4.15.1. Sources of drinking water

Many (50%) respondents use taps outside their house as their main source of drinking water, 26% use tap inside the house and 11% use pump/borehole as their main source of water.

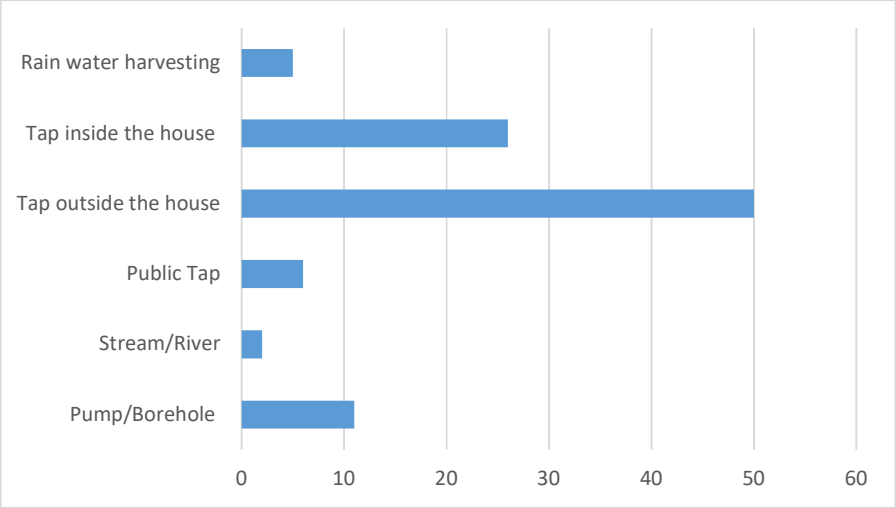


Figure 42 Sources of drinking water

4.15.2. Respondents preferred water source

Majority (56%) of the respondents preferred to use a tap outside their house, 34% preferred a tap inside their house, and 4% preferred a pump/borehole.

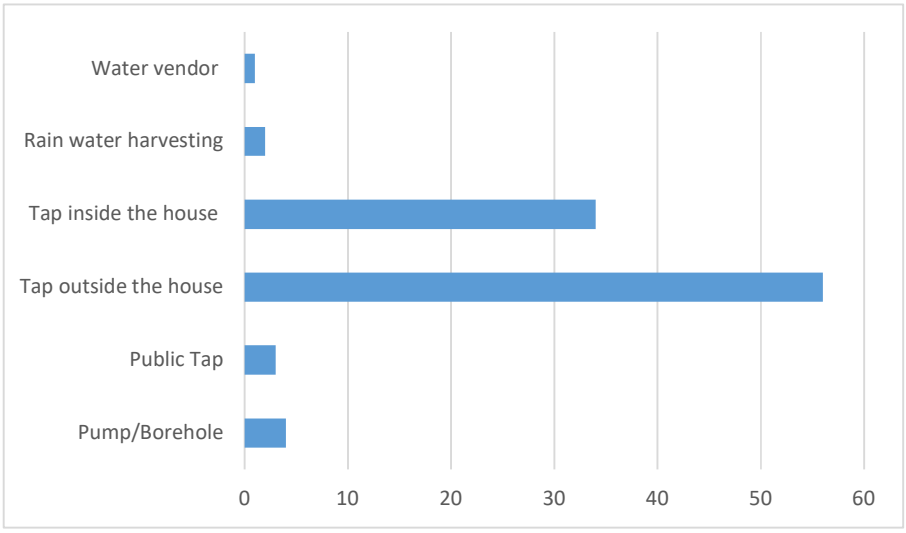


Figure 43 Preferred source of water

4.15.3. Main source of drinking water for domestic animals

Majority (64%) of the respondents have no domestic animals, 18% of the respondent's main source of drinking water for domestic animals is tap outside the house, 8% pump/borehole, and 4% for both tap inside the house and rainwater harvesting.

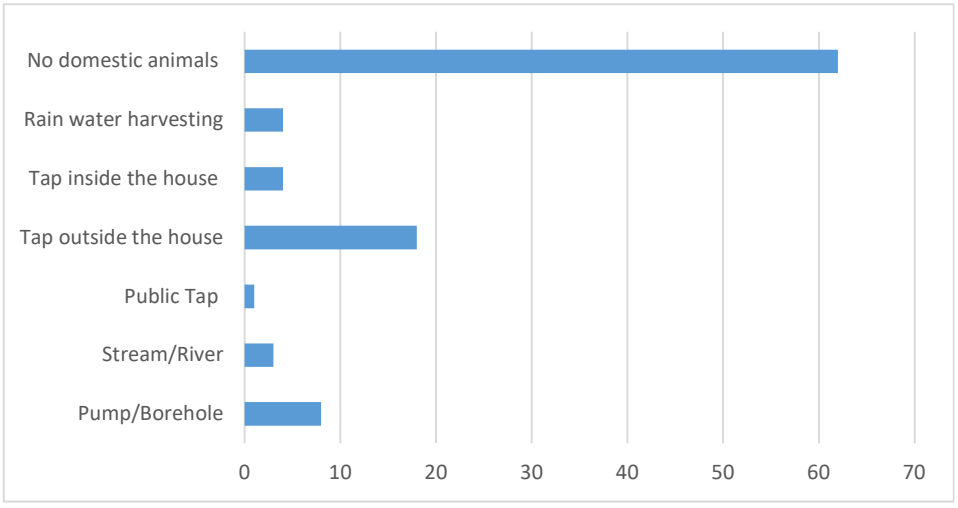


Figure 44 Source of water for domestic animals

4.15.4. Nearest source of water for drinking

Majority (95%) of the respondents travel for less than 1km to fetch water and 5% travel between 1km – 5km.

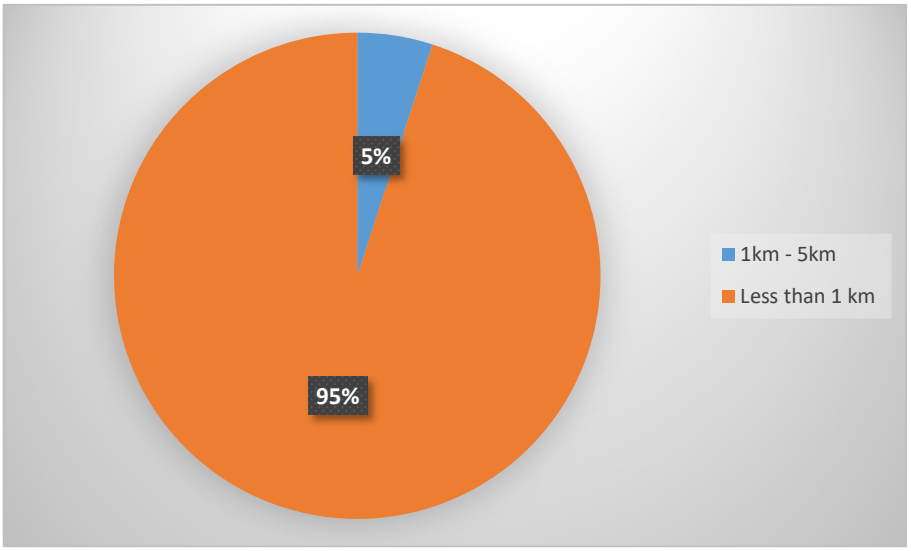


Figure 45 Distance Travelled in search of Water

4.15.5. Time taken to water source during the wet season

95% of the respondents travel for 0 – 15 Minutes to the nearest water source during the wet season.

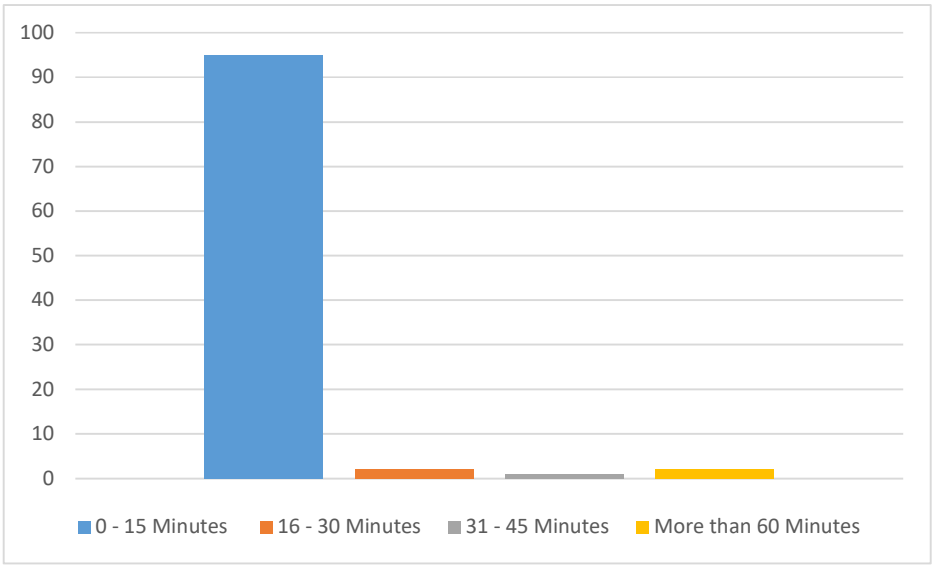


Figure 46 Time taken to water source during the wet season

4.15.6. Time taken to water source during the dry season

During the dry season , 88% of the respondents travel for 0 – 15 Minutes to the nearest water source and 8% for more than 60 Minutes.

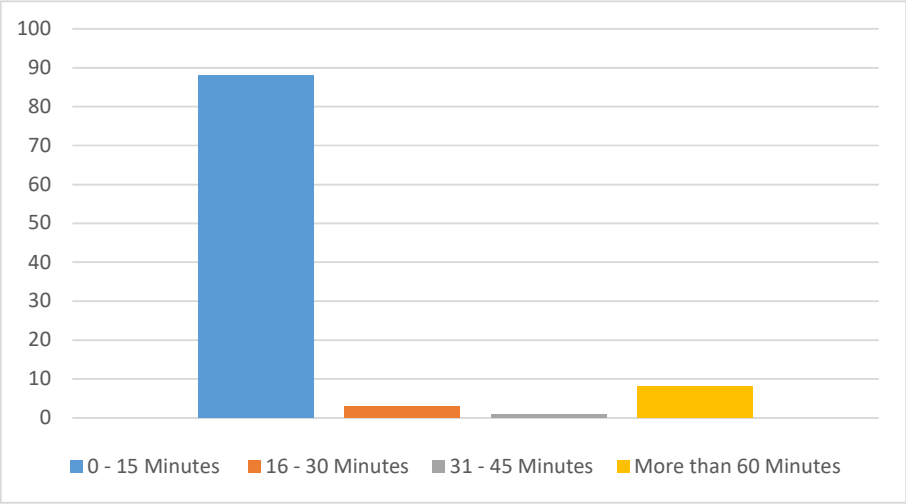


Figure 47 Time taken to water source during the dry season

4.15.7. Sources of water for drinking and other household needs

On being asked whether they use the same sources of water for drinking and other household needs, 99% of the respondents indicate that they use the same sources of water for drinking and other needs.

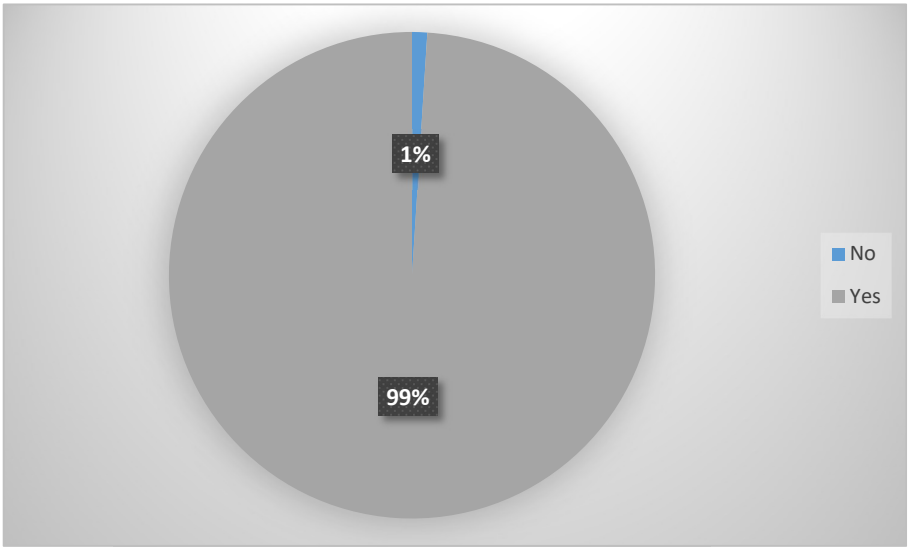


Figure 48 Sources of water for drinking and other household needs

4.15.8. Quantity of Water Used in Households

Majority (59%) of the respondents use less than 100 litres per day, 19% use 101 litres – 200 litres and 12% use 201 litres – 300 litres.

With an average of 3.9 persons per household,a single household needs about 390 Litres per day. The amount of water in use is below WHO and UN guidelines. he WHO (2003) recommends a minimum of 50 liters per person per day to ensure basic needs such as drinking, cooking, and personal hygiene are met. This amount is considered essential for maintaining good health and sanitation (Domestic Water Quantity, Service Level and Health." WHO, 2003: The United Nations (UN) in a document titled 'The Right to Water." UN, 2010 recommend 50 l to 100 l per person per day.

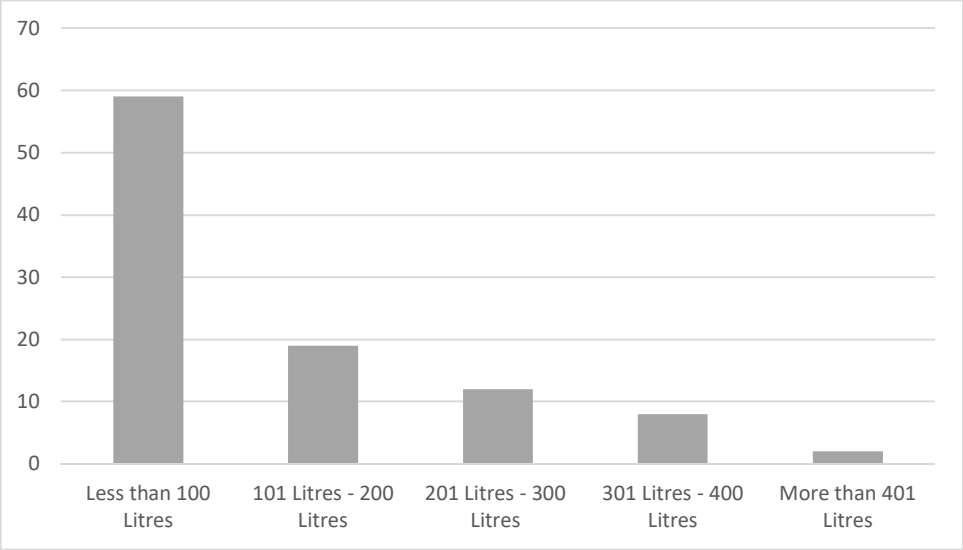


Figure 49 Quantity of water used in Households

4.15.9. Households using Water from Nanyuki Water and Sewerage Company

Majority (83%)of the respondents get their water from Nanyuki Water and Sewerage Company WSP. With the high water demand and low supply experienced, this project will be a game changer in the area.

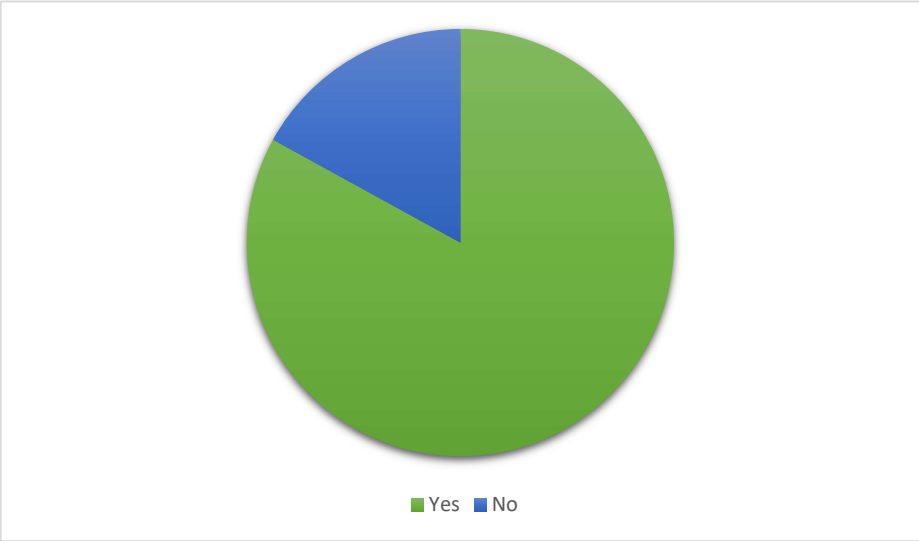


Figure 50 Households using Water from Nanyuki Water and Sewerage Company

4.15.10. Payment for the WSP water you consumed

All the 83% the respondents pay for the WSP water they consume.

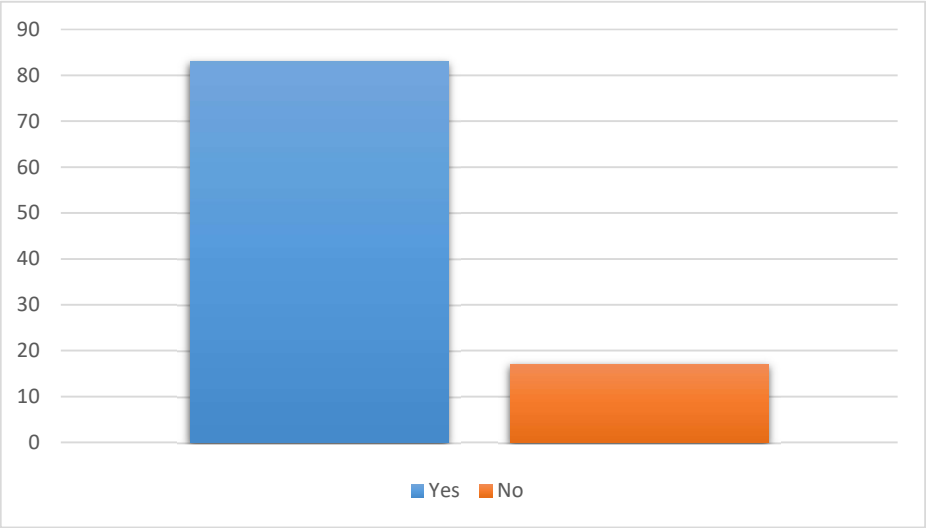


Figure 51 Payment for the WSP water you consumed

4.15.11. WSP Monthly Bills to Consumers

Majority 58% of the respondents pay ksh 100 – 500 monthly for the water they consume, and 30% pay ksh 1500 – 2000. The WSP water is relatively cheap since the acceptable water tariffs are applied. From focus group discussions, the cost of water per 20 litre container is Ksh 50 thus on average a household using 100 litres per day would pay Ksh 250 per day.

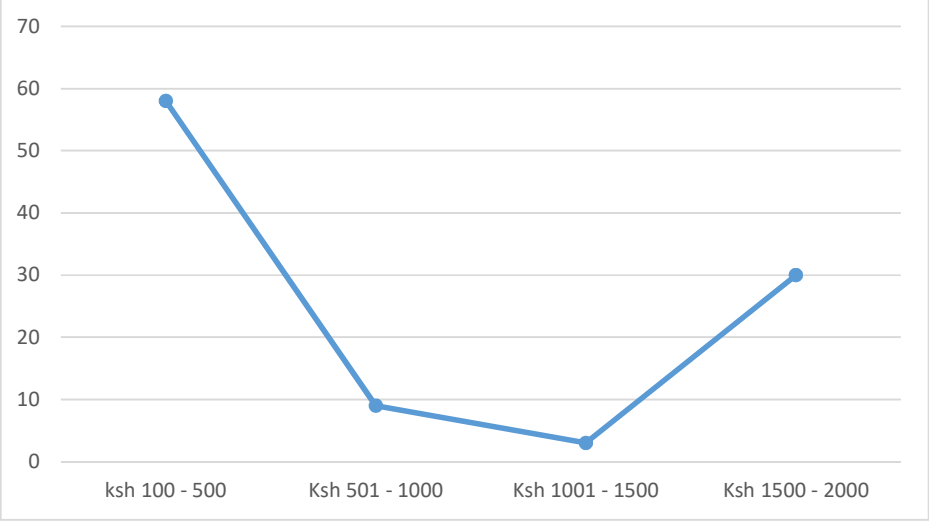


Figure 52 WSP Monthly Bills to Consumers

4.15.12. Satisfaction with the current water supply in the area

In the study area, 45% are satisfied with the current water supply, 25% are not satisfied and 20% are highly satisfied while 10% were non committal. This means that improvement of the water service will lead to a highly satisfied clientele.

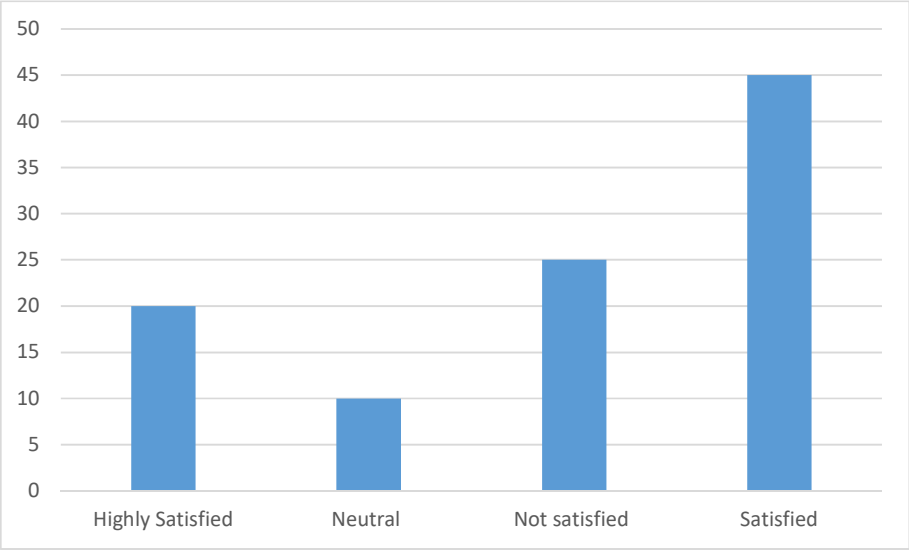


Figure 53 Satisfaction with the current water supply in the area

4.15.13. Change or improvement of the current water supply

Majority (79%) of the respondents want the water supply changed. The 21% who would not want the water supply to be changed are maybe the 20% who indicated that they were highly satisfied with the current water supply.

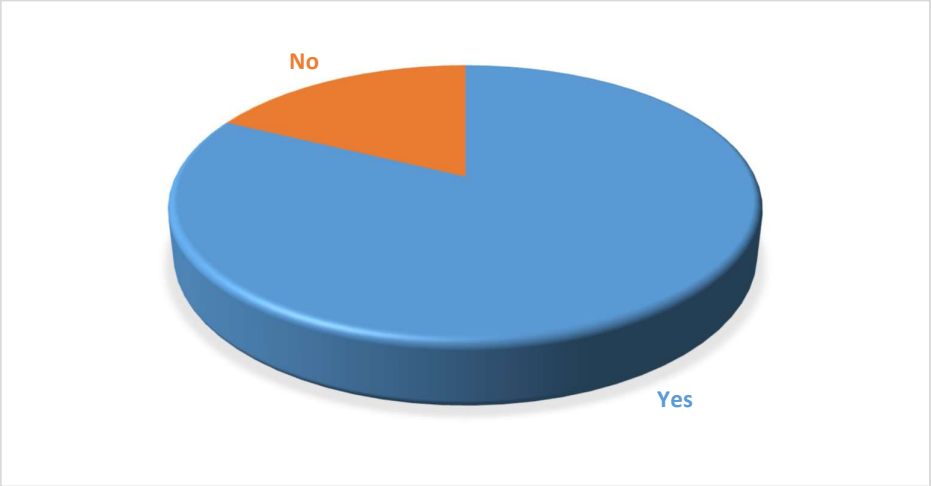


Figure 54 Change or improvement of the current water supply

4.15.14. Willingness to pay for improved water services

Majority (76%) of the respondents are willing to pay for improved water services. The 24% not willing to pay for the service may be the ones who are very satisfied or satisfied with the current water supply.



Figure 55 Willingness to pay for improved water services

4.16. Water and Gender Issues

4.16.1. Responsibility of fetching water in a household

Majority (58%) of respondents indicated that adult women are responsible for fetching water in most of the households and followed by the boy child in second place (20%), adult men (7%),hired help (7%) adult youth at 6% and girl child at 2%.

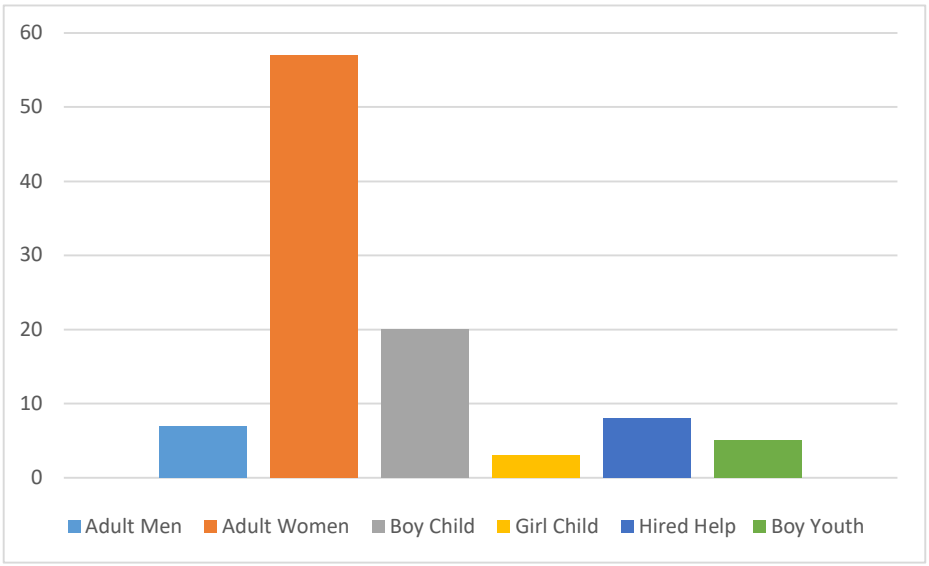


Figure 56 Water fetching and gender

4.16.2. Rainwater Harvesting

Rainwater is harvested in 70% of the households.

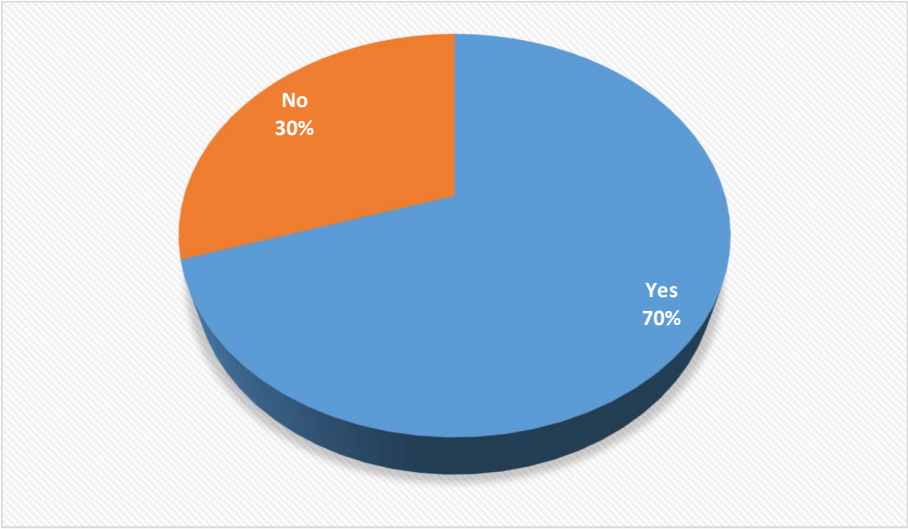


Figure 57 Rainwater harvesting

4.16.3. Methods of rainwater harvesting

The majority (64%) of respondents indicated that the harvested rainwater is stored in tanks and 34% is stored in household containers.

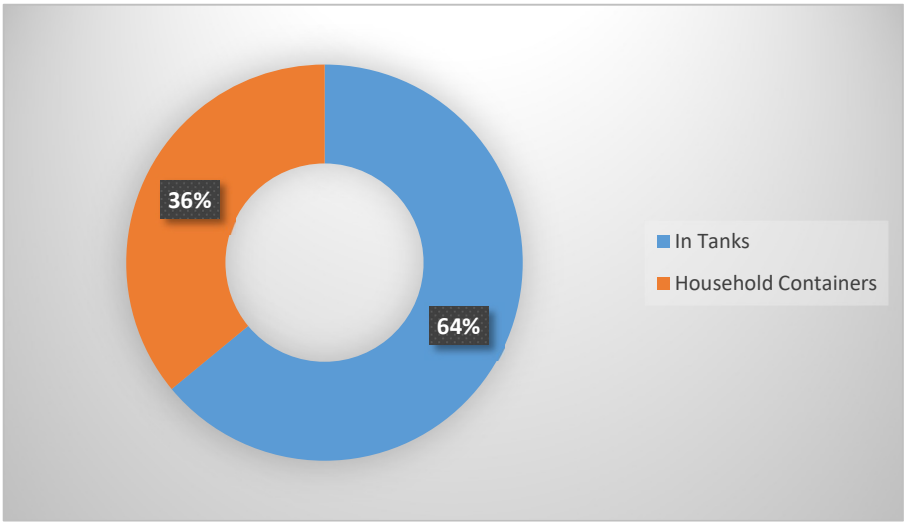


Figure 58 Rain water harvesting

4.17. Sanitation Facilities and Services

4.17.1. Hand washing

Majority (31%) of the respondents wash their hands before eating, 27% wash their hands after using the toilet,17% after working, 14% after using the toilet, 8% after handling an infant and 3% after handling an infant.

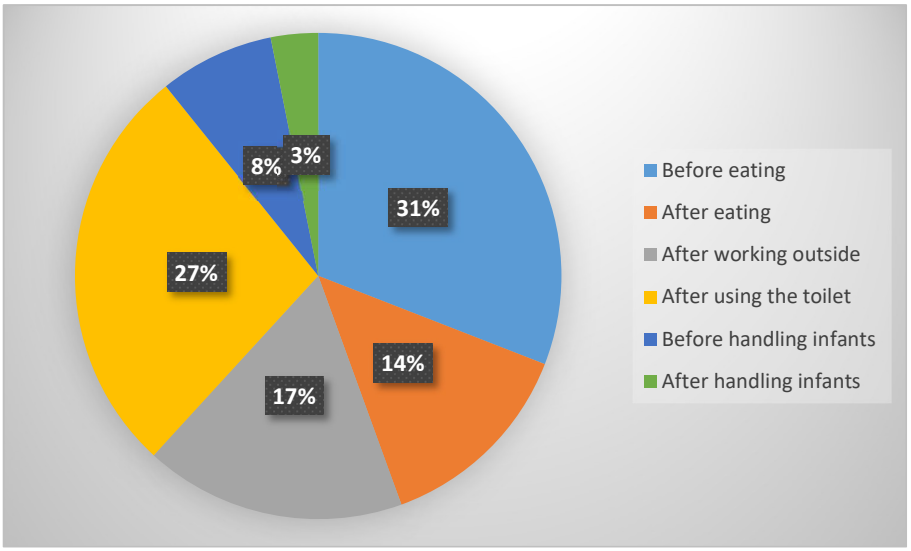


Figure 59 ***Hand washing***

4.17.2. Types of latrine/toilet facility

All households sampled had a latrine/toilet facility.The majority of the respondents have private flush toilets (45%) and pit latrines (37%) with wall and roofs as their toilet facilities.

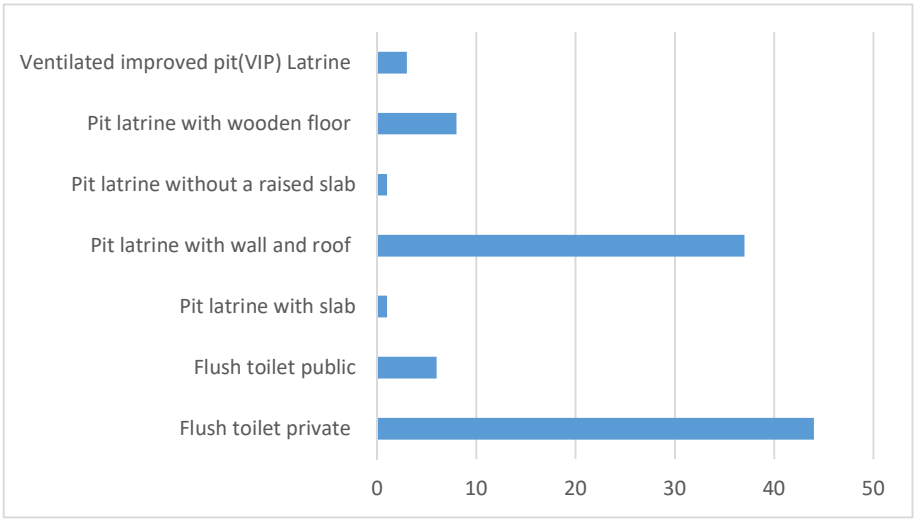


Figure 60 Type of toilet

4.17.3. Status of the latrine/toilet.

The status of the toilets was clean at 47%, very clean 23% and 22% said they are fairly clean.

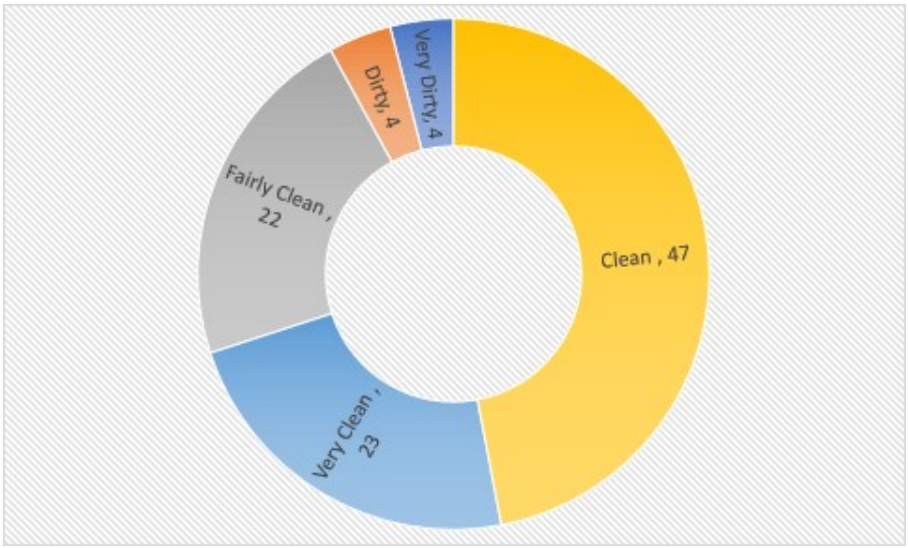


Figure 61 Status of the toilet

4.17.4. Presence of a hand washing facility next to the latrine/toilet

Most (56%) of the households have a hand washing facility next to the latrine and 44% don't have one.

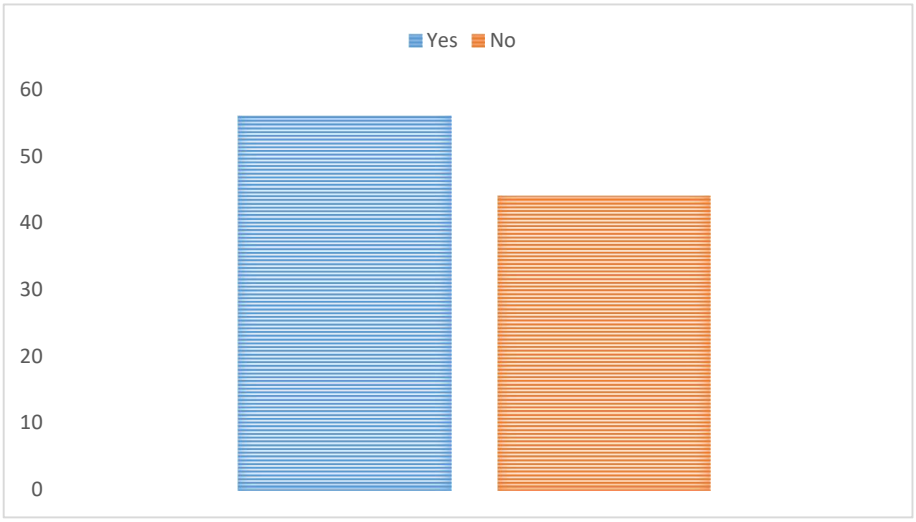


Figure 62 Presence of a hand washing facility

4.17.5. Presence of a bathroom/bath shelter in Households

96% of the respondents were in households that have a bathroom facility

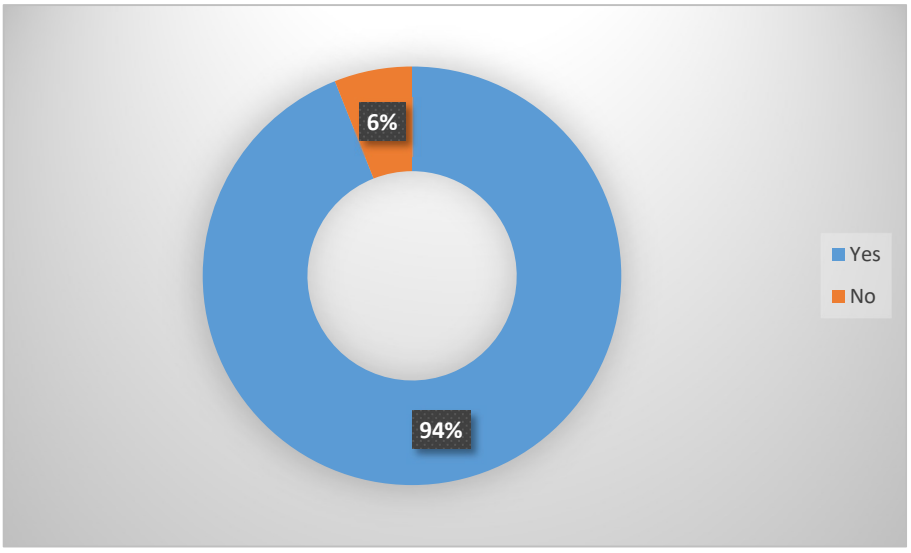


Figure 63 Presence of a bathroom facility

4.17.6. Sanitation challenge faced by Households

Among the sanitation challenges mentioned by most respondents included

- Blocked sewer lines.
- Inadequate water supply/water rationing.

- Poor disposal of solid waste.
- Piling of garbage due to lack of organised garbage collection groups

4.17.7. Suggestions for improving sanitation in the area

- Rehabilitation of the spoilt or blocked sewer lines.
- Pump more water and install tanks to store more water during the dry season to counter water rationing.
- The County Government/Municipality should collect garbage every week to reduce pile-ups that pollute the environment.

4.17.8. Social support groups or organizations in the area

Social groups are important in a community to offer each other support in terms of knowledge, finances, crisis management and just for personal well being. The areas being a growing and migratory town had most of the respondents not belonging to social groupings(55%), 36% belonging to women groups, 8% to men groups and 1% are members of farmers cooperatives.

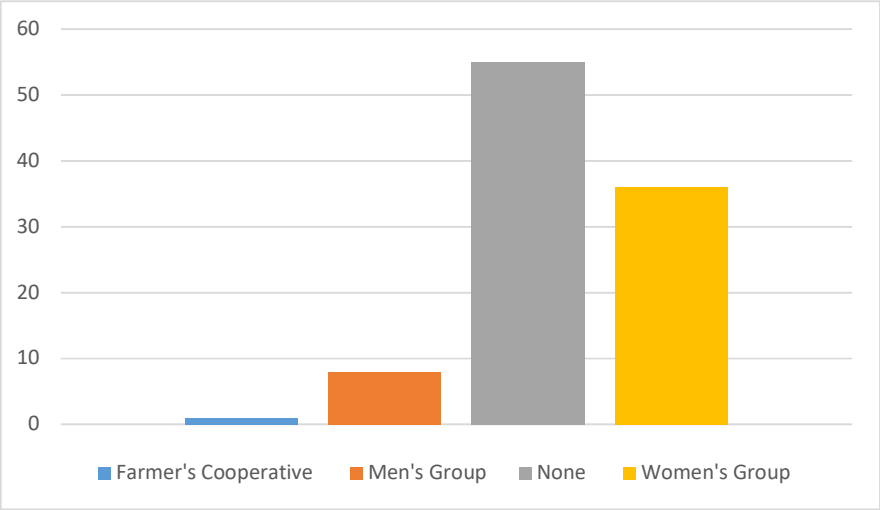


Figure 64 Social groups in the area

4.17.9. Type of Support Received from Social Groups

Of the respondents who are in support groups or organizations, 63% receive credit services through table banking popularly known as merry go rounds, 30% receive extension services, and 7% marketing services.

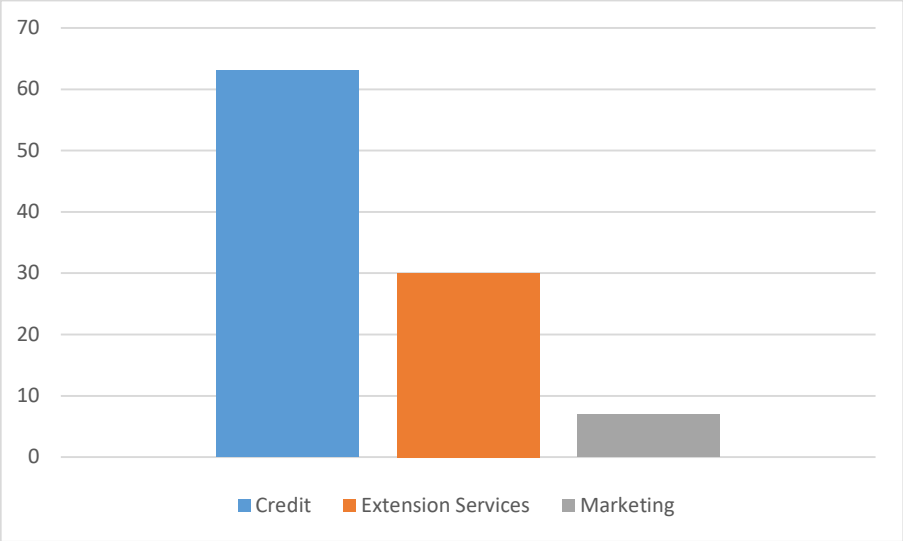


Figure 65 Services offered by the groups

4.17.10. Non Governmental Organisations (NGOs)Working in the Area

The NGOs working in the area include:

- ✓ Caritas: Caritas is a global confederation of Catholic Institutions working in humanitarian emergencies and towards the betterment and fullness of life for the marginalized in the community.
- ✓ Habitat for Humanity: Habitat for Humanity works by providing sustainable, safe and decent homes to vulnerable families.
- ✓ Kenya Red Cross: Red cross works during and after disasters and health emergencies to meet the needs and improve the lives of vulnerable people.

4.17.11. Social and cultural values

Most of the respondents (73%) indicated that there are no common cultural heritage/site; 12% indicated that there are ritual grounds, 10% graves and 5% caves. The ritual ground mentioned was near River Nanyuki where there is a huge Mugumo tree (*Ficus thonningii*), is a sacred/revered tree among the Kikuyu community. However, where the tree stands is on the banks of the river and the project will not at all interfere with the tree.

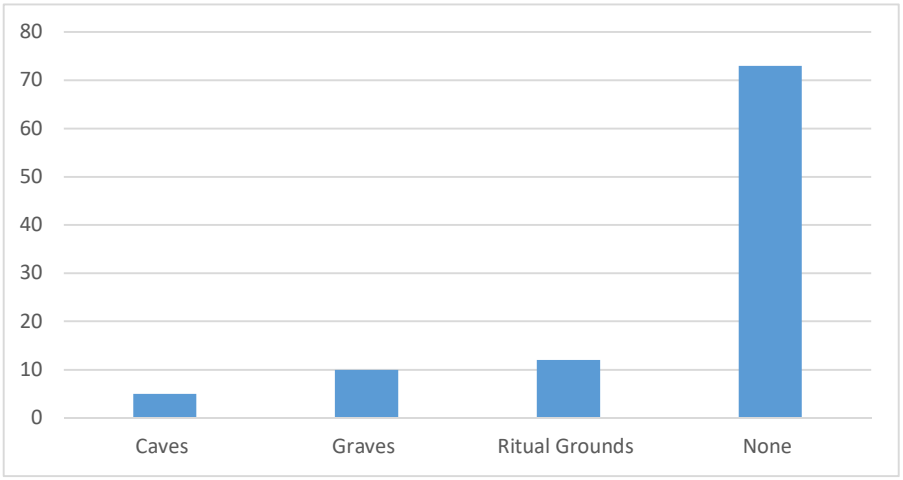


Figure 66 Cultural sites

Cultural ceremonies conducted in the area

Circumcision is the most conducted ceremony in the community.Most respondents (54%) indicated there are no ceremonies conducted in the area; 45% mentioned circumcision and 1% age-grade transition.

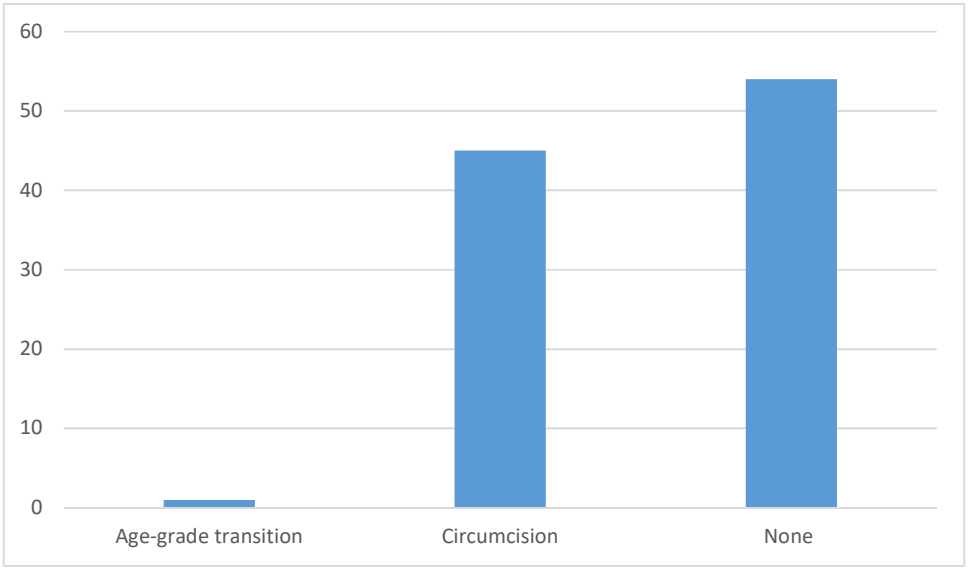


Figure 67 Cultural ceremonies

4.17.12. Recreational facilities in the area

Nanyuki is among the most popular destination for both local and International tourists. It has several hotels such as: The Bantu Lodge,Falcon Heights ,Maiyan Lodge, Nanyuki Peacock Gardens , Mt Kenya National Park hotel and The Sportsman Arms Hotel among others.

4.18. ENVIRONMENTAL ISSUES

4.18.1. Solid waste Disposal

Half of the respondents dispose of their solid waste through compost pits the rest use either burning (34%) or just dump the wastes in open land (16%).

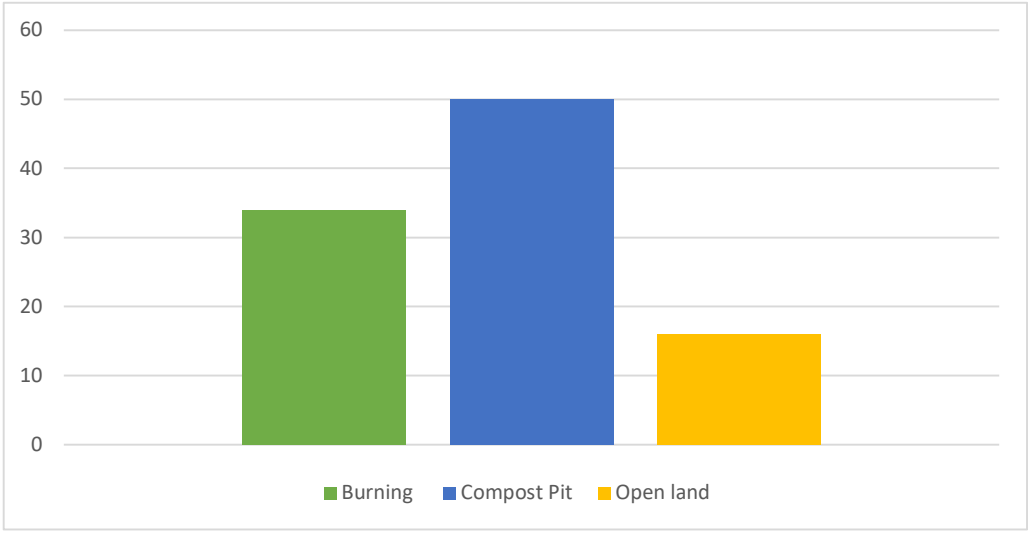


Figure 68 Solid waste disposal

4.18.2. Wastewater disposal

More than half (55%) of the respondents have a sewer systems passing in their area of residence and therefore dispose their wastewater in the sewer, the rest, use open ditches (27%) and open land 18%.

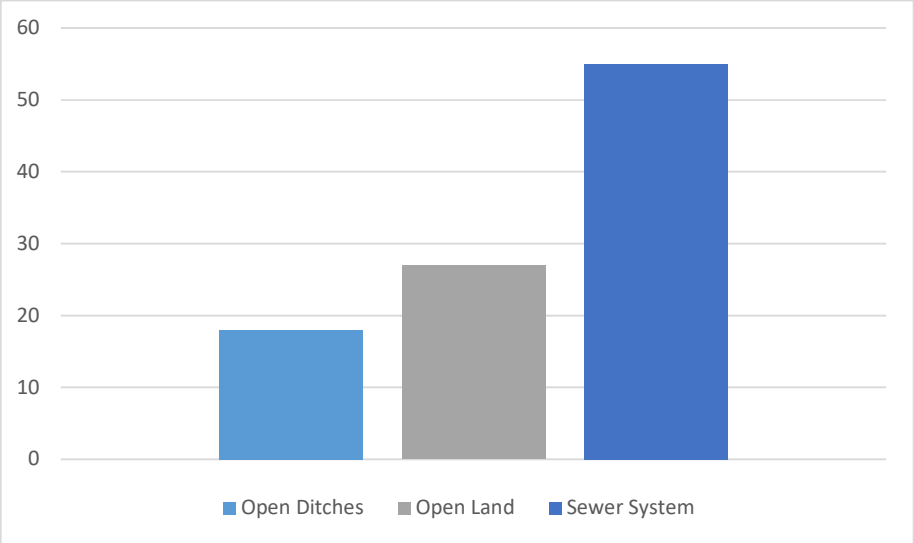


Figure 69 wastewater disposal

4.19. Environmental problems

Most (36% of the respondents mentioned climate change as the leading environmental problem in the area, 21% poor drainage, 16% drying of rivers, 9% deforestation, 7% water borne diseases among others.

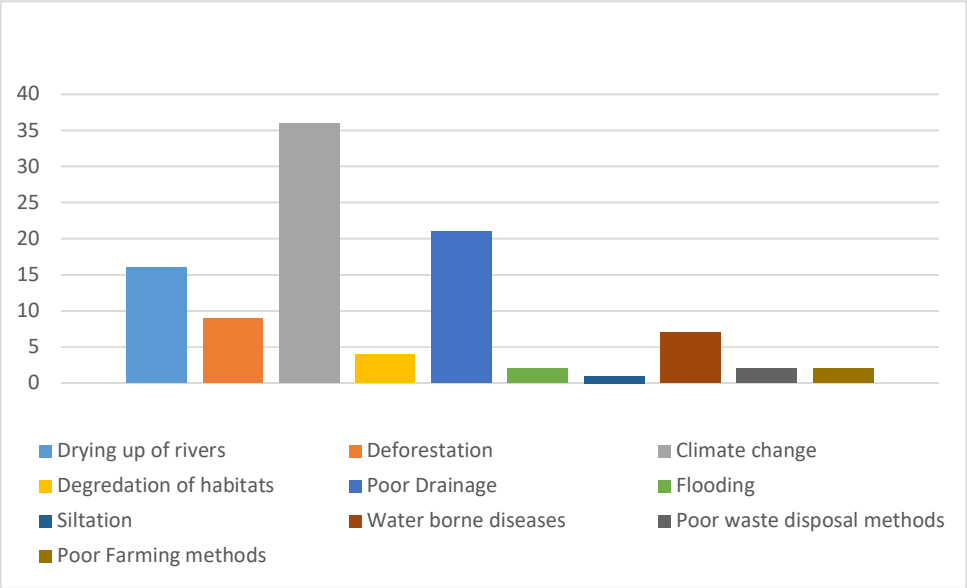


Figure 70 Environmental Challenges in the area

It was surprising that the community did not mention invasive plant species namely *Opuntia stricta*, *Sodom* apple *Acacia reficiens*. The project area at Kilimo teachers has several pockets of the invasive species with evidence of rapid encroachment.



Photo 8 Opuntia stricta and *Solanum Incanum* in Kilimo area

4.19.1. Mitigation of environmental problems

The community respondents mentioned that Public education (38%), reforestation (33%) and improving access to water (12%) among others are among the best ways to mitigate these environmental changes in the area.

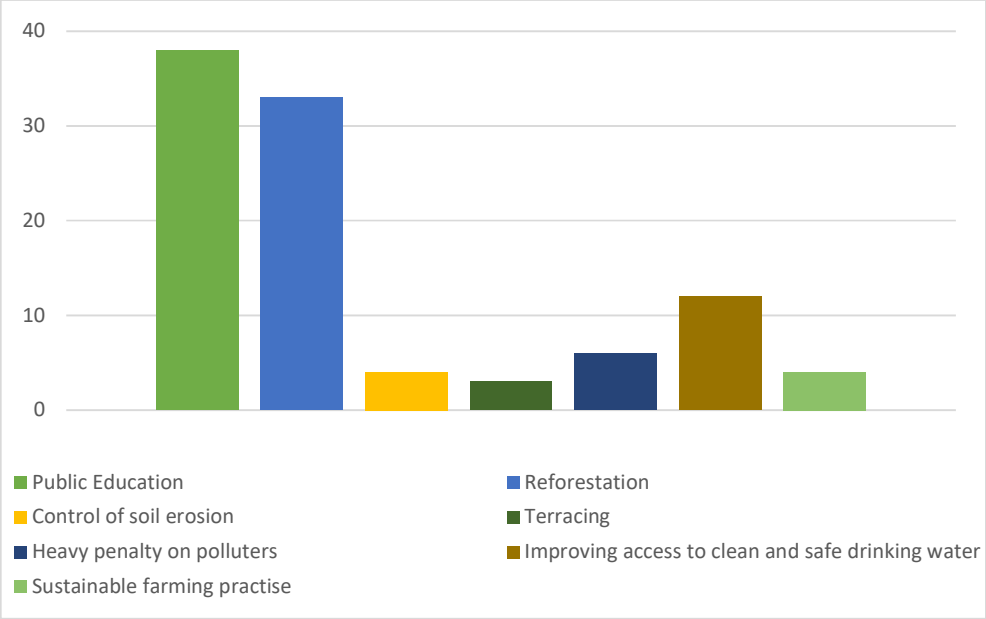


Figure 71 Mitigation of environmental problems

4.19.2. Main sources of information on environmental issues?

The respondents indicated that information on environmental issues is mainly relayed through meetings (41%), trainings (26%), radio (22%) and Internet (11%).

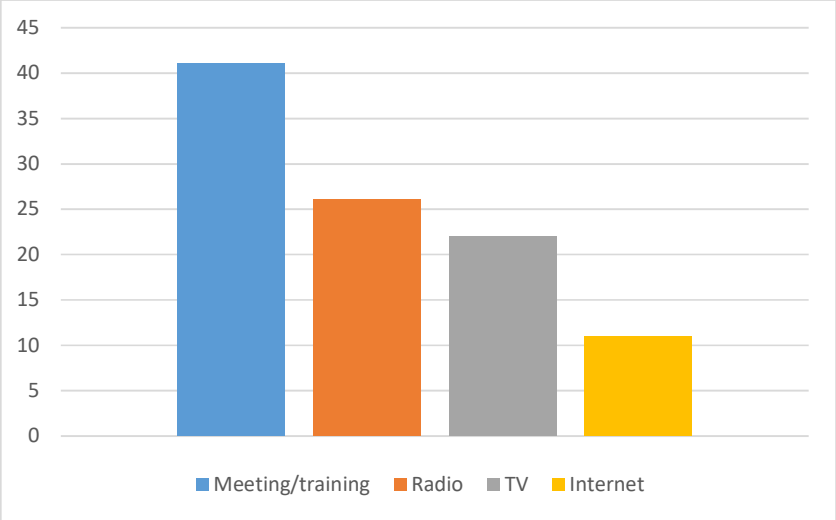


Figure 72 Source of environmental Information

4.20. Flora and fauna of the project area

4.20.1. Common tree species

A transect walk around the pipe sites revealed a highly modified biological environment. The area had no forests or large pockets of natural vegetation. However, the scattered indigenous trees and shrubs were a characteristic of a dry Savannah vegetation. Urbanisation and human settlements have led to destruction and wiping out of the natural vegetation, However scattered trees and shrubs that exist include both exotic and endemic species that include: Acacia (*Acacia drepanolobium* (Gall acacia), *Acacia mellifera, Acacia nilotica, Acacia senegal, Acacia tortilis* and *Acacia xanthophloea*), Bluegum (*Eucalyptus globulus* (blue gum) and *Eucalyptus saligna* (Sydney blue gum), Avocado (*Persea americana*), Silky oak Grevillea *robusta*, Casuarina/Australian pine/whistling pine (*Casuarina equisetifolia*) , Bottom brush (*Syzygium guineense*), lemon bottle

brush (*Callistemon citrinus*) Cypress, Kei apple (*Dovyalis caffra*), guava (P*sidium guajava*) and (*Cupressus lusitanica*).

4.20.2. Uses of Trees in the area

Most (68%) of the respondents use the trees in the area for firewood; fruits (20%), sale of timber (10%), ornamental purposes (1%) and making vessels (1%).

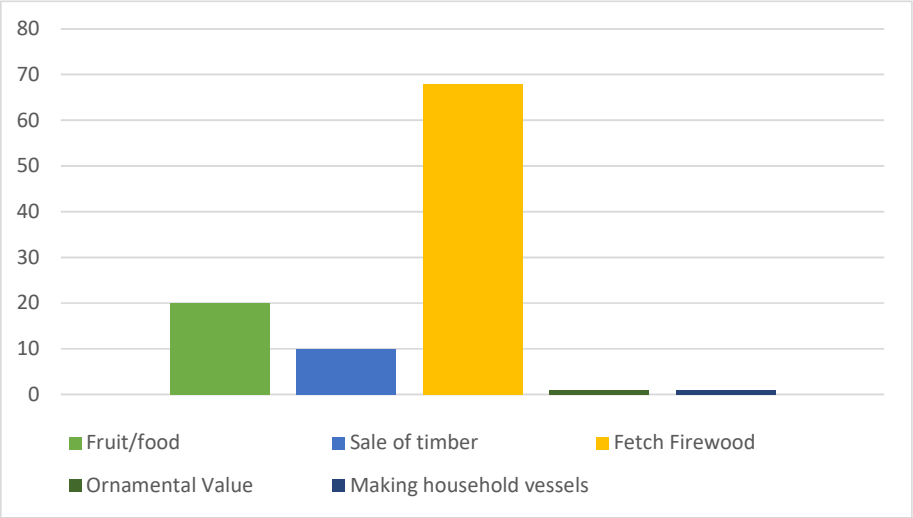


Figure 73 Use of trees in the area

4.21. Common animals in the area

The project area is in an urban centre but on the outskirts the respondents indicated they keep low numbers of : Goats, Cows, Poultry (Hen and Ducks) and Sheep. Among the values mentioned for the animals we have: Provision of milk, meat, eggs and income generation. In addition to that, ducks provide security.

4.21.1. Wildlife in the area

Majority (67%) of the respondents reported that there are no wildlife in the area. However 33% have at one time or another reported having sported wild animals in the area. This could be because of the proximity of the town to National parks, game reserves and conservancies.

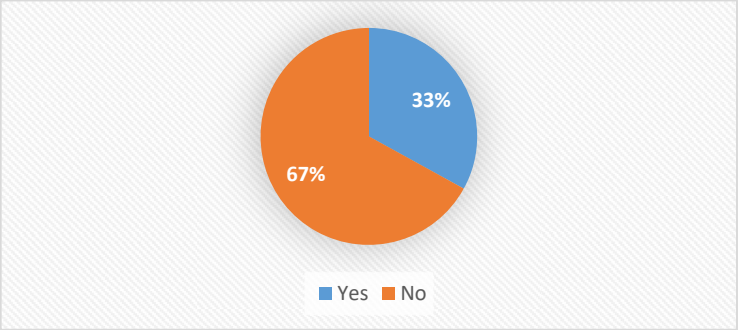


Figure 74 Wildlife in the area

4.21.2. Common Wildlife spotted in the area

Gazelles (13%), monkeys (12%), Zebras (7%)were mentioned are the most common wildlife animals in the area.

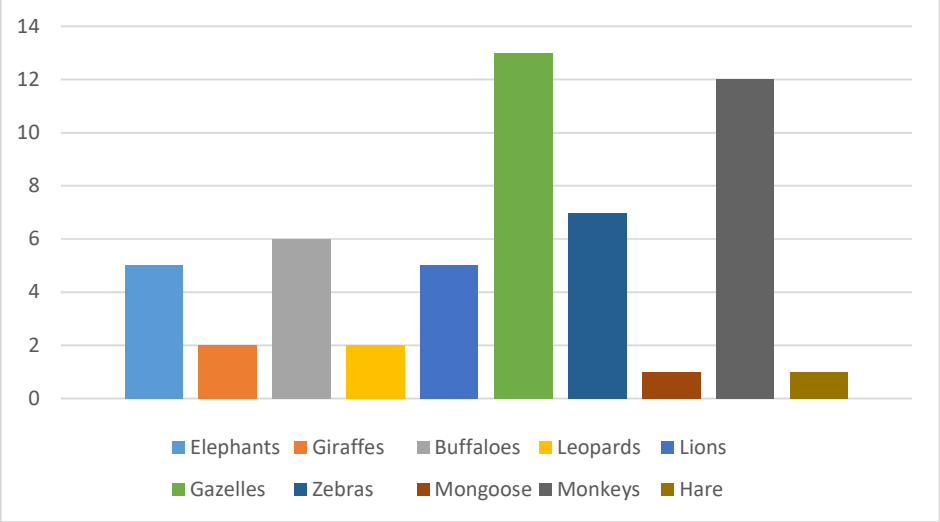


Figure 75 Common wildlife in the area

4.21.3. Migratory corridors in the area

Only a few respondents (14%) reported animal migratory corridors in the area. The migratory area mentioned on further probing is in Mt Kenya game reserve which is far from the project area.

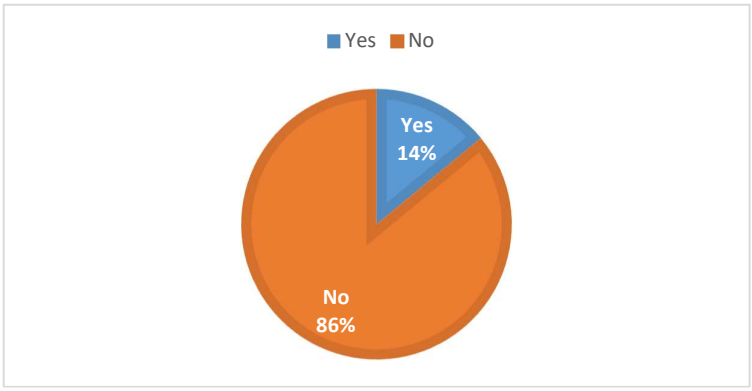


Figure 76 Migratory corridors in the area

The animals that pass through the migratory corridors are elephants, gazelles, buffaloes and zebras.

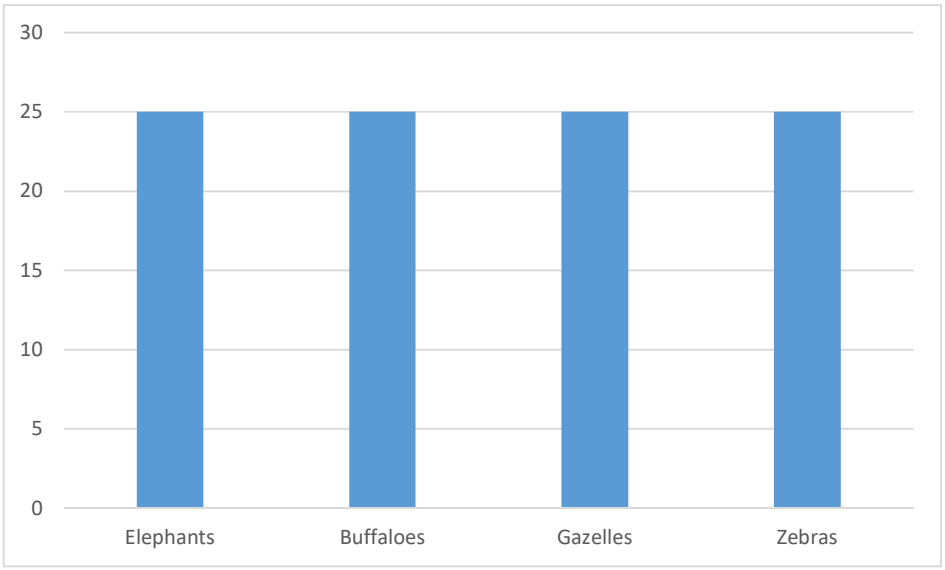


Figure 77 Animals that use migratory routes

4.22. Human Wildlife Conflicts

Human-wildlife conflicts are not common in the area with 91% of the respondents reporting no conflicts.

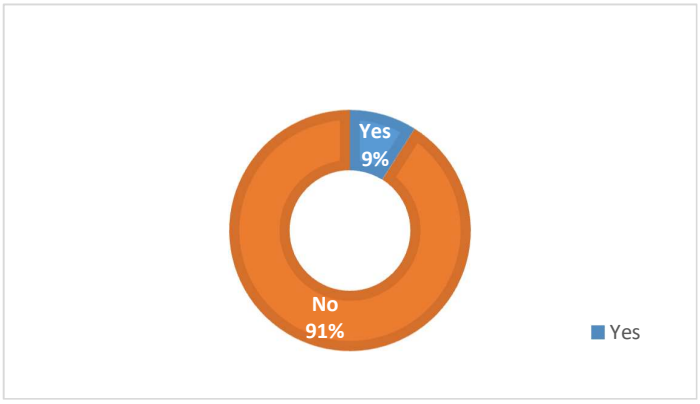


Figure 78 Human wildlife conflicts

4.22.1. Main causes of Human Wildlife conflict

The most common causes of human-wildlife conflicts are due to wildlife damage to crops (70%), predating on domestic animals (10%) and attacking men (20%).

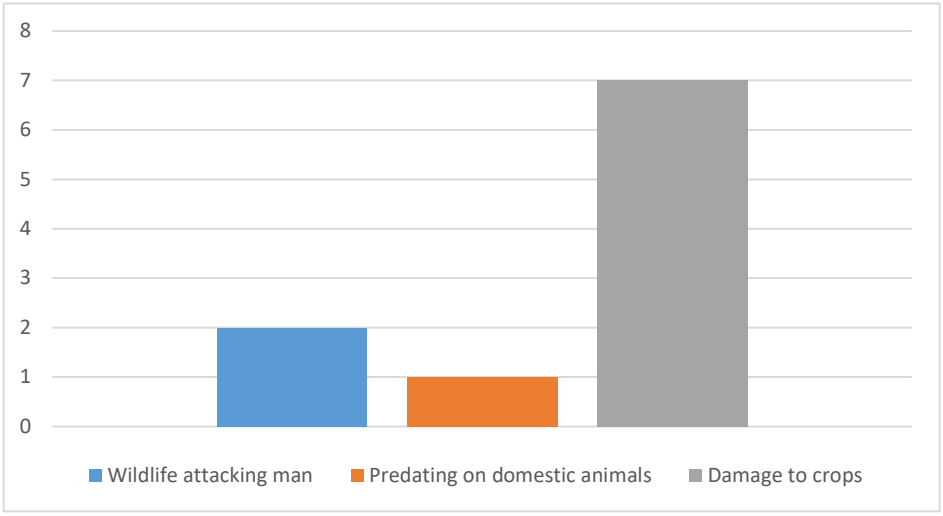


Figure 79 Main causes of human wildlife conflicts

4.22.2. Conflicts resolution

The respondents reported that only 22% of the already existing human-wildlife conflicts have been solved with 78% pending.

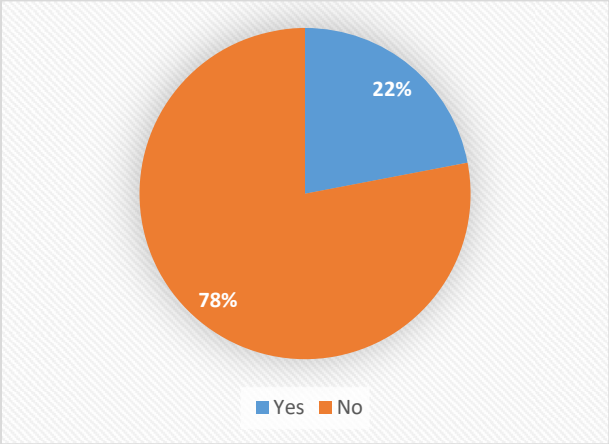


Figure 80 Conflicts resolution

4.22.3. Common conflict resolution mechanisms are available for use

Clan elders/chiefs (72%) are the most preferred by the respondents as a way of human-wildlife conflict resolution, KWS and religious leader were mentioned by 14% of the respondents.

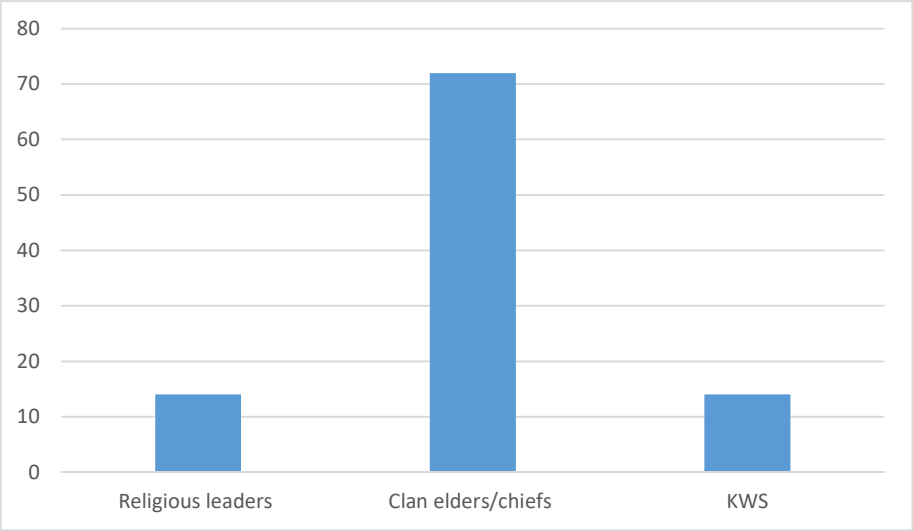


Figure 81 Available Conflict resolution parties

4.23. Notable sensitive habitats within the area

Majority of the respondents (66%)indicated that there are no sensitive habitats,14% mentioned forests, 8% cultural sites, and 8% sloppy lands as the most notable sensitive habitats.

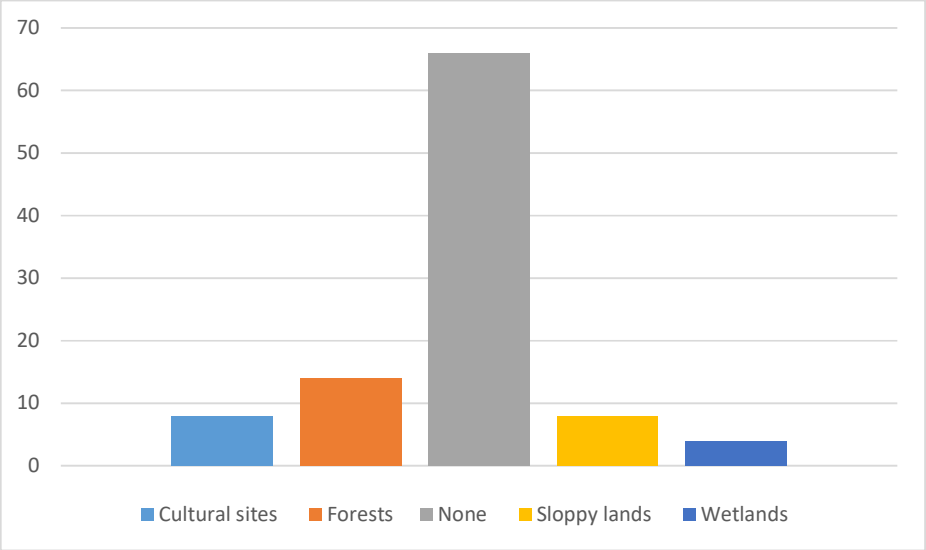


Figure 82 Sensitive habitats

4.24. Manifestations of climate change in the area

Drought was mentioned by most of the respondents (46%) as the main manifestation of climate change then drying up of rivers (38%), flooding (8%), crop pests and diseases (5%) and animal diseases (3%).

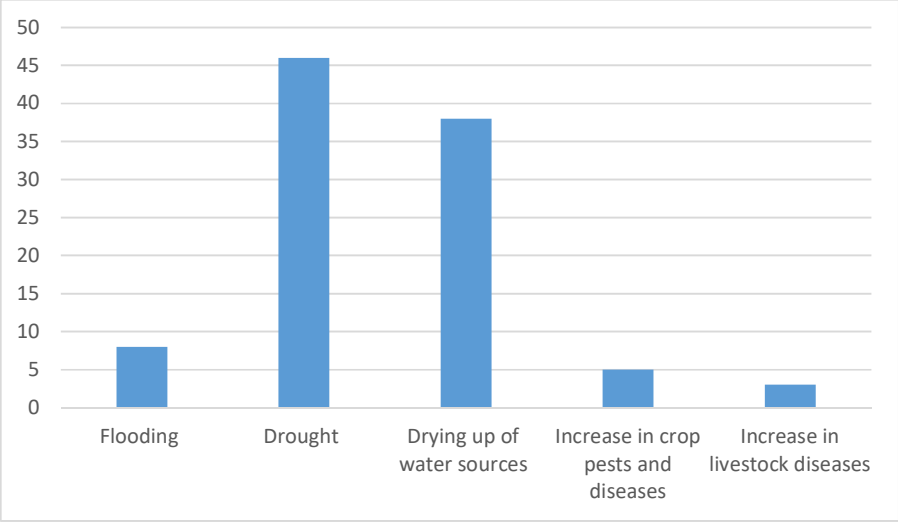


Figure 83 Climate change manifestation

4.25. Land Tenure System

Majority of the respondents (71%) are under Private Land (Freehold), 27% are under Private Land (Leasehold) and 2% are under Trust land.

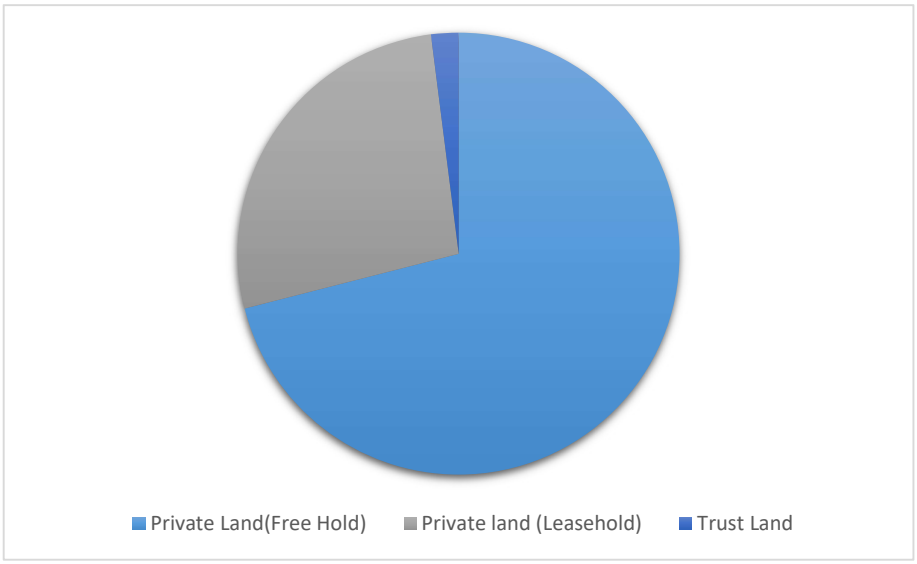


Figure 84 Land tenure

4.25.1. Category under which the household respondents Occupy the premises

Most (54%) of the respondents were land owners and 46% were tenants.

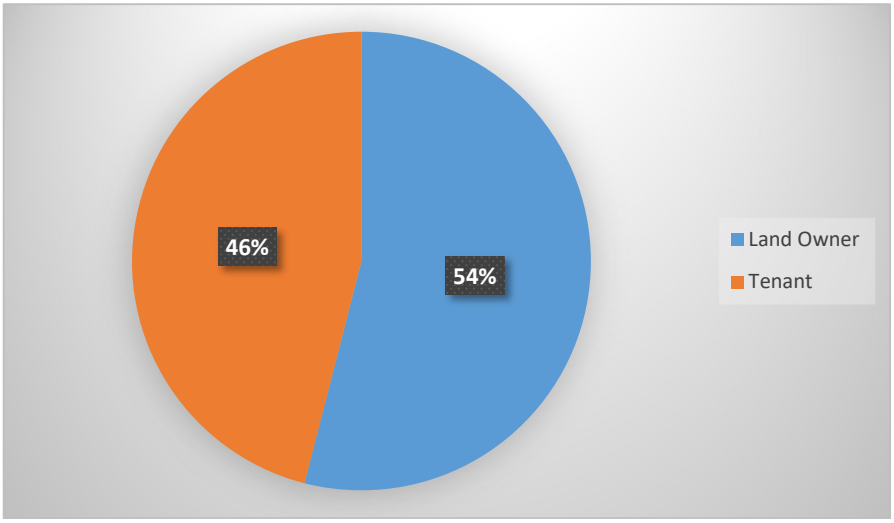


Figure 85 Premises Occupancy

4.25.2. Land use

The land is mainly used for residential purposes as indicated by 81% of the respondents followed by subsistence farming at 8%, business premises at 4% and cash crop farming at only 1%.

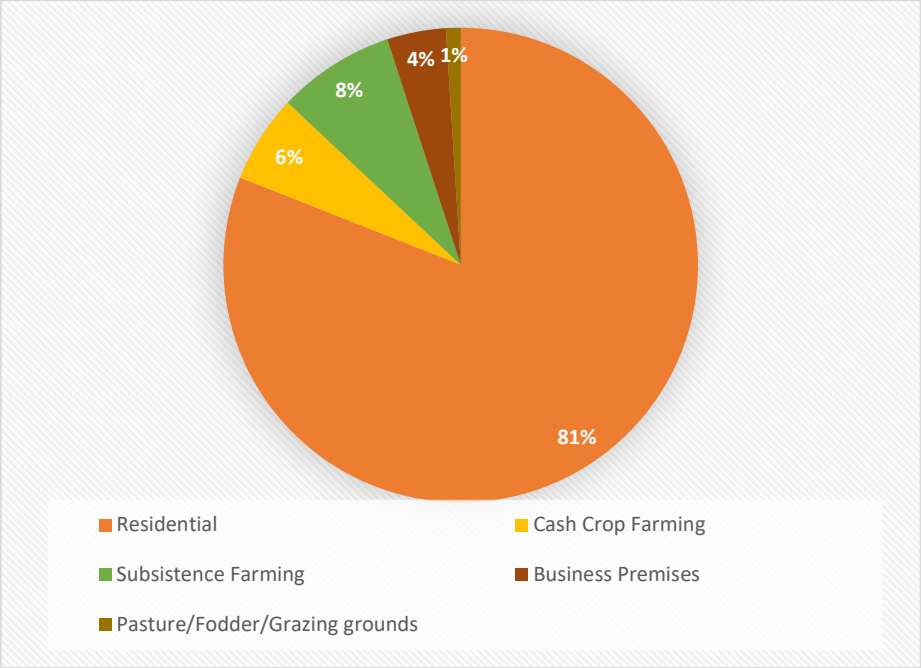


Figure 86 Land use

4.25.3. Three (3) most important resources on communally owned/common lands

Forests (35%), firewood (36%) and timber (29%) are the 3 most important resources for communally owned land.

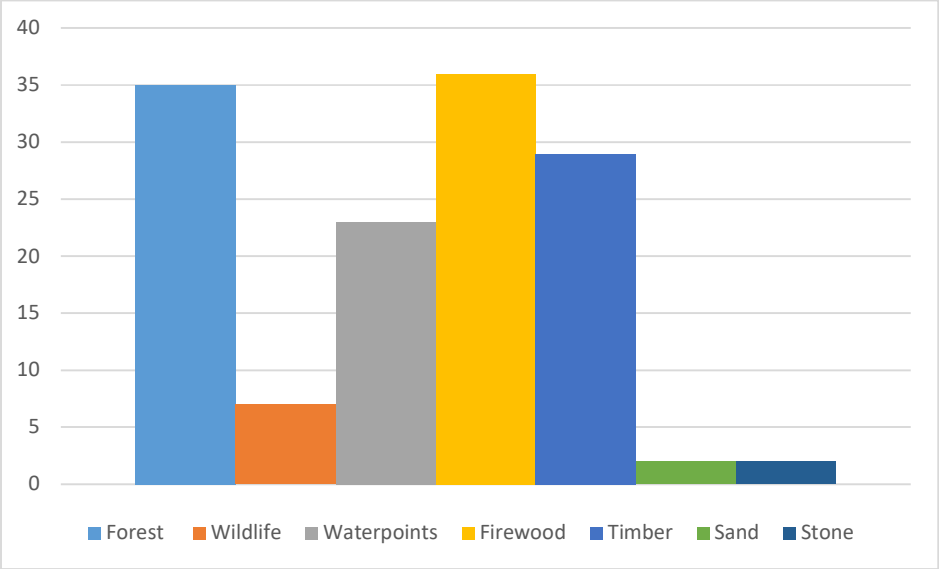


Figure 87 Resources in Communal land

4.26. The Proposed Water Project

4.26.1. Awareness of the proposed Nanyuki Water Service Providers project

Majority 53% of the respondents sampled in households were aware of the proposed Nanyuki WSP project. However during the barazas, the awareness level by the community was noted to be high.

The situation with the Key Informants sampled during this project was different since most were not aware of the proposed project. Sensitisation on the same should be intentionally undertaken by NAWASCO.

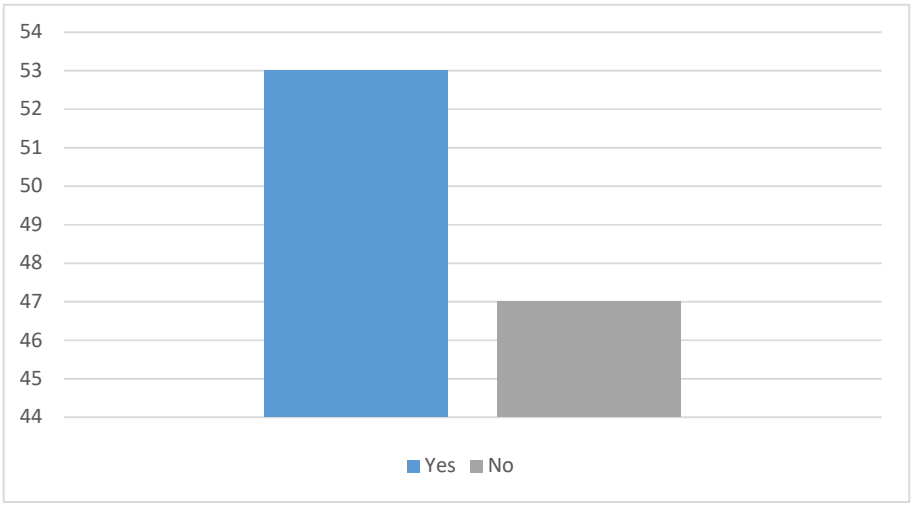


Figure 88 Project Awareness

4.26.1.1. Source of project information

Most information about the WSP project was relayed to the community through both local government/authority (49%) and village barazas (43%) and radio (6%).

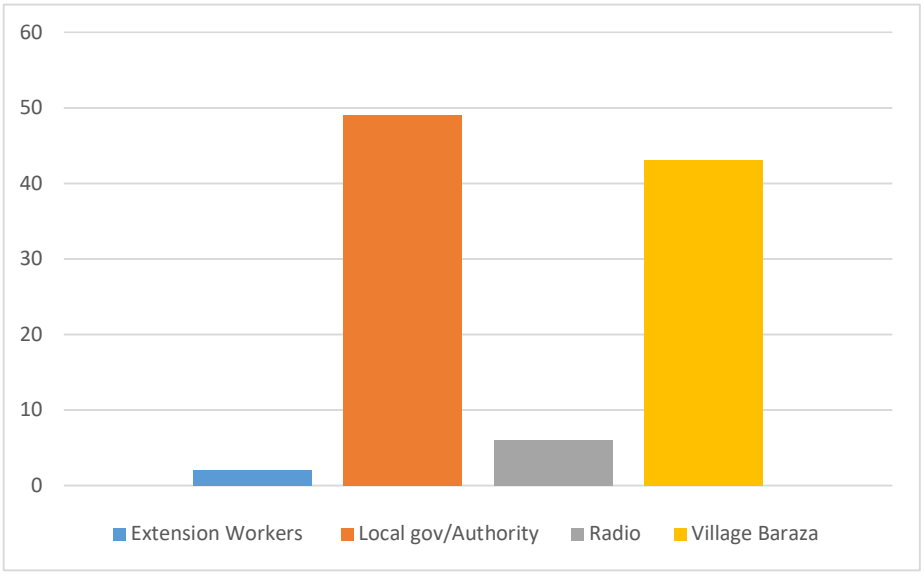


Figure 89 Source of information

4.26.2. Community support for the proposed project

During Household surveys, 99% of the respondents indicated that they would like such a project in their area and only 1% were indifferent but no one strongly said they would not like such a project. The ones who said they wouldn't like the project was because they don't own the land. This information is similar to the responses from the community meetings. During the 3 barazas held at the project sites, 100% of the attendees were supportive of the project. They indicated that the project does not interfere significantly with their land uses. The pipes are on the road reserve but where they cross through entrance to a homestead, excavation of that area should be done speedily and only when the pipes are being laid to avoid a lot of interference.

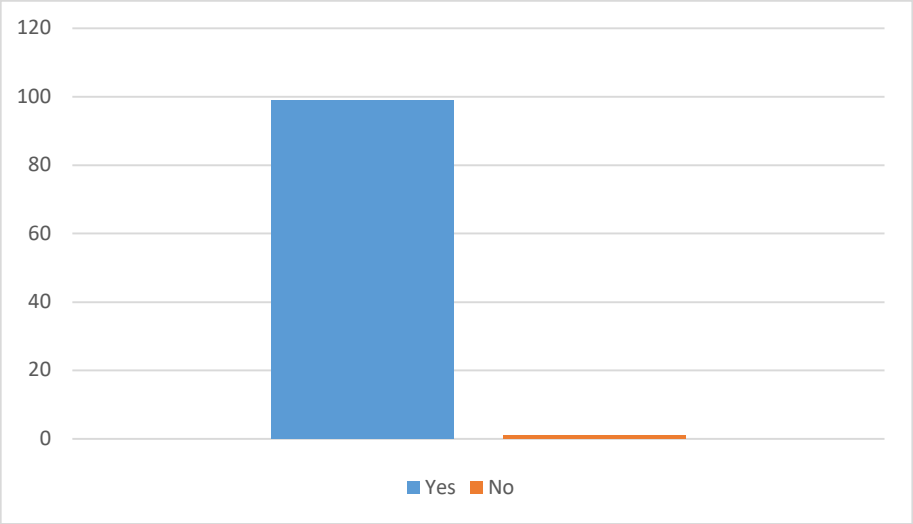


Figure 90 ***Community support for the project***

4.26.3. Land Ceding For The Project

The project is in the road reserve thus there is no requirement for land ceding for pipes. However, 65% of the respondents said they are willing to cede their land if any need arises but 35% are not willing because there are either tenants or lessees and they have no rights over the piece of land they are currently on.

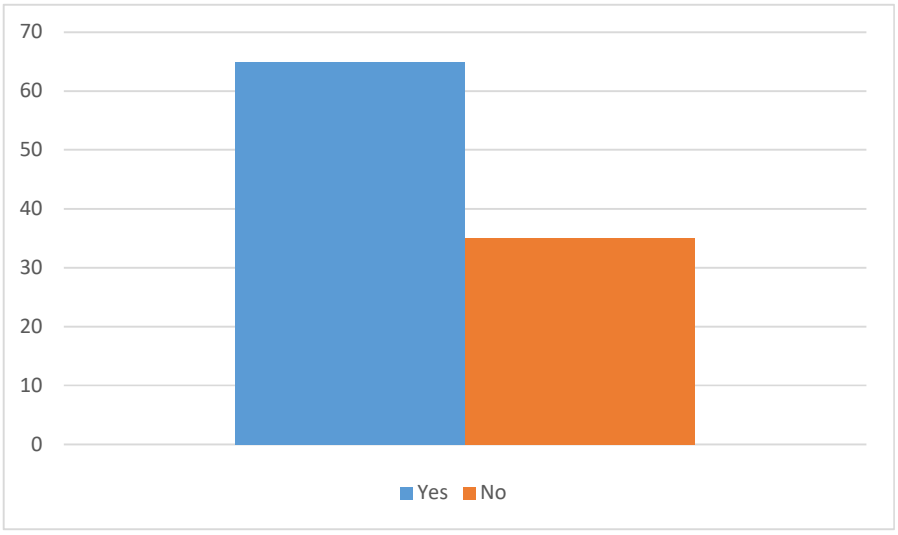


Figure 91 Willingness to cede land for the development

4.26.4. Project financing

The respondents indicated that both donors and government (46%) should be the key financiers of the project, government (32%) and donors only at 17%.

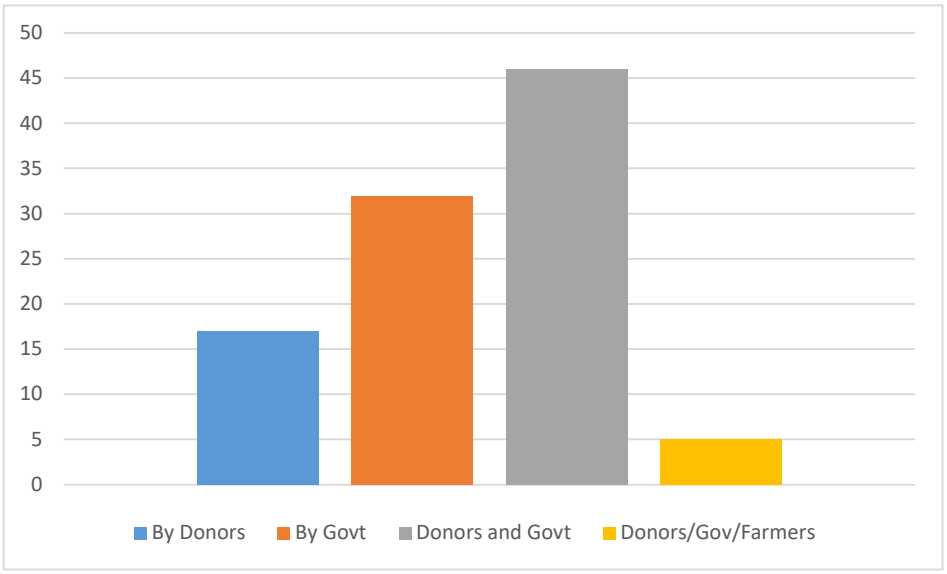


Figure 92 Project Financing

4.26.5. Willingness to contribute to the project

Majority (79%) of the respondents are willing to contribute to such a project either financially or in kind by offering labour.

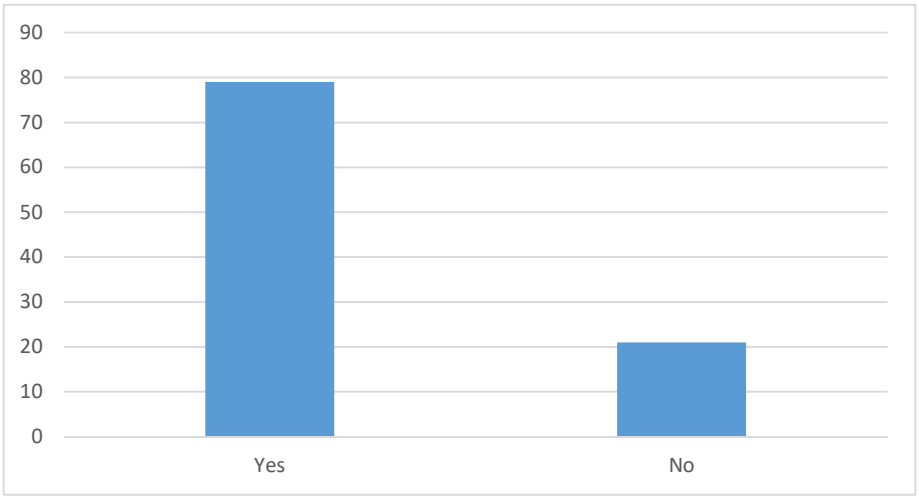


Figure 93 Willingness to contribute to the project

The majority of those who are willing to contribute indicated that they would contribute in kind (54%), 25% both in kind and cash and 21% in cash.

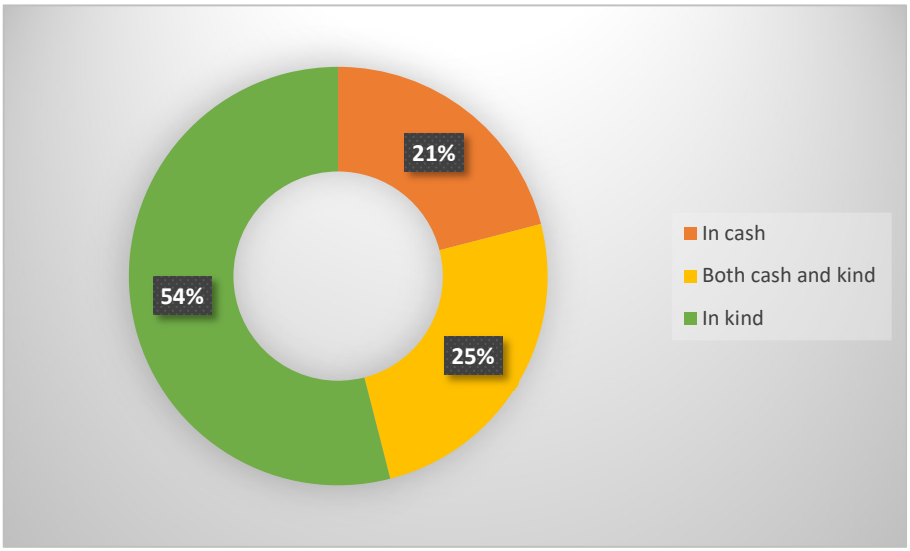


Figure 94 Modes of contribution for the project

Those not willing to contribute to the project gave the following reasons;

- No finance to support the project.
- The government should fully fund such projects
- No trust in the project.

4.26.6. Social Benefits Anticipated from the project

Safe drinking water is the most anticipated social benefit of the proposed project proposed by 60% of the respondents, followed by better hygiene at 23%, decreased waterborne diseases, improved community participation among other benefits.

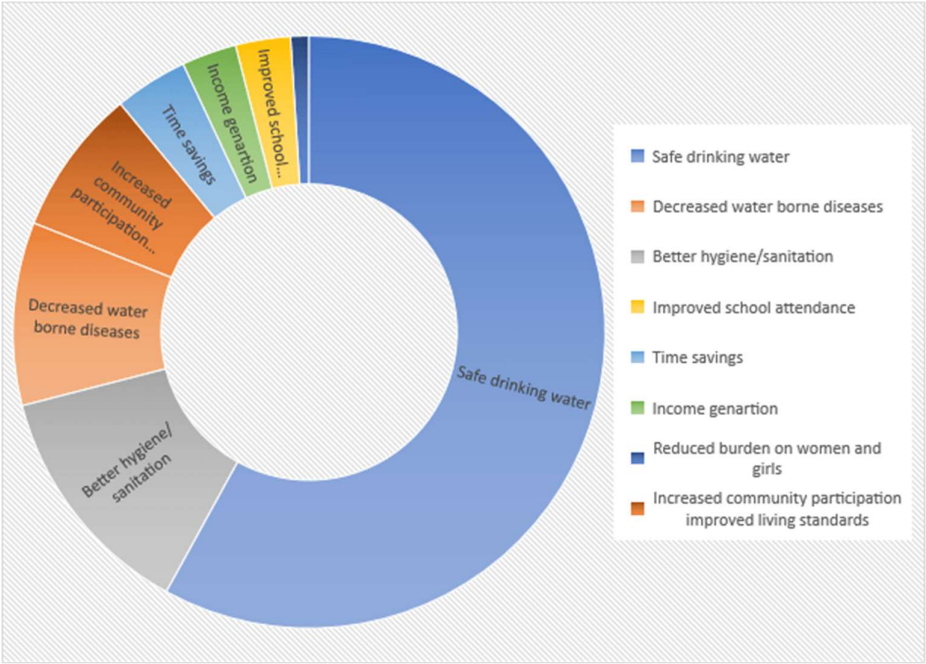


Figure 95 Social benefits of the project

4.26.7. Environmental benefits anticipated from the proposed project

The provision of safe drinking water (53%), improvement of hygiene standards (23%), and improved water supply efficiency (17%) are the major environmental benefits anticipated from the proposed project.

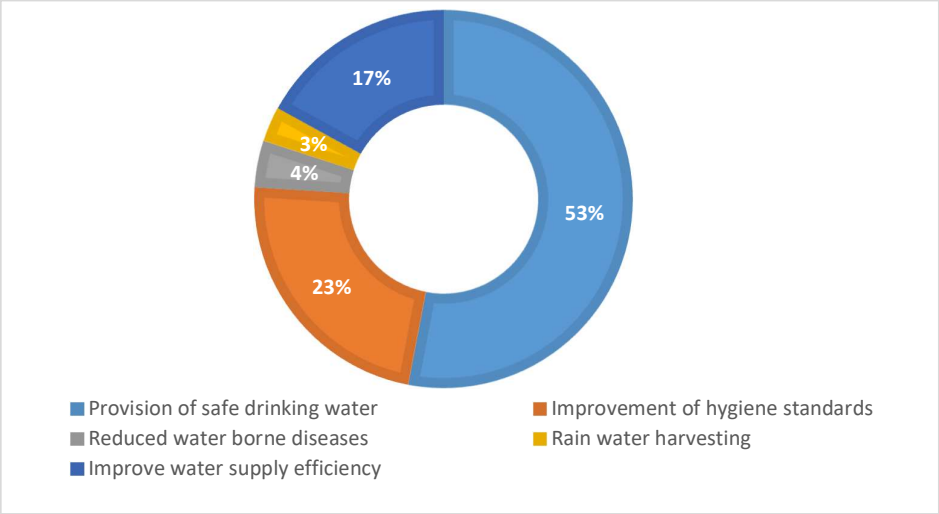


Figure 96 Environmental benefits of the project

4.27. Environmental problems anticipated from the proposed project

The community highlighted some of the key environmental problems anticipated including clearing of trees/devegetation. However from the field surveys, there are no trees along the pipe areas. The only plants along the pipeline are grass species and shrubs that are mainly the invasive such as *Solanum Incanum* (Sodom apple), *Opuntia stricta*, and *Acacia reficiens*. Others include soil degradation by erosion, drying of rivers and water pollution among others. During the community meetings the fears of the community were addressed and for the valid concerns , the project ESMP has addressed them through the proposed mitigation measures.

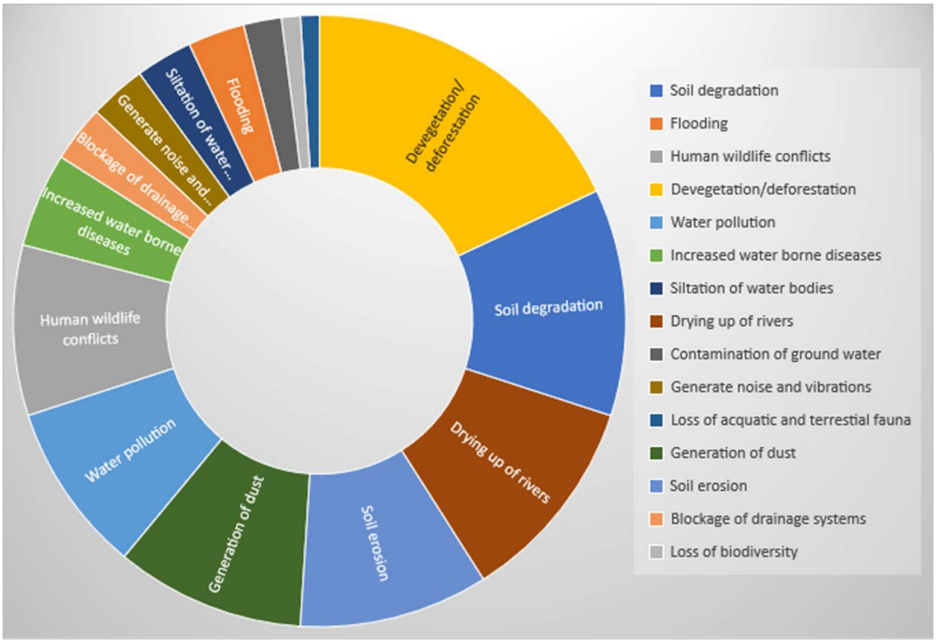


Figure 97 Key environmental challenges in the area

Mitigation of the anticipated environmental problems emanating from the proposed project:

The respondents indicated that the stated environmental problems can be mitigated through:

- Construction of soil conservation structures such as terraces and gabions to curb soil erosion
- Reforestation
- Agroforestry
- Building trenches to help with water drainage
- Treating the water before distributing it to consumers.

4.27.1. Social problems anticipated from the proposed project

From the household survey, majority (30%), of the respondents indicated that human conflicts over water distribution may be a possible impact of the project, 20% feared displacement, 19% feared increased insecurity while others feared loss of land aesthetics, gender based violence and cultural erosion. During the community meetings the fears of the community were addressed and for the

valid concerns , the project ESMP has addressed them through the proposed mitigation measures such as a setting of peace committees to avoid conflicts and employment of security personnel.

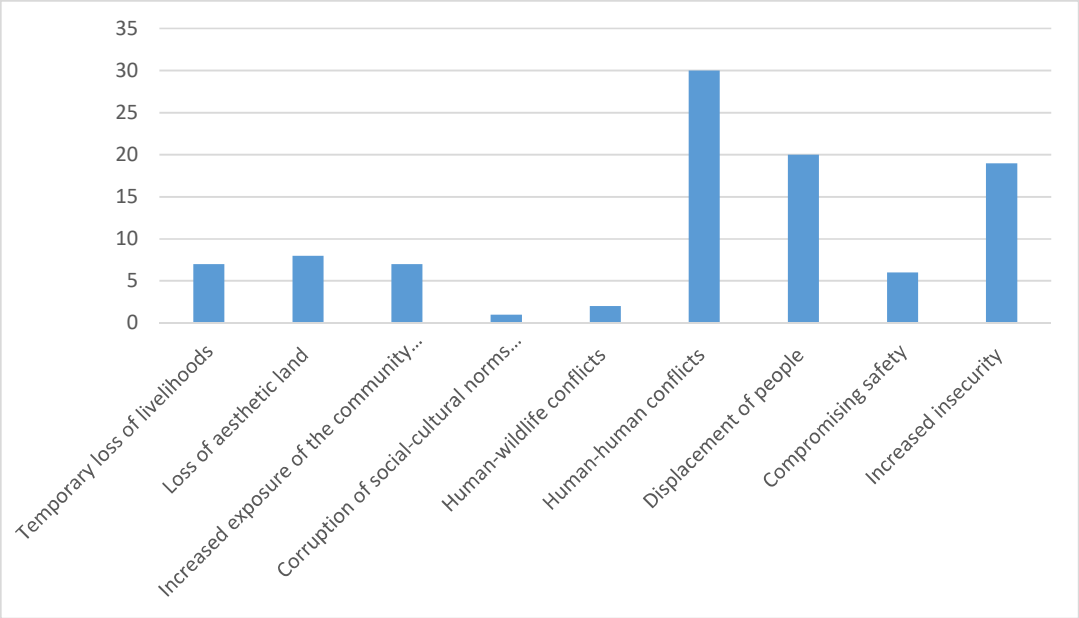


Figure 98 Social problems anticipated from the project

4.28. Gender Analysis

4.28.1. Women and girls

- ✓ Domestic chores such as fetching water from the river, boreholes and springs are mainly done by women;
- ✓ Women have been subjected to gender based violence when they take long to come with or without the water they had gone to fetch;
- ✓ Rape cases and child defilement as people go looking for water was mentioned as one of the problems in the areal
- ✓ There exists inequality in education attainment between men and women. When there is a water crisis, women and the boy child were mentioned as the ones who go to draw water;
- ✓ The women in the area are enlightened on public participation and were able to air their views.

4.28.2. The role of males

- ✓ Men it emerged are not key to water provision;
- ✓ Men indicated that women go to gossip when going to look for water and take long to come back and in the process fights come about;
- ✓ Men are also engaged in seasonal farm work such as digging and fencing.
- ✓ Young men also help in farm work and grazing animals
- ✓ Public participation: both men and women can freely express views in public meetings unhindered;

4.28.3. Project impacts

- ✓ Provision of domestic water nearer to residential areas will reduce distance, save on time and increase accessibility of water to women. This will afford them with time to pursue other opportunities and improve their well being
- ✓ Better hygiene
- ✓ Reduction of incidences of gender based violence
- ✓ Improved health particularly in communities depending on boreholes with excess levels of salt
- ✓ Reduction of incidences of waterborne diseases that emanate from buying water whose sources may not be safe;
- ✓ Elderly people who could not walk long distances in search of water will have easy access.

CHAPTER 5. CONSULTATIVE PUBLIC PARTICIPATION AND DISCLOSURE

5.1. General Overview

The importance of public consultation in Environmental and Social Impacts Assessment is to collect data on the environmental and social setting of the project, interrogate the impacts that can arise from the project, assess the community willingness to embrace the project, get individual and community goodwill, seek community participation and ownership and finally draft out the sustainable mitigation measures and compensation plans.

The main objective for the consultation process in NAWASCO Water Development Project is to involve the community at the very early stages to identify likely negative impacts and find ways to minimize negative impacts and enhance positive impacts of the project.

Towards the fulfillment of the terms of reference, this ESIA has been conducted through a participatory process to ensure that all the stakeholders including target beneficiaries and persons affected by the proposed project are involved through provision of data and information, pointing out issues of concern and suggesting solutions on how various areas of conflict can be addressed.

Public Disclosure is the process through which the consultants give findings of their survey for the purposes of interrogation by the client and the project stakeholders. It involves presentation of study scope, delineation of the project area, results of public participation, analysis of positive and negative social and environmental impacts, rating of the impacts, mitigation measures of the negative impacts, analysis of project alternatives and development of Environmental and Social Management and Monitoring Plans. The conclusions and recommendations given by the consultant are presented. The issues raised by the client and stakeholders including project beneficiaries are addressed during the meeting.

5.2. Objectives of the Public Consultation

- ✓ Provide clear and accurate information about the project to the project stakeholders and beneficiary community;
- ✓ Obtain opinions and suggestions directly from the affected communities on their preferred mitigation measures;
- ✓ Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.
- ✓ Obtain the main concerns and perceptions of the population and their representatives regarding the project;
- ✓ To obtain information from key informants regarding the anticipated impacts of the project on the physical, social and economic environment, and;
- ✓ To inform the benefiting community on the details of the proposed Nanyuki Water Service providers Project.

The important aspects of the ESIA process included:

- Collecting information using questionnaires, checklists, photography Evaluating the information and
- Presenting relevant social & environmental information for use in project planning and decision making.

The purpose of stakeholders' participation is to ensure that all important environmental, social and economic issues relating to the project are clearly understood by all stakeholders to enable them to make informed decisions on the project including endorsement and provision of information and recommendations toward enhancement of positive impact and mitigation of negative impacts. The participation was achieved through the activities presented in the following sections.

5.3. Local Stakeholders Meeting and Familiarization during the Reconnaissance Survey

A site visits/survey was carried out between 5th to 21st June 2024 with the aim of the consultants familiarizing themselves with the project area. The key community leaders in the area such as chiefs were met. During the site visit, the consultants observed some of the environmental issues that can affect project actualization.

5.4. Consultation with Government Line Offices

This involved consultations with officials of key government departments, at the county level. Local leaders, religious, administrative and the community leaders have an important role to play in the mobilization of the community to participate in the development of the project. During the inception phase, the consultant in consultation with the client held a community leaders and opinion leaders meeting to explain about the proposed expansion of the project. This is in order to give an early opportunity for the leaders to give their views and inputs on the proposed expansion as a way of deepening local ownership of the process.

5.5. Local Leaders Project Orientation and Consultative Meetings

Elected local leaders, both religious and administrative, have an important role to play in the mobilization of the community to participate in the project development. Very early in the project the Consultant held a local leaders meeting on 12th June 2024. One main Baraza was held .The local leaders gave their inputs on the proposed project and the way community support can be enhanced.

5.6. No Objection Note from Laikipia County Government

The County government of Laikipia through a letter dated 27th November to NAWASCO, confirmed that the land traversed by the project belongs to County government of Laikipia and they have no objection to NAWASCO the use of the road reserve where the dilapidated pipes are being replaced.

5.7. Community Sensitization Meetings

In summary, from the engagements during the baraza, it emerged that the community has been facing water crisis with low volumes of water leading to inadequate pressure and flow. Water rationing has also been rampant. NAWASCO staff explained that the main cause of rationing has been high cost of electricity to pump the water, irregular power supply, pipe size was also found to be small in comparison to the volume of water that should flow through it and dilapidated pipes.

The main purpose of the project is to rehabilitate the pipes to increase water supply. With these mitigations, there will be reduced cost of power for water supply, adequate flow of water and rationing will be reduced.

During all the baraza, all the Members present were given a chance to introduce themselves.

The client (NAWASCO) explained the purpose of the meeting and gave an outline of the proposed project. She indicated that the project was demand driven and that it came about because of the many complaints their office received from the client about the low water volumes, low pressure and rampant incidences of rationing. She encouraged the public to share their views about the project.

The consultants took the community members through the ESIA requirements and explained that EMCA 1999 stipulate that projects should have social and environmental compliance and an Environmental and Social Impact Assessment is necessary. Since 2022 in Kenya, its mandatory to carry out an ESIA for development projects and submit the ESIA report to NEMA for project approval and licensing. The consultants further elaborated that a comprehensive report should include participants names and signatures for meetings attended and also photos for community meetings.

The community members explained that the area is fast growing, with a lot of immigrants coming to the area to look for job opportunities leading to high

population and increased demand for housing. This explosion of population has led to an increase demand of water and sanitation infrastructure.

The community indicated that they were receptive of the project in the area because they have been experiencing rampant and uncoordinated water rationing, low water volumes, exaggerated water bills and poor water quality due to high salty concentration.

5.8. ROLE OF DIFFERENT STAKEHOLDERS

During the baraza it was made clear that cooperation between NAWASCO, community, community leaders and the government was key to success of the project. The government has a role move with speed once the community raises an alarm over insecurity. The government should provide patrol officers in the area, ensure access roads to some of the areas are in good condition, improve drainage in the area and demarcate road reserves.

The role of the community is to assist with identification of water pipes coverage , identify areas with water distribution challenges, report when there are pipe bursts, provide security for pipes and report cases of vandalism and report water pipe bursts.

NAWASCO staff also have a key role to ensure that the community will receive water and in the event there is rationing of water it is fairly done. NAWASCO should also ensure that billing is done accurately and in good time. They should also make sure that water consumers are not harassed and their water disconnected by officers from NAWASCO unless amicable solution cannot be reached.

5.9. Community Concerns

The following concerns were raised by the community and the consultant respondent to the question. However, some of the questions were directed to the client and the client respondent to them.

Concern/Question	Response by Consultant/Client

Will the water be treated and will it be safe for human consumption.	NAWASCO responded that all the water provided for domestic use is treated. Records from 2023 to June 2024 were provided and the water was safe to drink. All parameters were compliant with the specified standards of quality analysis.
Will the current water tank be enough for water storage ?	Members of the community were advised to install water tanks for storage when water is available
The current water bills are exaggerated yet the water supply has been infrequent. Who addresses the water bills?	The staff from the water department asked the community to attend a planned meeting and air their concerns to the desk officers who are carrying out community sensitisation on water bills and other project matters.
Will the water pipes be closed during project implementation	The client confirmed to the community that the water supplies will not be discontinued abruptly but that the pipes will be replaced gradually
Why does the project concentrate on improvement of the piping system and not the storage ?	An illustration was given based on blood flow, that it is important to widen the water ways to increase the water volumes flowing through the pipes.
What happens about pipes that are within residential areas?	NAWASCO staff explained that a common point near the premises will be provided by NAWASCO but within a residential area, the landlords/landladies should pipe the water for themselves.

5.10. Anticipated Project Impacts

The community members were able to enumerate the impacts of the project on them and the environment. They listed both the positive and negative impacts of the project. Some of the positive impacts include:

- ✓ Continuous water supply for domestic use for the growing population

- ✓ Establishment of Kitchen gardens
- ✓ Increased value of rental houses
- ✓ Saving of money and time
- ✓ Reduction of family conflicts
- ✓ Job creation during the implementation
- ✓ Improvement of academic performance as children will concentrate on their studies
- ✓ Improved security since people will not have to go far to draw water
- ✓ Improvement of women health. Drawing water from the river or buying from far has impacted on women's health especially making them develop backaches
- ✓ Better hygiene
- ✓ Reduction of water borne disease such diarrhoea, ameobiasis and typhoid
- ✓ Continuous water supply
- ✓ Establishment of Kitchen gardens
- ✓ Saving of money and time
- ✓ Reduction of family conflicts
- ✓ Enough water for domestic animals
- ✓ Water will reach out to the growing population
- ✓ Improvement of academic performance as children will concentrate on their studies

Some of the concerns highlighted by the community include:

Concern raised by the community	Consultants response
Clogging of pipes by dirty water	The water will also be subjected to water treatment including sedimentation to make it clean
Water may benefit people who are not in the project area	The water will be appropriately distributed to the community to ensure there is fairness in water distribution.
Construction materials and waste may be dumped carelessly	All waste materials and spoil will be disposed at NEMA approved sites

Increased costs of the water tariffs	The client confirmed to the community that the unit cost will remain the same but water supply will be improved

The possible negative impacts from the project include:

Negative Impacts	Mitigation measures
Increased traffic flow	The Contractor will plan vehicle routes to target low traffic hours Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas; Ensuring moving equipment is outfitted with audible back-up alarms;
Noise and vibration generation from mobilization of equipment	Movement of the heavy machinery should be limited only to day time, e.g. 6 am to 7 pm
Dust pollution causing discomfort and allergies	Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls; Care must be taken in the unloading construction materials
Increase in Insecurity including vandalism of meters and water pipes	Improvement of security around the project infrastructure. The community though the "nyumba kumi" initiative should also be a source of security.
The project benefiting people from other areas leading to irregular water supply for the customers	The current project beneficiaries should be prioritized before thinking of other people

Increase in immorality and sexual defilement of school going children	Both the project beneficiaries and the construction workers will be sensitised on issues of peaceful co-existence. A grievances– mechanism will be put in place as part of the project initiatives; A code of conduct should be developed and the workers should adhere to it during construction. At community level, campaigns to educate people on GBV, its consequences, and legal implications will be conducted. The local leaders, religious institutions, will be requested to spread awareness. Use of social media and posters will be used to reach a wider audience.
Increase in sexually transmitted diseases incidences including HIV/AIDs spread.	The community will be sensitised on the importance of abstinence from any form of sexual interactions with the project team including the casual labourers from the community; A code of conduct for the project team will be developed and all project workers will be expected to strictly adhere to the same failure to which disciplinary action will be taken on the offender..

5.10.1. Community Expectations from The Project

1. Provision of jobs during project implementation
2. Involvement in project management
3. Reduced water bills
4. Regular water supply

Community recommendations concerning the project

5.10.2. Recommendations

- ✓ During project implementation, NAWASCO should strictly adhere to the accepted government water tariffs
- ✓ NAWASCO team should read the meters and disburse their bills in good time and avoid giving estimated costs of water;
- ✓ NAWASCO should urgently repair the open and blocked sewer lines to avoid contamination of drinking water;
- ✓ The open pipes that were damaged by the heavy rains should be closed for safety purposes.
- ✓ NAWASCO staff were requested to be holding meetings with the community to have an idea of the sufferings they were facing due to water scarcity;
- ✓ Community members in the project area should be considered for the available jobs during construction hence creating jobs.
- ✓ NAWASCO should consider digging deeper trenches for pipes to reduce incidences of contamination. They current pipes get damaged when people use forked jembes to weed around the road reserves;
- ✓ Proper installation should be done to stop the increased cases of vandalism/ stealing of water meters.
- ✓ NAWASCO should consider improving the water flow in all the areas under their jurisdiction to cater for the ever growing population
- ✓ Rainwater harvesting infrastructure should be added as part of the project and directed to water harvesting tanks;
- ✓ When the old piping is being changed, care should be taken not to leave people without water for long periods of time.

5.10.3. Community Meetings



Photo 9 *The consultants in a baraza at Kilimo*

5.11. People Affected by the Project (PAPs)

Field reconnaissance and the public meetings were conducted with communities living within the project area and along the pipelines at Kilimo. The community highlighted that the project posed no direct challenges since the pipelines are along a road reserve which is government land and there is no moving of the pipes to any other areas.

However, some 10 temporary structures were found along the pipelines. The location of the kiosks were recorded and GPS coordinates taken. The names and the phone numbers of the kiosk owners have been provided. During public participation baraza, the project cut off date was agreed and set for 17th June 2024. Before the project commences, the affected persons should be given the economic displacement allowance. Once the project commences but before the pipes excavation and rehabilitation is undertaken, NAWASCO will inform the structure owners in advance to remove their merchandise to avoid destruction. NAWASCO should also be committed to fast tracking the old pipes removal, laying of the new ones, covering and compacting them in the shortest time

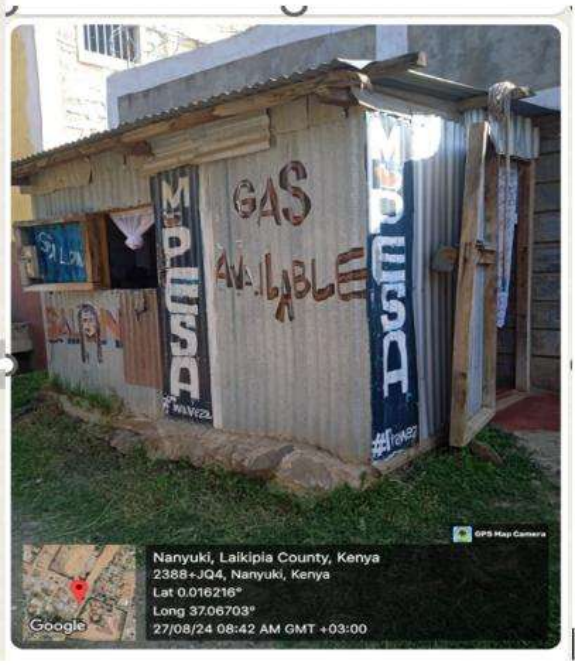
possible to avoid a lot of interference with the daily running of these businesses. The construction works should also be done very early in the morning or during the night when business activities are low or offpeak. In these areas some level of disturbance will be experienced during excavation and removal of the old dilapidated pipings. The community members suggested that they should be informed in advance when there is a foreseen disturbance in the area.







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Juliet Nateche 0740123114



Photo Structures along the pipeline along Kilimo Pipe area

5.11.1. Meeting With Persons Affected By The Proposed Project (PAPs)

During the survey, it was noted that the proposed pipelines pass through the road reserves and as a result there are no persons who will be displaced by the project. However, 10 individuals have encroached upon the road reserve and have temporary structures that are affected by the project. These 10 people need to be given an economic displacement allowance before the project commences.During a meeting held on 13/6/2024 at Kilimo area, the cut off date for PAPs was agreed to be 17th June 2024. The location of the businesses affected and the PAP names were surveyed on 17th June 2024. The business premise coordinates were marked.

A meeting was held between the Water Service Provider (NAWASCO), the consultants team and the Persons Affected by the project since it remains critical to adopt a balanced approach that considers their sentiments and well-being. Out of 10 PAPs, 6 attended the meeting, 4 had apologies but all the PAPs were reached out to individually and an asset inventory for the informal business done. During the meeting the NAWASCO team leader gave a brief of the project and informed the Project Affected Persons (PAPs) that the project entails upgrading of the Kilimo-Teachers Pipeline. The major project activities highlighted included: excavation along the old pipeline, replacement of the pipeline with a new pipeline, back filling and installation of new meters.

The consultant team leader gave the PAPs a brief overview of the ESIA process and told them that their structures were identified during the ESIA and this necessitated the visit

to offer an opportunity for deliberation on how the interest of each party (NAWASCO and PAPs) will be considered.

The PAPs confirmed that public consultations meeting were held and household interviews conducted to inform the wider community of the proposed project. The objective of the meeting was to inform the PAPs on the project components, the timelines, the likely impact and the measures that NAWASCO will put in place to mitigate against the likely negative impacts.

5.11.2. Concerns And Recommendations Between Nawasco And Project Affected Persons

PAPs were given an opportunity to give their comments regarding how their concerns will be addressed. The following were the comments that were captured:

- ✓ The PAPs were appreciative that NAWASCO and the chief had included them in the process;
- ✓ They appreciated that the project would benefit them as residents in the area and business owners and therefore they were ready to give way for the project to be implemented.
- ✓ They however requested to be informed prior to the project start so that they can make prior arrangement to remove their merchandise before construction work commences.
- ✓ NAWASCO indicated that these concerns were well noted. They also informed the community that the project would set some money aside to construct temporary bridges to allow them to access their business premises during construction.

5.11.3. ECONOMIC DISPLACEMENT AND ASSET REGISTER

An asset register of the 10 persons affected by the project was developed. Out of the 10 PAPs,7 were female and 3 males, 2 were female headed households and only one PAP had a spouse. The PAPs were informed that the disruption would be temporary and for a maximum of 3 days. The type of business venture was recorded and the cost of demolition, disruption of business and business income lost during construction was recorded per PAP. The total costs of disruption totaled **Ksh 98320**. A comprehensive asset register has been attached. For the PAPs who have any form of vulnerability a

10% support was added to the total entitlement emanating from the economic displacement.The list of PAPs has been presented to the client as a separate attachment.

WAY FORWARD

NAWASCO committed to creating access bridges so as not to disrupt the businesses of those who own the structure along the road. The 10 persons whose livelihood activities are affected indicated that they were aware that the disruption of the temporary business structures will be temporary and for a short time. The following should be done:

a) During public participation held on 13/6/2024, the project cut off date was agreed to be on 17th June 2024.
b) Ksh 98320 should be set aside for allocation to PAPs for economic displacement and the PAPs should be given the money before the project commences.
c) NAWASCO will inform the structure owners about excavation activities in their area ONE week prior to the start of the project upon which they will be required to pave way for excavation and pipe-laying.
d) NAWASCO will communicate the project timelines TWO MONTHS prior to the project to enable the structure owners to plan accordingly.
e) NAWASCO will ensure the Project Affected Persons are given priority consideration to provide unskilled labour during excavation, pipe laying and back filling
f) Trenching and back filling will be done immediately to avoid closure of the business for long
g) Where possible, NAWASCO will apply manual excavation in the areas where the structures are established to minimize extensive damage to the structures
h) NAWASCO will provide temporary access structures (bridge like structures) where excavation is done in front of a structure to facilitate access and avoid disruption of business activities.
i) NAWASCO indicated that since there is no possibility of relocating or detouring the project to avoid passing where the structure are.

5.12. Summary of Key Informants from the Government Line Ministries

1) County Government of Laikipia: Director of Environment

- At the time of the field survey, the director was not aware of the proposed project. The consultant took him through the project components, the site and the community benefiting from the project.
- He indicated that the project would bring both positive impacts and negative impacts.

The positive impacts of the project would include:

- Improvement of water supply
- Improvement of Health through reduction of water bone diseases
- Improved sanitation
- Conservation of the Water catchment area through tree planting

Negative impact

- Over abstraction and misuse of water
- Reduction of water levels in rivers through depletion of water reservoirs
- Loss of biodiversity (micro habitat)
- Duplication of projects
- Lack of strategies for to ensure sustainability of project

Proposed mitigation measures

- Supporting communities with tanks for water harvesting during the rainy season
- Recycling of water
- Catchment management and protection
- Re-afforestration
- Involvement of all stakeholders in management of resources
- Reviewing policies on water and other resources management
- The proponents should be guided by the County water master plan to address and coordinate water projects

2) County Government of Laikipia: Social Development Officer

- At the time of the field survey, the officer had not been informed about the project and so the consultant took him through the project components, the site and the community who will be served by the project. He was informed that the main purpose of the ESIA was to assess the social and environmental suitability of the proposed project.

- The officer indicated that the project implementation in the area is a good idea and is ideal since it would solve water problems that are rampant in the area.
- He indicated that the project would lead to:
    - Increased and continuous water supply
    - Improved hygiene and sanitation standard
    - Reduction of waterborne disease

He also stated that there could be negative impacts mainly:

- Disruption of business ventures along the piping area
- Noise pollution from excavating machines and heavy vehicles;
- Conflicts over job opportunities

- Mitigation Measures
    - Involvement of community members in the whole of the project cycle
    - Looking for amicable ways to avoid a lot of disruption on the affected business structures e.g construction of bridges for access to the structures along the road reserve.

3) County Government of Laikipia- County Commissioner Office

- At the time of the field survey, the county commissioner had not yet been sensitised about the project and so the consultants took him through the proposed project. The officer indicated that the project if implemented will have positive impacts mainly:
    - Ensure continuous water supply
    - Tree nurseries establishment leading to survival for tree seedling
    - Time saving since the community will not have to go so far looking for water
    - Enhance food security through kitchen gardening

He also stated that there could be negative impacts mainly:

- Depletion of water aquifers due to over abstraction of water
- Conflicts over water provision.

He suggested some mitigation measures including:

- Roof water harvesting
- Construction of dams
- Tree planting

4) County Government of Laikipia- Nanyuki Water Resources Users Association

- The chairperson of the WRUA indicated he and the other members of the WRUA were aware and have been involved in the deliberations concerning the proposed water provision improvement project by NAWASCO.

The positive impacts he highlighted include:

- Possibility of commercialisation of water supply. This will be a more sustainable venture that will lead to realisation of value for money in water supply dynamics.
- Increase water pressure will ensure that more people are supplied with water.
- Increase water supply to water scarce areas

Negative impacts include:

- Increase in pipe size may lead to water over-abstraction;
- The water source should be well thought of so as to retain the environmental flow for animals
- The water tributaries and distributaries may dry up due to over-abstraction.

Mitigation measures include:

- Procure abstraction permits if there is variation of water abstracted different from the previous amounts;
- Construction of dams along the rivers for water supply may be a more permanent solution
- Control of the number of water projects along the same rivers
- All water abstraction projects should abstract water from the same intake.

5) County Government of Laikipia- Director Environment, Wildlife, Forestry and Natural Resources.The officer had not been informed about the project and so the consultant took him through the project components, the site and the community who will be served by the project. He was informed that the main purpose of the ESIA was to assess the social and environmental suitability of the proposed project.

-
- However he indicated that the project if implemented will be important for water provision since the water is scarce in Nanyuki

- Sanitation and hygiene challenges in the county are due to water scarcity
- There is catchment degradation and no conservation efforts due to water scarcity.

Among the negative impacts mentioned:

- Over abstraction of water
- Water reservoirs destruction
- Reduced water flows to the rivers

Mitigation measures

- Recycling of water
- Construction of dams and other reservoirs
- Re-afforestation
- Catchment protection

CHAPTER 6. PROJECT ALTERNATIVES ANALYSIS

6.1. Alternatives for Development

Several alternatives exist to determine whether the proposed works are necessary or not.

6.1.1. "No project alternative"

The first alternative is the NO PROJECT ALTERNATIVE. This alternative describes a situation where the proposed project will not be put up. If this position is maintained, people would continue experiencing water scarcity, water rationing and the Nanyuki WSP would operate sub-optimally.

The no project option will lead to the following (general) major negative and long-term impacts:

a) NAWASCO would remain without regular water supply to provide to its consumers. The existing water sources that are not functional will also not be rehabilitated.
b) The pipes will continue leaking and leading to water losses
c) High operation costs due to electricity bills as result of pumping
d) Vandalism of the steel elevated tanks and general low storage capacity of the existing systems
e) Water shortage degrading their quality of health and sanitation
f) Stunted economic growth within the urban areas as a result of water
g) Increased time wastage as a result of travelling long distances to fetch water
h) Increased risk of water related conflicts
i) The proponent will not increase distribution in the service area

6.1.2. Alternative location option

The second option, the ALTERNATIVE LOCATION option, suggests that the proposed project may be in a different area. This means there would be no improvement on water provision in the area, meaning that the option is no better than the NO PROJECT ALTERNATIVE. The project proponent, NAWASCO chose the project based on a pressing need to enhance water supply

in the area so as to avoid water rationing and loss of water through pipe leakages. The area is also growing very fast with an expanding population in Nanyuki municipality.

6.1.3. Diverting the pipes to follow a new piping route

This will include decommissioning the old pipe system and laying new pipes along a different route. The impacts of this includes:

- ✓ Disturbance of new areas
    - Loss of biodiversity
    - Possible displacement thus a need for resettlement
    - Disturbance of infrastructure
    - Improved resilience to future environmental or infrastructure risks.
    - If well managed, the system may have long term durability based on the materials used

Based on all the above considerations, rehabilitation of the dilapidated pipes is the best option in terms of costs and improvement of water supply.

CHAPTER 7. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND PROPOSED MITIGATION MEASURES

7.1. Introduction

This chapter highlights the impacts the proposed project will have on the environmental, social and health components of Nanyuki town residents.

All the phases of the project namely Pre-construction, construction, operation and decommissioning phase are evaluated for both positive and negative impacts. This is because these impacts are interlinked and any fault in one component will affect all the other phases of the project. Both positive and negative impacts are anticipated from the proposed project. Positive impacts should be enhanced through enhancement measures while negative impacts should be mitigated to reduce them.

After the impact were identified and assessed, suitable mitigation measures have been defined to reduce or totally avoid the impacts. Mitigation measures were proposed based on national requirements, best practices, preliminary stakeholders' views, ESIA experts' advice, and according to the following mitigation hierarchy:

- avoid as much as possible;
- where avoidance is not possible, minimize following best practices;
- where minimization is not sufficient, mitigate through specific measures;
- where mitigation is not sufficient, compensate for residual risks and impacts.

7.1.1. Impact assessment scoring

To systematically identify, predict, evaluate and determine the significance of impacts resulting from the project construction and operation, generic criteria developed by Haug et al (1984) were adopted. Precautionary principle was used to establish the significance of impacts and their management and mitigation i.e. where there is uncertainty or insufficient information, the Environmentalist erred on the side of caution.

Table 7-1: Impact significance rating criteria

SEVERITY OF IMPACT	RATING	
Insignificant / non-harmful / less beneficial	-1/ +1	CONSEQUENCE
Small/ Potentially harmful / Potentially beneficial	-2/ +2	
Significant / slightly harmful / Significantly beneficial	-3/ +3	
Great/ harmful / beneficial	-4/ +4	
Disastrous/ extremely harmful / extremely beneficial	-5/+5	
DURATION OF IMPACT	**RATING**	
One day to one month	-1/ +1	
One month to one year	-2/ +2	
One year to ten years	-3/ +3	
Life of operation	-4/ +4	
Post closure	-5/+5	
SCOPE OF IMPACT	**RATING**	
Activity specific	-1/ +1	
Right of way specific (within right way)	-2/ +2	
Local area (within 5km of the project)	-3/ +3	
Regional	-4/ +4	
National	-5/+5	
FREQUENCY OF ACTIVITY / DURATION OF ACTIVITY	**RATING**	LIKELIHOOD
Annually or less / low	-1/ +1	
6monthly / temporary	-2/ +2	
Monthly / infrequent	-3/ +3	
Weekly/ life operation/ regularly / likely	-4/ +4	
Daily / permanent / high	-5/+5	

FREQUENCY OF IMPACT	RATING
Almost never/ almost impossible	-1/ +1
Very seldom / highly unlikely	-2/ +2
Infrequent / unlikely/seldom	-3/ +3
Often / regularly/ likely/ possible	-4/ +4
Daily / highly likely/ definitely	-5/+5

Table 7-2: Significance rating matrix

LIKELIHOOD (Frequency of activity + frequency of impact)	CONSEQUENCE (Severity+ Spatial Scope + Duration)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 7-3: Mitigation ratings

Significance Ratings	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very High	**126-150**	Improve proposed management	Maintain proposed management
High	**101-125**	Improve proposed management	Maintain proposed management
Medium - High	**76-100**	Improve proposed management	Maintain proposed management
Low - Medium	**51-75**	Maintain proposed management	Improve proposed management

Low	26-50	Maintain proposed management	Improve proposed management
Very low	1-25	Maintain proposed management	Improve proposed management

7.2. Potential Positive Impacts

7.2.1. Pre-construction phase

During this phase, the following occurs: community sensitization and organization; development and agreement of protocols and processes with communities; mobilization of equipment, land clearing, set-up of workers camps, and workers recruitment). This section presents the potential positive impacts at pre-construction stage which need to be enhanced during the other phases of the project. The section also discusses the negative impacts anticipated to occur at the onset of project activities including pre-construction. Mitigation measures are also proposed in this section based on information on the preferred state of environment by the lead agencies, communities, and international best practice standards.

Enhanced environmental and social awareness of the community

Community members will be sensitized about the project in preparation for the proposed project inception. The aspects of capacity building especially reporting social and environmental grievances and grievance redress mechanisms will be lifelong.; preparation of the contractors team, especially the work groups / camps on social responsibilities and policies and laws related to the interaction of the work teams with the communities;

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+4

Frequency of activity / duration of activity	+3
Frequency of impact	+3
Result	**+60 Low to medium**

Increased House Rent

There will be an increase in demand for houses within the area due to adequacy of water supply. A demand driven increase in rent due to the constant and regular supply of water.

Impact Analysis

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+2
Duration of impact	+4
Frequency of activity / duration of activity	+3
Frequency of impact	+4
Result	**+70 Low to medium**

Recruitment/employment of local communities during the pre-construction and community mobilization

Local people will be engaged to provide labor during pre-construction activities such as offloading materials needed and also in community mobilization.

Impact Analysis

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+2
Duration of impact	+3

Frequency of activity / duration of activity	+3
Frequency of impact	+3
Result	**+54 Low to medium**

It is recommended that:

- Priority should be given to residents of the communities within close proximity to the project site;
- Equal treatment of men and women should be emphasized during the employment process;
- Child labour should not be allowed during all the phases of the project cycle;

Licenses and permits

Abstraction permits are paid for, so there will be local revenue generated to the government.

Impact Analysis

Impact without Mitigation	
Severity of impact	+2
Spatial scope of impact	+1
Duration of impact	+1
Frequency of activity / duration of activity	+1
Frequency of impact	+2
Result	+12 Very Low

Social cohesion

The community members will be capacity built creating awareness and making them more enlightened. There will be increased community joint activities and possibly cohesion and interaction with local leaders and possible collaboration in future projects.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+2
Duration of impact	+5
Frequency of activity / duration of activity	+4
Frequency of impact	+4
Result	**+80 Medium to high**

7.2.2. Construction phase

Employment

During ground excavation for removal of the old pipes, moving and disposal of the won out pipes and replacement with new pipes job opportunities both skilled, semi-skilled and unskilled labour opportunities will arise. This will lead to economic empowerment of the locals since unskilled labor will be used in lying of pipes works and transport of construction materials, semiskilled labour in construction and highly skilled labour in engineering. Socially community members will be engaged in productive employment.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+3
Frequency of activity / duration of activity	+2
Frequency of impact	+4
Result	+54 Low to Medium

It is recommended that:

- Local people should be given priority during the recruitment process unless the expertise needed is not available locally
- There should be gender mainstreaming in recruitment opportunities
- During recruitment there should be a balance in opportunities allocation among the different ethnic communities

Growth of local economy

During construction some of the project money shall be released into the local economy due to the construction activities, the hired persons will get money and get greater purchasing power of local goods and services. Business opportunities in the local areas will improve through purchases of construction materials, food and accommodation services.

Impact Analysis

Impact without Mitigation	
Severity of impact	+2
Spatial scope of impact	+3
Duration of impact	+2
Frequency of activity / duration of activity	+2
Frequency of impact	+3
Result	**+35 Low**

It is recommended that:

- Business opportunities such as provision of food to construction workers should be left for the local communities.

Creation of market for construction materials

The project will require materials, some of which will be sourced locally within the project area. This includes Assorted pipes, cement, meters, submersible pumps, cement, ballast, sand and hardcore for the construction of the structures

The constructor should ensure that local suppliers are given first priority in supply of construction materials.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+3
Frequency of activity / duration of activity	+2
Frequency of impact	+4
Result	**+54 Low to medium**

It is recommended that:

- Locally available materials needed for construction should be sourced from the local community.

Increase in number of small scale businesses

Around the construction site, small scale business such as food kiosks and groceries will start to cater for the growing population of workers.

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+3
Duration of impact	+3
Frequency of activity / duration of activity	+2
Frequency of impact	+4
Result	**+60 Low to medium**

7.2.3. Operation phase

Increased water supply

Rehabilitation of dilapidated infrastructure will reduce water losses and the wider pipes will increase the amount of water flowing through them. This will alleviate the problem of low water pressure and the rationed occasioned small diameter pipes.

Impact Analysis

Impact without Mitigation	
Severity of impact	+5
Spatial scope of impact	+4
Duration of impact	+5
Frequency of activity / duration of activity	+4
Frequency of impact	+5
Result	**+126 very high**

Decrease in Water borne diseases

The community reported that they experience episodes of water borne diseases due to consuming water that may be originating from source that may not be very safe and clean.

Impact without Mitigation	
Severity of impact	+5
Spatial scope of impact	+4
Duration of impact	+5
Frequency of activity / duration of activity	+4
Frequency of impact	+4
Result	**+ 112 High**

Increased Revenue to NAWASCO

The company has been experiencing high power bills when using electricity and also the small pipes in relation to water that needs to be supplied makes them ration the water. The old pipes also have leaks leading to the company losing water. With the project inception the company will be able to collect more revenue since the community will use more water than they are doing since there is no rationing.

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+3
Duration of impact	+5
Frequency of activity / duration of activity	+5
Frequency of impact	+5
Result	**+120 Very high**

Improvement in hygiene

Water is needed to make people maintain high standards of hygiene. When water is scarce people compromise on these standards.

Impact Analysis

Impact without Mitigation	
Severity of impact	+5
Spatial scope of impact	+3
Duration of impact	+5
Frequency of activity / duration of activity	+5
Frequency of impact	+5
Result	**+130 Very high**

Improved livelihoods

With improved water supply, the residents of the area will be able to engage in other economically important ventures. Currently a lot of time is wasted looking for water.

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+3
Frequency of activity / duration of activity	+5
Frequency of impact	+5
Result	**+130 Very high**

Improved food security

The community members can farm on kitchen gardening throughout the year. This will enhance food security and improved nutrition and health of the local people.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+4
Frequency of activity / duration of activity	+3
Frequency of impact	+4
Result	**+70 low to medium**

Tree nurseries

Establishment of tree nurseries can be a good income generating activity that would keep the youth positively engaged. This will reduce idleness and delinquency in youth;

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+2
Duration of impact	+4
Frequency of activity / duration of activity	+4
Frequency of impact	+5
Result	**+81 medium**

Improved well-being of women and children

In Nanyuki area like many other water scarce regions, the burden of fetching water for domestic use and watering livestock at a household level is left to the women. This leaves them with very little time to engage in other development activities and compromises on their health and well being.

Availability of piped water throughout will free children to attend classes hence improving school attendance. Time saved by women can enable them attend to other engagements that could bring financial benefits to the family.

Impact Analysis

Impact without Mitigation	
Severity of impact	+5
Spatial scope of impact	+3
Duration of impact	+4
Frequency of activity / duration of activity	+4
Frequency of impact	+5
Result	**+108 high**

Poverty reduction and increased incomes

Availability of water for livestock and fodder will enhance the growth rate and fattening ability of livestock, making them fetch better prices in the market. This will in effect lead to improved living standards of the local community, hence alleviating poverty.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+4
Duration of impact	+4
Frequency of activity / duration of activity	+4
Frequency of impact	+4
Result	**+88 medium to high**

Improved gender parity

Capacity development engagements will be as gender sensitive as possible and will ensure gender mainstreaming in the project activities. Equal access to and control of resources may result since women will gain power and improve their position in the community.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+3
Frequency of activity / duration of activity	+4
Frequency of impact	+4
Result	**+54 low to medium**

Sensitisation Campaign on HIV/AIDS

The project will link up to other line ministries and organizations with expertise in health and hygiene. This will in particular contribute to increased knowledge of transmission and prevention of HIV/AIDs and water borne diseases such as malaria and typhoid.

Impact Analysis

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+3
Duration of impact	+4
Frequency of activity / duration of activity	+3
Frequency of impact	+4
Result	**+77 medium to high**

Decrease in waterborne diseases

Treated drinking water supply will lead to a decrease in waterborne diseases due to availability of clean water for drinking.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+3
Duration of impact	+4
Frequency of activity / duration of activity	+4
Frequency of impact	+4
Result	**+80 medium to high**

Minimization of conflicts emanating from water rationing

Implementation of the project will lead to decrease or elimination of any conflicts in the area arising from scarce water resources that has contributed to rationing of the water. The residents of Temu especially have been affected by water scarcity.Their main complaint was that they have been neglected by the government since they are at the boarder of Laikipia and Nyeri and so many of the development projects bypass them.

Impact Analysis

Impact without Mitigation	
Severity of impact	+5
Spatial scope of impact	+4
Duration of impact	+4
Frequency of activity / duration of activity	+5
Frequency of impact	+5
Result	**+130 very high**

Contribution to the flora, fauna and micro-climate

The availability of water at the area will support onfarm tree growing, kitchen gardens and tree nurseries and kitchen gardening. Opportunities for agroforestry and planting of indigenous varieties will arise. This will enhance food security and also nutrition diversification due to growing of fruits and vegetables.

Impact Analysis

Impact without Mitigation	
Severity of impact	+2
Spatial scope of impact	+3
Duration of impact	+4
Frequency of activity / duration of activity	+4
Frequency of impact	+4

Result	+72 low to medium

7.2.4. Decommissioning phase of the piped water supply

Decommissioning refers to the formal process of removing something from the operational status once the project cycle is complete or if it is in a dilapidated state or has operated at a gross loss over a long period of time.

The NAWASCO water development project can be decommissioned when the design period ends or due to one of the following reasons:

- ✓ The water source may become inadequate due to unexpected change in climate rendering the project inefficient
- ✓ Dilapidation of infrastructure overtime

Under these circumstances, the proponent will demolish all the structures remove the salvage materials and restore the sections affected to the original state. The following materials will be part of what is collected:

- ✓ Pipes and Conduits: Metal Pipes, Cast Iron, Ductile Iron,Steel,Copper
- ✓ Plastic Pipes: PVC (Polyvinyl Chloride) &HDPE (High-Density Polyethylene)
- ✓ Joint Materials: Rubber Gaskets, Bolts, Nuts, and metal Clamps
- ✓ Support Structures and Fittings: Metal Brackets, Concrete Blocks and Couplings and Flanges
- ✓ Pumps and Associated Equipment: Submersible Pumps, Surface Pumps, Pump Housings and taps
- ✓ Ancillary Structures: Protective Casing Covers, Reservoir and Tank Structures (Concrete, Steel)
- ✓ Other waste materials : Sludge from Pipes and Tanks, Chemical Residues from Treatment Processes
- ✓ Landscaping Materials : Plants and soils

The materials that cannot be recycled should be disposed off in NEMA designated areas.

Recyclable Materials

All the materials that can be put into other use should be collected, cleaned and stored for future use. Materials that cannot be used as they are can be recycled and processed into other usable items.

Materials that can be recycled include: All metallic infrastructure, the steel tanks, all the pumps that are in good condition, Metals: Steel, iron and copper. Plastic Pipes such as PVC, can be used.

7.2.5. Impacts During Decommissioning

Recyclable materials

The resultant waste should be sorted into re-recyclables and non-recyclables before disposal at the designated site in accordance to NEMA regulations on solid waste. The recyclables, e.g. pump sets, GI pipes, plastic materials could be reused in new projects or sold to recyclers.

Impact Analysis

Impact without Mitigation	
Severity of impact	+3
Spatial scope of impact	+2
Duration of impact	+2
Frequency of activity / duration of activity	+2
Frequency of impact	+2
Result	**+28 low**

Creation of jobs

For demolition to take place properly and in good time a source of labour is needed and several people will be involved. As a result several employment

opportunities will be created for the demolition during the decommissioning phase of the proposed irrigation infrastructure.

Impact Analysis

Impact without Mitigation	
Severity of impact	+2
Spatial scope of impact	+2
Duration of impact	+2
Frequency of activity / duration of activity	+2
Frequency of impact	+3
Result	**+30 low**

Site restoration

Upon decommissioning of the proposed project, rehabilitation of the project sites will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to improved visual quality of the area. Landscaping of the area may be done.

Impact Analysis

Impact without Mitigation	
Severity of impact	+4
Spatial scope of impact	+2
Duration of impact	+3
Frequency of activity / duration of activity	+3
Frequency of impact	+5
Result	**+72 low to medium**

7.3. Potential Negative Impacts

7.3.1. Pre-construction phase

Impact on Livelihoods/economic displacement

In the project area, there are temporary structures where food vendors and green grocers sell their merchandise. During excavation on the road sides to lay pipes, there will be temporary disruption of these activities.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-24 Very low**

Mitigation Measures

- Providing them with an economic displacement allowance equivalent to what they would lose in business the 3 days of excavation.
- Informimg the community in advance the dates and days when construction works would be undertaken
- Trenching and back filling within a short time where we have the structures

Traffic flows

The pre-construction phase will entail material haulage that will put varying numbers of heavy trucks on the main roads to the project area.

Impact Analysis

Impact without Mitigation	
Severity of impact	-1
Spatial scope of impact	-1
Duration of impact	-2
Frequency of activity / duration of activity	-1
Frequency of impact	-3
Result	**-16 very low**

Mitigation:

- The developer will plan vehicle routes to target low traffic hours
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle;
- Ensuring moving equipment is outfitted with audible back-up alarms;
- Using inspected and well-maintained lifting devices that are appropriate for the load, such that there are no breakdowns in the middle of the road;
- Contractor shall provide temporary road signage during construction and ensure drivers observe speed limits and for safety of other road users.
- Establish and clearly mark entry and exit points; and sensitize the truck operators on the exit and entry points;
- There should be a person guiding traffic especially where there are diversions.

Noise and vibration generation from mobilization of equipment

Before construction work commences, heavy trucks moving equipment and materials in preparation for the construction will generate a considerable amount of noise and vibration within the area. Along the pipelines in Kilimo, there are schools along the road that will act as noise receptors. These include:

- ✓ Imani Junior primary school
- ✓ St Loise Nanyuki girls' high school
- ✓ Township secondary school
- ✓ Phill academy
- ✓ DEB Primary school

The noise generated though it is localised will have impacts on the students on a short term basis in varying degrees.

Impact Analysis

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-3
Frequency of impact	-3
Result	**-42 Low**

Mitigation:

- Sound-control devices on equipment should be maintained in good condition. Regular servicing of equipment and machinery shall be emphasized.
- Appropriate and sufficient PPE for noise protection shall be provided to all workers and visitors to highly active sites;
- Movement of the heavy machinery should be limited only to day time, e.g. 6 am to 7 pm;
- The contractor shall be required to obtain a license in case there is emission of noise beyond the permissible noise levels.
- Selecting equipment with lower sound power levels and installing suitable mufflers on engine exhausts;
- The developer will limit the hours of operation for specific pieces of equipment

and operations;

- Portable Sound barriers should shield the drilling rigs to minimise noise.

7.3.2. Construction phase

Community Disturbance

The project is composed of expansion and rehabilitation of water pipes. There is no displacement envisioned but minor disturbances during digging up of the old pipes and replacement with new ones.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-2
Result	**-15 Very low**

Mitigation:

Temporary bridges will be constructed to give access to areas disrupted by trenching;

Where there are persons affected by the project, trenching and back filling should be completed within the shortest time possible.

Clearing of vegetation

The proposed project will involve clearing of vegetation cover especially along the pipelines where there are grasses and a few shrubs.

Impact Analysis

Impact without Mitigation

Severity of impact	-2
Spatial scope of impact	-1
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-3
Result	**-25 Very low**

Mitigation:

- Only minimal bush clearing should be allowed;
- Excavations of the site will be confined only the necessary areas.
- Re-plant indigenous trees a bit further from the pipelines in areas that will be identified with help of the community.

Air emissions and air quality

Gaseous emissions

Emissions associated with combustion of fuel from the construction vehicles and equipment. These emissions may be in the form of oxides of nitrogen as well as volatile organic carbons. Similar to other combustion processes, emissions from vehicles include CO, NO_2, SO_2, and VOCs. Emissions from the construction vehicles should comply with national or international standards.

Impact Analysis

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-3
Frequency of impact	-3
Result	**-48 Low**

Mitigation:

- Regardless of the size or type of vehicle, operators should implement the manufacturer recommended engine maintenance plans;
- Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits;
- Contractors should consider additional ways to reduce potential impacts including implementing a regular vehicle maintenance and repair plan.
- Recruit staff from the surrounding communities to decrease the travelling distance thus reducing emissions from vehicular traffic.
- Ensure that all vehicles involved in the transport of construction material and staff, and machinery involved in the construction is properly maintained and serviced.

Dust pollution

The most common pollutant involved in fugitive emissions is dust. This will be released during certain digging up of pipes and transportation of materials.

Impact Analysis

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-3
Frequency of impact	-3
Result	**-48 Low**

Mitigation:

- Use of dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls;
- Ensure that all material (sand and aggregate) stockpiled on the site to be used in construction activities are regularly sprayed to reduce the effects of wind whipping.

- Ensure that all trucks carrying aggregate and sand are covered during

Soil erosion

The activities involved in the construction phase of the development will have a major negative short-term impact on soil. This is due to the removal of vegetation from the pipe spread and construction areas;

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-24 low**

Mitigation:

- Only remove vegetation from areas for the pipe rehabilitation areas;
- Designate a main access route for heavy machinery;
- Avoid site preparation in period when wind velocities are highest.

Noise and vibration

The construction phase of the development may likely have a negative impact to the ambient noise and vibration in the development area. Several measures may be undertaken by the Contractors to reduce the impact of noise on the existing and potential residents as well as the workers involved in the project.

Impact Analysis

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-2

Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-32 Low**

Mitigation:

- Access roads should be sited in such a way that the noise from this movement affects as few of the existing residents as possible.
- Where possible silenced machinery and instruments should be employed to reduce the impact of noise on the existing residents and workers.
- Construction hours should be limited to the hours of 8:00 a.m. and 6:00 p.m. daily.
- The delivery of raw materials must be limited to 8:00 a.m. and 6:00 p.m. daily.

Increase in HIV /AIDs Transmission

Removal of dilapidated pipes and replacement with new ones takes an average of four to six months and may attract a few migrant workers from different areas. These workers due to influx of project associated money may engage in irresponsible or transactional sex, which can increase HIV transmission risks. The local communities and commercial sex workers may engage in sex for pay. Substance use (alcohol or drugs) may heighten in the construction sites leading to impaired judgment and risky sexual behaviours.

Impact without Mitigation	
Severity of impact	**-5**
Spatial scope of impact	**-3**
Duration of impact	**-2**

Frequency of activity / duration of activity	**-2**
Frequency of impact	**-2**
Result	**-40 Low**

Mitigation measures

- ✓ HIV/AIDS Awareness Campaigns and education for construction workers and the beneficiary community.
- ✓ Development of Codes of Conduct which should be signed by all workers
- ✓ Enforcement of policies that promote moral behaviour that reduces risky behavior
- ✓ The code of conduct should clearly spell out the deterrent measures for Sexual Harassment

Gender Based Violence and Sexual Exploitation and Abuse

Construction works may introduces migrant workers who may interact with the local community creating an avenue for sexual exploitation or abuse. This may also lead to gender based violence due to the suspicions that may be created in families. Harassment within the workforce, particularly for women and youth laborers could arise.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-3
Duration of impact	-3
Frequency of activity / duration of activity	-2

Frequency of impact	-1
Result	**-33 Low**

Mitigation Measure

- ✓ Enforce the environmental and social safeguards
- ✓ Include measures to control GBV-SEA-SH risks during project planning.
- ✓ All workers should attend a mandatory on code of conduct and sign the code of conduct.
- ✓ Awareness creation and community outreach to educate locals about their rights and available reporting mechanisms.

Child Labour

Direct child labour may be limited since drilling and solarisation is a specialised task. However a few casual positions such as carrying materials like sand, cement clearing the site and waste bulking may attract child labour. Indirect child labour may occur when parents get engaged to work in the project and as a result leave their children to take over household activities leading to missing classes.

Impact without Mitigation	
Severity of impact	-4
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2

Result	**-36 Low**

Mitigation

- ✓ The contractor should adhere to the labour laws;
- ✓ The client should conduct regular inspections to ensure no children are working on-site.
- ✓ Using law enforcement agencies to monitor and apprehend those who contravene the laws.

Influx Of Labour

The water piping project will lead to to influx of workers in an area to excavate the pipes, remove them and move them to a designated place, lay the new pipes, backfill and level the ground . Care should be taken when employing the unskilled workers making sure they are drawn from the community. If this is not observed, there could be conflicts and tensions, increased risk of sexual exploitation, harassment, or abuse.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-1

Result	**-30 Low**

Mitigation

- ✓ Hiring of local workers for ease of management of workforce
- ✓ Enforcing the code of conduct for workers
- ✓ Frequent consultations with local leaders and community members when hiring the local workers
- ✓ Establish grievance redress mechanisms to address complaints and concerns

Conflicts over water access and management

With improved water supply , disputes concerning allocation of water especially priority areas, competition for water leading to conflicts between communities or households. Other disputes may arise from mismanagement, corruption and lack of enforcement of water regulations and favouritism and triggers conflicts including along ethnicity.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-2
Duration of impact	-3
Frequency of activity / duration of activity	-1
Frequency of impact	-3

Result	**-40 Low**

Mitigation Measures

- ✓ Having a community driven Water Resources Users Associations committee
- ✓ Participatory decision-making involving all stakeholders benefiting from the borehole water.
- ✓ Using the WRUAs to determine water distribution and times of rationing and resolve disputes effectively.

Occupational health and safety concerns

Construction and operation activities of project that involve handling of equipment and machinery may cause injuries to project workers, leading to loss of limbs, and in the worst case scenario, death. Workers may also be exposed to diseases arising from poor sanitation which may lead to a loss of valuable work-days due to ill health.

Impact Analysis

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-5
Frequency of impact	-2
Result	**-63 low to medium**

Mitigation:

- Contractor shall develop and implement occupational health and safety management plans.
- Every construction tool, equipment and machines shall be well set and adequately maintained.

- The construction area shall be kept free from objects such as sharps and trippings such as hanging ropes which can cause accidents ranging from minor cuts to deaths during construction.
- The rehabilitation of pipes sites shall be delineated and adequately protected from unauthorized intrusions. There will be warning signs and barricades should be properly displayed and strictly adhered to.

Construction spoil

There will be excavation of the ground to pave way for pipelines. If this material is not well disposed, it can pave way to increase in vermin such as rats and mice. The spoil can be carried by rainwater during floods polluting water bodies and the spoil makes an area lose the aesthetic value.

Impact Analysis

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-3
Frequency of impact	-4
Result	**-49 Low**

Mitigation:

- Backfilling will be done using the excavated soil
- Stumps and roots that may have been removed in the area will be allowed to dry then burnt
- The remaining soil will be used for landscaping the area through planting trees and grasses

Solid waste generation

During construction works, a lot of solid waste or spoil will be generated. Solid wastes include tree stumps, soil spoils, papers used for packing, plastics, cuttings

and trimmings of materials among others. To preserve the aesthetic value of the land, proper disposal of the wastes is important. Dumping around the site will interfere with the aesthetic status and movement of animals. Improper waste disposal could lead to pest-breeding sites, pollution of physical environment including water resource and invasion of scavengers.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-3
Frequency of activity / duration of activity	-3
Frequency of impact	-3
Result	**-42 Low**

Mitigation:

- Identification of the waste types,
- Segregation into the various categories and establish suitable mechanisms of collection, storage, transfer and final disposal.
- All construction debris and solid waste generated by the workforce must be taken out of the site and disposed of in a sensible manner, at a specified and approved dump site.
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler.

Disruption of cultural norms and practices

At a very low scale, there is also a possibility of disruption of cultural norms of the local residents of Nanyuki. The society may mix with people of different cultures and this can be manifested through changes in dressing, diet and behavior.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-1
Frequency of activity / duration of activity	-1
Frequency of impact	-2
Result	**-15 very low**

Mitigation:

- Capacity building shall be done to strengthen the community in order to enhance their ability to deal with the social impacts that will result from the population influx;
- Cultural norms relating to gender will be respected and considered in all aspects of project implementation including the guidelines, which will be adopted for use in the project area.

Social ills

Increase moral decadence due to an influx of people from different cultures and increased incomes. This could make the youth more promiscuous and also play truant in school.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-12 very low**

Mitigation:

- Guidance and counseling services for community members;
- Empowerment of boy and girl child;
- Sensitization of workers by the contractor in collaboration with other stakeholders such as the ministry responsible for Public Health;
- All workers in the project should be sensitized and should sign the code of conduct provider by the contractor. The code of conduct should spell out the disciplinary measures that will be taken on offenders in case of misconduct.

Loss of aesthetic quality / land use

Changes in aesthetics (landscape/visual beauty) . There is growing evidence that people increasingly value aesthetics in their daily life and environment. Ground disturbance and vegetation removal may lead to disturbances as a result of trenching to bury pipes and stockpiling soil and spoils (if not removed).

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-3
Duration of impact	-3
Frequency of activity / duration of activity	-1
Frequency of impact	-3
Result	**-32 low**

Mitigation:

- The contractor in consultation with the Client and other stakeholders will follow the Environmental Management Plans to restore the landscape as near as possible to its natural state prior to project implementation;
- Excavation areas will be properly cordoned off to limit access to all none-construction crew to prevent accidents and exposure to construction site conditions;
- All trenched areas will be back filled and trees, grass planted

Occupational health and safety of the workers

During the construction period, it is important to ensure that health and sanitation issues are properly addressed by the contractor.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-1
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-20 Very low**

Mitigation:

- Health screening and profiling of workers before recruitment and periodical checks/screening should be conducted to monitor occurrence and prevalence of diseases;
- The contractor shall provide a safe, accessible and clean drinking water source to all workers;
- The contractor shall develop and implement an HIV/AIDS and STDs prevention and awareness plan for the workers and surrounding communities to the project area;

7.3.3. Operation Phase

Negative Impacts

Vandalism and theft of installed infrastructure

Water utilities often experience theft from residents especially when the system is not functional/no water flow. These activities can affect the delivery and management of the installed system, which results to limited access in the town. They range from theft of pipes, fittings, and water through bypassing meters and tempering with connections.

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-5
Frequency of impact	-1
Result	**-60 low to medium**

Mitigation measures

- The implementing agency to ensure good relationship with the local community through continuous engagement. The existing NAWASCO area managers can facilitate this.
- Foster household ownership of the infrastructure through payment of water by households
- Enforce law against reported cases of vandalism

Increased water demand

Increase in population in the area due to presence of continuous flow of water may lead to a strain on the water treatment plant.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-3
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-28 low**

Possible measures to address issues of increased water capture by the proposed water project will include:

- Putting in place water conservation measures and sensitize the water users on conservation issues;
- The design of the project should include adequate flow of water

Possible water users' conflicts

This could arise at a small scale only if the water provision by members of the community is not well regulated. Competition for water sources by the community members could result into conflicts which could even interfere with the sustainability of the project.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-3
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-28 Low**

Mitigation:

- Guiding the community on how to form a Water Users Association (WUA) with a well-drawn constitution and By-laws that will guide on water usage and resolve conflicts in the project area;
- Water Users Association should be capacity built to resolve water use conflicts among all water users.

7.4. CUMULATIVE IMPACTS

The rehabilitation of Kilimo water project will have cumulative impacts that are both positive and negative. However the positive benefits will overshadow the negative

impacts which are minimal since the pipeline rehabilitation will be along existing infrastructure and thus involve minimal vegetation clearance along a government owned road reserve.

The environmental and social benefits include:

Improved water distribution efficiency: The community has been experiencing water rationing due to low volume and pressure. The cumulative benefit of improved infrastructure could lead to more efficient water distribution increasing water availability;

Improved tree cover: Waste water from household uses can be used to irrigate onfarm agroforestry trees contributing to enhanced tree cover;

Better health for women and children: Women and children are the people who are most affected by lack or scarcity of water. During the focus group for women, they indicated that most of them suffer back pains due to carrying water for domestic use.

Better school enrolment and enhanced performance; school going pupils have missed classes at one time or another due to dirty school uniforms or if they have to follow their parents to line up for water. This affects not only their health but also academic performance.

Improved living standards: Money used to buy water by the community can used to support small business initiatives or buy some of the necessities that used to be previously foregone. Time spent looking for water can be dedicated to other economic activities.

Establishment of kitchen gardens which will lead to improved nutrition: vegetables can be grown in kitchen gardens through use of recycled water. This can enhance food and nutrition security to the benefiting community.

Decrease in water borne diseases: Clean water supplied through the project will lead to a decrease in water borne diseases. Water that is not safe for drinking may be contaminated by microorganisms that cause diseases such as dysentry and cholera.

Environmental and social negative impacts

Reduction in water levels of Nanyuki River: Improving the water conveying infrastructure through increasing the diameter of the pipes will allow a higher volume of water to pass through the pipe at the same time increasing the flow rate. Therefore more water can be abstracted in a shorter period and this may lead to overabstration of water if this is not controlled;

Mitigation Measures

Set abstraction rates based on scientific data to ensure withdrawals do not exceed natural recharge rates.

Implement water pricing mechanisms to discourage excessive use.

Localised soil compaction: This is likely to occur due to vegetation clearing and construction disturbances;

Mitigation measures:

Use mechanical methods such as ripping, sub soiling, or tilling to break up compacted soil layers.

Introduce native grasses, shrubs, or cover crops with deep root systems to naturally loosen compacted soils.

Water wastage: Misuse of water due to ease of availability and low cost when compared to commercial water vendors.

Mitigation measures;

The community members will be sensitised on the importance of prudent use of water;

Water metres will be installed in communal water points and also in the individual water connections.

7.5. Decommissioning Phase

Loss of a safe source of drinking water

Decommissioning of Kilimo water project will lead to loss of a source of water for the community members who were dependent on the water source.

Impact Analysis

Impact without Mitigation	
Severity of impact	-5
Spatial scope of impact	-5
Duration of impact	-5
Frequency of activity / duration of activity	-5
Frequency of impact	-5

Result	**-150 Very High**

Mitigation Measures

Community engagement to inform them of the proposed decommissioning of the project and addressing the community concerns;

Getting an alternative source of water;

Getting water storage facilities and distributing or selling to the community at a subsidized rate.

Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of excavation of pipes and demolition of water infrastructure.

Impact Analysis

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-1
Frequency of impact	-2
Result	**-18 Very Low**

Mitigation measure:

- Demolish mainly during the day, a time with minimal noise disturbance
- Alert the community in advance on the days when the demolitions are likely to commence;

Solid Waste Generation

Demolition of the proposed Kilimo Teachers Water project piping and other related infrastructure will result in generation of solid waste. The waste will contain the

materials used in construction including concrete, metal, adhesives, sealants and fasteners.

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-1
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-20 Very Low**

Mitigation measure:

- Use of durable, long-lasting materials that are recyclable thereby reducing the amount of demolition waste generated during decommissioning phase
- Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements
- Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided.

Dust

Some dust will be generated during demolition works of the proposed Kilimo Project. This will affect the persons working in the site as well as the neighbouring community.

Impact without Mitigation	
Severity of impact	-3
Spatial scope of impact	-1
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-30 Low**

Mitigation measure:

- Watering all active demolition areas as and when necessary to lay dust.

- Cover all trucks hauling soil and other loose materials
- Provide the staff working on site with personal protective equipment.

Traffic Impacts

During decommissioning movement of trucks carrying demolition equipment and demolished materials for disposal will cause several adverse impacts including, road blockage, slow traffic, noise and dust.

Impact without Mitigation	
Severity of impact	-2
Spatial scope of impact	-3
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-2
Result	**-28 Low**

Mitigation

- Signages to guide and control traffic;
- Speed bumps to control speed
- Driver training
- Community sensitisation of the increase in traffic.

7.6. GRIEVANCE REDRESS MECHANISM

A Grievance Redress Mechanism (GRM) is a structured process designed to receive, address, and resolve complaints or concerns from individuals or groups affected by a project or activity. It ensures that grievances are handled fairly, transparently, and efficiently, often as part of a project's environmental, social, and governance (ESG) framework.

7.6.1. GRIEVANCE REDRESS MECHANISM PROCEDURE

A ledger book to record grievances will be availed to the community by the client and the contractor. A complaint will be recorded and all the steps taken to address it will be recorded until a resolution is reached and the case closed. The grievance redress mechanism will follow the following steps:

Grievance Report: The GRM committee will receive a grievance from a community member either at a personal level through or as presented in a community meetings; Record date, complainant details, nature of grievance, and any evidence provided.

Assessment of the Grievance presented and Review to categorize the grievance based on severity.

Acknowledgment: Acknowledge receipt of grievance to the complainant within a specified time

Invitation of the GRM Committee to start gathering information and conduct Investigations

Analysis of the information provided to authenticate the cause of the grievance

Development of a proposal of action plans and response to the aggrieved

Invite the complainant to discuss the proposed resolution to ensure it addresses their concerns.

Carry out the agreed-upon action (e.g., compensation, project modification, public apology).

Monitor Implementation to ensure that the resolution is adhered to as agreed.

Get feedback of whether the complainant is satisfied with the resolution.

Close the grievance file if the complainant is satisfied

Appeal & escalation Process: If the complainant is dissatisfied, the appeal process should start or the issue presented to a higher level committee

There should be documentation and detailed records of all grievances, investigations, resolutions, and communications.

CHAPTER 8. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.1. Introduction

The purpose of the following Environmental and Social Management and Monitoring Plan (ESMMP) for the project is to initiate a mechanism for implementing mitigation measures for the potential negative environmental impacts. The monitoring plan will ensure that the indicators highlighted to ensure mitigation measures are implemented are monitored and that the efficiency of these mitigation measures are based on relevant environmental and social indicators. Mitigation measures have been proposed in Chapter 7 above and the proponent will monitor how well the mitigation measures have been implemented and if they were working in redressing identified impacts. The ESMMP identifies certain roles and responsibilities for different stakeholders for implementation, supervision and monitoring. The objectives of the ESMMP are:

i. To provide evidence of practical and achievable plans for the management of the proposed project.

ii. To guide on the role and responsibilities of different persons involved in the project implementation.

iii. To provide the Proponent (NAWASCO) with a monitoring framework to confirm compliance with relevant laws and regulations.

iv. To provide guidance on the budgetary implications of the mitigation measures that need to be employed for the success of the project.

v. To provide community with evidence of the management of the project in an environmentally acceptable manner.

Each of identified impacts, criteria, and parameters to be monitored will be based on the thresholds/standards governing the activity which may include but not limited to:

- ✓ Water Quality Regulations, 2006 (Legal Notice 121)

- ✓ Waste Management Regulations, 2006 (Legal Notice 121)
- ✓ Occupational Safety and Health Act (OSHA) 2007
- ✓ Environmental Management and Coordination Act, 1999
- ✓ Environmental (Impact Assessment and Audit) Regulations, 2003

8.2. Environmental and Social Management and Monitoring Plan (ESMMP) Principles

This project is geared towards enhancing benefits and improves livelihoods to the people living within beneficiary area. The project, however, should also observe environmental conservation requirements in accordance to the established laws and regulations. To realize this goal, acceptability by a majority of the beneficiaries and minimal effects to the physical and biological environment will require to be integrated in the project through constant consultations, evaluations and review of the project concepts and objectives.

It is recommended that guiding principles specific to this project and the regulations governing water resources management be developed that will allow integration of environmental management considerations in the construction, maintenance of the system components and public other utilities. Among the factors that need to be considered in this particular project implementation will include:

(i) Enhancing integration of environmental, social and economic functions in the project implementation;

(ii) Minimizing conflicts of any land and/or property that may get affected by the project in accordance with the laid down guidelines.

The contractors and other players in the project activities are prevailed upon to implement the ESMMP through a sustained supervision and continuous consultations. Conversely, environmental monitoring provides feedback about the actual environmental impacts of a project. Monitoring results help judge the success of mitigation measures in protecting the environment. They are also used to ensure compliance with environmental standards, and to facilitate any needed

project design or operational changes. This ESMMP is prepared for the three project stages where potential significant negative impacts manifest. These are:

- ✓ Construction Phase ESMMP
- ✓ Operation Phase ESMMP
- ✓ Decommissioning Phase ESMMP.

8.2.1. Management Responsibility of ESMMP

In order to ensure the sound development and effective implementation of the ESMMP, the responsibilities and authority of the various persons and organizations that will be involved in the project have been identified and are defined. The following entities will be involved in the implementation of this ESMMP:

- NAWASCO
- NEMA Nanyuki County
- Contractor
- Design Consultant;
- County Government of Nanyuki

8.2.2. NAWASCO

NAWASCO the project proponent, will be charged with the responsibility of implementing ESMP.

This will be achieved by inclusion of the ESMP provisions in the tender documents and conducting ESMP monitoring to ensure the objectives of this ESMMP are met. Monitoring will be done on a daily basis by an EHS consultant.

8.2.3. National Environment Management Authority (NEMA)

NEMA is tasked with overseeing and coordinating all aspects pertaining to the environment, serving as the primary governmental instrument in Kenya for implementing policies related to environmental matters. The Authority has an oversight mandate in ensuring proponents implement

project ESMPs.

8.2.4. The Contractor

The person/firm contracted to drill the borehole will be required to comply with the requirements of the ESMMP within this report. To ensure strict compliance environmental specifications of this ESMMP should form part of the contract documents.

8.2.5. Environment al Health and Safety Officer

NAWASCO will identify an officer within the company who is trained in environment and social issues. With the help of WSTF, the identified person will be capacity built on how compliance to ESMP should be assessed during the project cycle to ensure the ESMP is well implemented. The EHS Officer will conduct weekly audits of the ESMMP to ensure that its performance is as expected. NAWASCO will share the EHS report with the contractor to enhance compliance.

8.2.6. County Government of Nanyuki

The relevant departmental officers in Nanyuki County will provide advisory and institutional monitoring services according to existing guidelines and policies e.g. water quality monitoring by WRA and Department of Water.

Table 1 : ESMMP for Kilimo Teachers Pipeline Water Supply Project

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
PRE-CONSTRUCTION PHASE						
Increase in traffic flow	Materials haulage will increase flow of heavy trucks on the main roads to the project area.	Plan vehicle routes to target low traffic hours Improve visibility of personnel through their use of high visibility Contractor shall provide temporary road signages Establish and clearly mark entry and exit	**Contractor**	**Random checks by NAWASCO on adherence to speed limit Road signanges**	**No accidents on the project site**	**Ksh 100,000**

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		points.				
Economic Displacement/Impacts on livelihood activities	The proposed project will have minimal interference with the community livelihood base. Only 10 temporary structure were found to be located along the road reserve.	-Ksh 98320 should be set aside by NAWASCO for the disrupted livelihoods, -The affected owners of the structures have been consulted and signed consent forms that they will allow the excavation works to commence but temporary	**NAWASCO Contractor**	**Fairness to the PAPs**	-PAP Assets register -Evidence of money given for livelihoods restoration -Signatures and Identity numbers of the persons occupying the road reserves	98320 to cater for economic displacement Capacity building the PAPs to use the funds given to restore their disturbed

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		bridges will be erected to avoid a lot of disruption to the businesses.				sources of livelihoods Construction of temporary bridges to avoid a lot of disruption to the activities in the 10 temporary structures.

CONSTRUCTION PHASE						

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
Interference with physical settings and minimal disturbance/inconvenience to the community during excavation.	-Soil and topography disturbance during trenching and laying of pipes among others -Staging areas for drilling equipment can further impact the physical landscape	-The design has catered for drainage -The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations; -Restoration shall be undertaken to ensure that the original setting is as much as possible retained.	-Contractor NAWASCO	Back filling and leveling of the trenched areas	Minimal landscape changes	250,000 For landscaping the area along the pipelines and fixing stone barriers where the area is prone to erosion.

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
Noise Pollution	Generated from machines that will be used during excavation of pipes and also moving the materials.	-Install portable barriers to shield compressors and other small stationary equipment -Use of quiet equipment (i.e. equipment designed with noise control elements); -Construct mainly during the day;	Contractor NAWASCO	Noise pollution is within acceptable limits	Minimal noise pollution	100,000 For hiring portable noise barriers, and buying noise PPEs

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		-Maintain noise levels during daytime of maximum 55 dBA in residential and educational areas and 70 dBA in industrial/commercial areas -Observe blasting protocols e.g., use of barricades, notifications etc.				
			NAWASCO			

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		-The Contractor shall provide, free of charge, all employees with personal protective equipment				
Gender Based Violence and Sexual Exploitation and Abuse	Influx of migrant workers may lead to incidences of sexual exploitation while access of money for both gender may cause GBV in families	All workers should attend a mandatory sensitization meeting on code of conduct and sign the code of conduct. Awareness creation and community outreach to educate locals about their rights and available reporting mechanisms	NAWASCO Contractor	-Sensitization meeting on code of conduct held -Evidence of awareness creation to locals e.g. materials on the site	Zero reports of sexual abuse & exploitation	20,000 (meeting venue)

Child Labour	Children may directly or indirectly be recruited in the project to ferry materials or even be left at home addressing the chores the parents do as the parents work in the project.	The contractor should adhere to the labour laws; The client should conduct regular inspections to ensure no children are working on-site. Using law enforcement agencies to monitor and apprehend those who contravene the laws.	NAWASCO	-Employment policy developed	No child is engaged in the project works either directly or indirectly	Ksh 20,000 nspection/ monitoring fee

Conflicts over water access and management	Lack of fairness in water distribution Water rationing	Having a community driven Water Resources Users Associations committee Participatory decision-making involving all stakeholders benefiting from the borehole water.	NAWASCO WRA	-WRUA or Water Committee established	-Zero conflicts on water distribution	20,000 (establishment of water committee)
Site Safety, Security, and Health arrangements	The nature of the project brings into fore many safety, security and health issues. These range from accidental falls in the well, injuries	-The contractor shall provide a detailed safety, security and health plan for the project; -The project participants shall guarantee security of all the personnel	Contractor NAWASCO	Drafting meetings and Approved SSHP	Safety and secure sites	100,000 For safety PPEs, and hiring security personnel and first aid kits

	from construction equipment or materials, poor hygiene etc.	working in the project; -Barriers shall be erected to prevent unauthorized access to the project sites				
		-Security personnel shall be deployed to secure the safety of the workers and property against vandals;				
		-The Contractor shall have his workers appropriately trained on safety and health matters				

		-Any accident, incident or hazardous situation should be reported immediately it occurs or identified;				

Worker's welfare (hygiene and sanitation)	Welfare of the workers is crucial for a successful project. Both legal and moral standards require that workers are provided with adequate facilities that will guarantee safety and health. The ACT (OSHA, 2007) obligates the employer to provide essentials facilities for sanitation water, accommodation	-The Contractor shall abide by the requirements under OSHA, 2007 in regard to the safety, health and welfare of the workers -The contractors shall provide, free of charge, appropriate PPEs -The Contractor shall provide clean portable drinking water for the workers -The Contractor shall provide first-aid services	The Contractor	Visual site inspections, audits and training records	Safe and health working environment	100,000 (portable toilets to be stationed in different points of the pipeline, drinking water and PPEs)

	for clothing, portable water supply, first aid facilities etc. Conversely, moral standards require that 'duty of care' be upheld in working situations to prevent injurious conditions.	sanitation facilities for both sex; -The Contractor shall communicate and implement the contents of the EHS policy of the Company to the employees -The Contractor shall make available emergency services at the site/ camp; -The Contractor shall retain a well trained				

		and experienced EHS officer at the site -The Contractor shall retain trained staff on Occupational safety and health as per the DOSHS curriculum, at the site		Freq: Continuous		
Effects on flora (plants/vegetation)	Kilimo teachers project area is located about 2.5KM west of Nanyuki town and the area is largely residential with residential houses and storeyed	-The Contractor and other project participants must ensure minimal or no disturbance to natural vegetation -Where there is need to cut any mature tree, the contractor should obtain a	The Contractor	site visits reports	Restoration activities implemented	200,000 for tree nurseries establishment, landscaping and planting trees along the project

	commercial buildings Clearing of vegetation of conservation importance will be minimal because the area lies on a road reserve where the main vegetation is grass and herbaceous weeds and a few	permit from the department of environment in the county -A compensatory conservation regime shall be established to allow for revegetation. -The project will make provision for tree planting within the site restoration activity				area; sensitisation campaigns on conservation status and way forward.

	scattered trees mainly exotic species.		NAWASCO KFS	Freq: continuous		
Water Quality	The selected sites are not located near waterways hence there is minimal impact on surface water. In the case of	-Locate storage areas and compounds away from the well site -Designate an equipment servicing	The Contractor NAWASCO Department of water- Laikipia County	Water quality assessment reports	Zero contamination	130,000 p.a (Water quality testing and waste collection)

	ground water, there is a probability of water pollution during the drilling process. This may be caused by fuel leakages from equipment or vehicles and inappropriate disposal of wastes.	location away from the proposed site -Appropriate storage of fuel and materials on site -The contractor should engage a licensed waste collector to manage the sites -Undertake water quality monitoring after construction to establish any contaminants in the water				

Vulnerable and marginalized groups	If not managed properly the impacts of construction may create a disproportionately heavy burden on vulnerable and marginal groups such as persons living with disability who may have challenges with blocked access routes, chronically ill persons who be	-Create awareness to the community on the proposed project works to increase preparedness & readiness -Construction materials and debris should not be stored along access routes -Construction vehicles should adhere to recommended speed limits in the sensitive zones	NAWASCO	Stakeholder Engagement Feedback Mechanism Allocation Mechanisms		30,000

	affected significantly by dust emissions, school going children who are at risk of accidents and falls due to ongoing works, the elderly who may experience inconveniences from blocked routes and noise from machines. Vulnerable people may be	-The contractor should have a watering schedule along the access road and on site to minimize dust emissions Implement pro poor water supply program to increase water access among the marginally poor groups in Nanyuki. -The contractor should engage the host community to				

	sidelined during water provision.	establish suitable Corporate Social Responsibility project that will serve the interest of all particularly the marginal groups				
Project Related Conflicts	There may be issues that may arise during project construction that need attention. This may range from employment issues, division of	-The project shall have in place a conflict/issues management strategy including engaging an EHS expert who will manage the project related conflicts	NAWASCO Contractor	Zero cases of conflicts Contactor's grievances management policy - Complete and accurate documentation of all	EHS expert engaged to handle conflicts Grievances & Redress record book provided	40,000 (EHS, grievances book , committee meetings)

	supply, project activities, duration of the construction period, engagement of host community etc.	-All matters or issues that may arise during construction shall be documented and presented to the relevant persons- NAWASCO, Contractor, Administration Officers -Sensitive matters beyond control of the relevant persons or institutions shall be referred to the court of law.		construction-related issues. - Documentation and tracking of court cases. - Number of unskilled labor positions filled by locals.	Evidence of how grievances are addressed	

		-The Contractor shall ensure that locals are given first priority during recruitment of workers. Unskilled labour opportunities will be given to the locals -In specialized tasks, the Contractor shall ensure that apprentices are from the local community to allow for skills transfers The contractor shall hold periodic				

		meetings with community representatives and local administration to communicate the project plan, design and progress.				
Politics and Political Goodwill	Intense and negative political influence is a recipe to collapse of many projects. Indulgence in political insinuations may lead to postpone or delay to project	-The project will provide for extensive public participation including the political class -The community shall be sensitized on negative political influence on projects implementation	-NAWASCO -County Government	Number of community sensitization meetings held prior to the project -Number of Engagements with Politicians	Encouraging Positive Political Engagement	40,000 (Meeting venues and water)

	completion and implementation.	-The politicians shall be encouraged to desist from negative politics for the sake of the community economic development				
HIV/AIDs and STIs and Alcohol or Substance Abuse	The scourge still stands a national disaster. Workers, especially during end months are prone to indulgence in unprotected sex and alcohol.	-Establish clear, accessible channels for workers to report grievances related to sexual harassment during the project period. -During evaluation of the EHS policy of the Contractor,	The Contractor,	Visual surveys, records and sensitisation materials Grievances redresss policy - Contractor's policy on Sexual	Low or zero HIV/Aids prevalence and sober and productive workforce	30,000

		HIV/AIDs policy element shall be expressly provided and written -The policy shall be sufficiently communicated to the workers during the safety talks -Posters, notices and other forms of awareness creation shall be used to sensitize workers on HIV/AIDS -Education and sensitization		Harassment & Gender based violence		

		-Alcohol and substance abuse shall be totally discouraged				
Operational Phase						
Vandalism and theft of infrastructure	Water utilities often experience theft from residents especially when the system is not functional/no water flow. These activities can affect the delivery and management of	-The implementing agency to ensure good relationship with the local community through continuous engagement -Foster household ownership of the infrastructure through payment of water by households	NAWASCO	Zero cases reported	Infrastructure is secured	50,000p.a(Meetings)

	the installed system, which results to limited access in the town. They ranging from destroying the theft of pipes, fittings, and water through bypassing meters and tempering with connections.	-Enforce law against reported cases of vandalism				

Water Quality	Water contamination during reticulation	-Provide for periodic water quality monitoring at strategic points including the source, and along the distribution lines. -Implement a regular monitoring program to assess water quality parameters such as pH, turbidity, total dissolved solids (TDS), microbial contamination (e.g., coliform bacteria), and chemical contaminants (e.g.,	NAWASCO	Periodic water quality monitoring	Water quality is within recommended level	300,000 p.a (Meetings and water testing)

		nitrates, heavy metals) -Educate local communities on the importance of water quality protection, proper sanitation practices, and the potential sources of contamination that could impact their water quality. -Develop an emergency response plan to address sudden water quality issues or contamination				

		incidents including: protocols for water testing, notification of stakeholders, and remediation actions.				
Wastage of Water	Increased water provision may lead to wastage of the scarce resource among beneficiaries. The system could also present inefficiencies that	-The piping material should be resistance to abrasions from external elements to prevent leakages -Establish a monitoring system to allow for prompt	NAWASCO	Records on water loss/usage Material Durability Ratings -Leakage Incidents	Reduced water loss	100,000 p.a

	lead to water loss in the course of distribution. Stakeholders noted that the current system has high levels of unaccounted for water.	detection of leakages and repairs -Create awareness among project beneficiaries on the need to use water judiciously. Build the capacity of the water utility to continuously improve the efficiency of the water supply system including reduction of non-accounted water, installation of efficient technologies		-Water Usage Trends -Training Sessions		

Vulnerable and marginalized groups	Over abstraction of water from the river may impact water availability for vulnerable communities and ecosystems dependent on the river flow. diseases.	-Involve vulnerable groups in all stages of pipe upgrading and management to ensure their needs and concerns are addressed. -Ensure equitable access to the pipe water by implementing transparent allocation mechanisms and considering the needs of vulnerable	NAWASCO	-Stakeholder Engagement - Feedback Mechanism - Allocation Mechanisms	Ensure equitable and sustainable access to water for vulnerable and marginalized groups	50000

		groups in water distribution plans. -Implement pro poor water supply programmes to increase water access among the marginally poor groups in Nanyuki town. -Implement sustainable groundwater management practices to prevent over-extraction and ensure the long-term				

		availability of water resources. -Regularly monitor the impact of the piped water on vulnerable groups and adjust management practices accordingly to address emerging issues.				
Decommissioning Phase						
End of project strategy	The project shall bear detrimental impacts if necessary measures are put	-The Project shall subject the project to an abandonment environmental and social impact assessment or risk	NAWASCO	Decommission strategy/Plan Freq: End of Project	Environmental protection	TBD

	in place to prevent environmental hazards and risks resulting from upgrading water pipes.	management in the event of closure of the project.				
		-The process shall involve all the concerned parties				
		-The legislations and best environmental practices prevailing then shall apply.				

CHAPTER 9. CONCLUSIONS AND RECOMMENDATIONS

9.1. Conclusions

The proposed project aims to establish a sustainable water supply system through a systematic process. Once permits and approvals are secured, construction activities such as trenching and laying of the pipes will commence. Once, the old pipes are dug out, they can be kept for assessment onto whether they can be converted to other uses or whether there are some pieces that can be kept for reuse.

Water quality testing in accredited laboratories will be done to ensure compliance with consumption standards before starting the operation of water distribution to the community by NAWASCO. The project also evaluates alternatives including a no-project scenario, highlighting that without intervention, NAWASCO would continue facing irregular water supply and high operational costs due to electricity bills. Existing infrastructure issues like vandalism and low storage capacity would persist, exacerbating water shortages and impacting health, sanitation, and economic growth. Furthermore, without the project, local skills would be underutilized, and risks of water-related conflicts would increase, hindering overall development and service distribution.

The project's proposed sites were selected based on geological suitability, accessibility, environmental impact, and future land use, offer a sustainable solution. The project aims to ensure reliable water supply, mitigate environmental impacts, and enhance water security . The construction phase is expected to provide local economic benefits and job opportunities but requires measures to mitigate environmental risks and community conflicts. During operations, benefits include regular water supply, reduced waterborne diseases, contingent upon strict water quality monitoring and sustainable management practices.

Along the pipe lines there were 10 temporary structures erected on the road reserve. The owners of the structures were engaged and they agreed to the fact that they have encroached on a road reserve , the location of the Kiosks were recorded and GPS coordinates taken. The names and the phone numbers of the

kiosk owners have been provided. During the meetings, NAWASCO committed to minimally affect their livelihoods through construction of temporary access bridges and trenching and back filling those sections very fast.

9.2 Recommendations

The recommendation of this study is that the proposed project be allowed to proceed on strict condition that the environmental management plan is implemented and follow-up is made to ensure compliance as may be directed by NEMA. Recommendations for the prevention and mitigation of adverse impacts are as follows:

i. Environmental and Social Management Plan should be communicated to all the responsible actors including Contractor, NAWASCO
ii. The contractor should develop a Construction Phase-ESMP for the proposed project
iii. The proponent should establish an environmental and social unit to oversee the implementation of the Environmental and Social Management Plan
iv. The proponent should institute a periodic monitoring plan to ensure regular reporting on environmental and social indicators
v. The proponent should document all environmental and social incidences occurring during project construction and operation

10 REFERENCES

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9.2. Bill of Quantities for Kilimo Rehabilitation project

KILIMO TEACHER V WATER PROJECT					
	BILL no 1: Distribution lines				
Item	Description	Unit	Qty	Rate	Amount
1.1	EARTHWORKS AND PIPEWORK				
1.1.1	Excavate, backfilll and compact pipeline trench, with socket and spigot joints depth not exceeding 0.75m	m^3	10,018	250	2,504,531
	SUBTOTAL				2,504,531
1.2	PIPEWORK- PIPES				
	Supply, handle, transport, lay and test the following pipes. Rate to include cutting to size, fixing and jointing materials inclusive of sockets, mechanical joints, or rubber rings where applicable.				
1.2.1	90mm HDPE PIPE PN 12.5	m	3,165	690	2,183,850
1.2.2	63mm HDPE PIPE PN 12.5	m	10,630	340	3,614,200
1.2.3	50mm HDPE PIPE PN 12.5	m	8,137	215	1,749,455
1.2.4	40 mm HDPE PIPE PN 12.5	m	9,723	142	1,380,666
1.2.5	20 mm PPR PIPE PN 16	m	13,808	63	869,904
	SUBTOTAL				8,928,171

1.3	PIPEWORK- FITTINGS				
	Saddle clamp HDPE PN 12.5 110mm x 90mm	no	3	2,000	6,000
1.3.1	Saddle clamp HDPE PN 12.5 90mm x 63mm	no	4	1,500	6,000
1.3.2	Saddle clamp HDPE PN 12.5 90mm x 50mm	no	2	1,500	3,000
1.3.3	Saddle clamp HDPE PN 12.5 90mm x 40mm	no	15	1,500	22,500
1.3.4	Saddle clamp HDPE PN 12.5 63mm x 50mm	no	4	600	2,400
1.3.5	Saddle clamp HDPE PN 12.5 63mm x 40mm	no	10	600	6,000
1.3.7	PN12.5 HDPE Equal TEE 63mm	no	3	2,500	7,500
1.3.8	PN12.5 HDPE Equal TEE 50mm	no	6	1,336	8,016
1.3.9	PN12.5 HDPE Equal TEE 40mm	no	15	1,072	16,080
1.3.10	Hexagonal Nipple Male GI 63mm	no	4	185	740
1.3.11	Hexagonal Nipple Male GI 50mm	no	6	140	840
1.3.12	Hexagonal Nipple Male GI 40mm	no	25	125	3,125
1.3.13	Hexagonal Nipple Male GI 20mm	no	1,726	38	65,588

1.3.13	Peglar Gatevalve GI 90mm	no	4	18,500	74,000
1.3.14	Peglar Gatevalve GI 63mm	no	7	7,000	49,000
1.3.15	Peglar Gatevalve GI 50mm	no	10	3,900	39,000
1.3.16	Peglar Gatevalve GI 40mm	no	40	2,500	100,000
1.3.17	Peglar Gatevalve GI 20mm	no	1,726	1,000	1,726,000
1.3.17	PN 12.5 HDPE Male Adaptor 90mm	no	4	2,125	8,500
1.3.18	PN 12.5 HDPE Male Adaptor 63mm	no	7	893	6,251
1.3.19	PN 12.5 HDPE Male Adaptor 50mm	no	10	581	5,810
1.3.20	PN 12.5 HDPE Male Adaptor 40mm	no	40	447	17,880
1.3.21	PN 16 PPR Male Adaptor 20mm	no	1,726	40	69,040
1.3.21	PN 12.5 HDPE Straight Connectors 90mm	no	32	3,000	96,000
1.3.22	PN 12.5 HDPE Straight Connectors 63mm	no	71	1,300	92,300
1.3.23	PN 12.5 HDPE Straight Connectors 50mm	no	71	900	63,900
1.3.24	PN 12.5 HDPE Straight Connectors 40mm	no	93	670	62,310
1.3.25	PN12.5 HDPE End Cap 90mm	no	4	4,732	18,928

1.3.26	PN12.5 HDPE End Cap 63mm	no	10	2,935	29,350
1.3.27	PN12.5 HDPE End Cap 50mm	no	9	1,100	9,900
1.3.28	PN12.5 HDPE End Cap 40mm	no	44	940	41,360
1.4	**WATER METERS AND AIR VALVES**				
	MultiJet bulk cold water meters(Brass Material). Meters to meet WASPA Technical guidelines. Minimum R 200				
1.4.2	DN90mm	no	3	20,000	60,000
1.4.3	DN63mm	no	6	10,250	61,500
1.4.5	Double orifice with 50 mm opening on OD 90 mm pipeline	no	3	6,900	20,700
	SUBTOTAL				**2,793,518**
1.5	**Chambers AND PIPE WORK ANCILLARIES**				
1.5.1	provide all materials and construct masonry chambers of inside measurements 1200mm x 1200mm (depth ranges 0.9-1.2m) with lockable copolymer heavy duty covers for all Gate valves and air valves		8	16,500	132,000

1.5.2	Supply and installation of valve indicator post at each chamber and surface box location. Indicator shall be pre - cast concrete grade inscribed with ("WM" "SV","GV","WO") respectively.	no	542	1,200	650,400
	SUBTOTAL				**782,400**
	TOTAL				**15,008,620**

9.3. Meeting Attendance Lists

WaterFund
Financing the Water Sector

NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

PROGRAMME - 13TH JUNE 2024

Time	Activities	Facilitator
9.30 - 9.40 a.m.	Prayers, Introduction and opening remarks	Area Chief
9.40 - 10.25 a.m.	• Sensitization on NAWASCO Water and Sanitation Services • Discuss upgrading of Kilimo and Teachers	NAWASCO
10.25 - 11.30 a.m.	• Identify any risks and mitigation measures during project construction phase • Way forward	WSTF ESIA Consultant
11.30 - 12.00 p.m.	Questions and Answers session	NAWASCO/WSTF Consultant
12.00 p.m.	Closing prayers	Ward Administrator

WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED NANYUKI WATER & SEWERAGE COMPANY INFRASTRUCTURE UPGRADE

KEY INFORMANT INTERVIEW

Respondent ONESMUS KYATHA, MBS	Organization : INTERIOR Designation: COUNTY COMMISSIONER
Project Awareness	Aware
Anticipated Positive Impacts	- Secure Reliable Supply - Most affordable grade - Time saving - Pasture - Economic - Education - Economic empowerment.
Anticipated Negative Impacts	- Table water levels -
Proposed Mitigation Measures	- Friendly - Cheap to learn - water harvesting. - Construction of dams - Tree planting.

SIGNATURE ..... COUNTY COMMISSIONER LAIKIPIA DATE 14/6/2024

STAMP

NAWASCO Officers Brief.

WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED ISIOLO WATER & SEWERAGE COMPANY INFRASTUCTURE UPGRADE (BOREHOLE DRILLING & SOLARIZATION)

KEY INFORMANT INTERVIEW

Respondent	**Organization :** Nanyuki Water. **Designation:** Monitoring & Evaluation
Project Awareness	- Community meeting will be held for sensitization the community have been complaining about water rationing - public address system has been used to invite people for the meeting
Anticipated Positive Impacts	- Better water provision - minimize water losses/ non revenue - Increase water flow - Decreased operation and maintanance costs - provision of safe clean water - Decreased waterborne diseases - Replacement of dilapidated pipes
Anticipated Negative Impacts	- slight vegetation disturbances - water flow interferance - increased traffic. - Replacement of dilapidated pipes
Proposed Mitigation Measures	- creation of awareness. - Revegetation of areas where there is clearing - water flow closure should be for very short period

SIGNATURE ..... **DATE** .....

STAMP

NANYUKI WATER & SANITATION COMPANY
MERU NANYUKI ROAD
05 JUN 2024
Tel: 062 31351, Mob: 0738 825 940
0708 514 075
P.O. Box 995, NANYUKI

9.5. Appendix Minutes of Baraza

MINUTES OF BARAZA ON ENVIROMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED UPGRADE AND REALIGNMENT OF DN20 TO DN90, 45KM KILIMO - TEACHER'S PIPELINE AT KILIMO ON 13/6/2024 AT 11AM.

PRESENT :ATTENDANCE (ATTACHED SIGN LIST)

AGENDA

1. Introduction
2. Brief of the proposed project from Nanyuki Water & Sanitation Company
3. Project Concerns & Recommendations by the beneficiaries and host community
4. A.O.B

PRELIMINARIES

The meeting started at 11.00am with a word of prayer from Miriam Wangari. Jane Kagotho, a Nyumba Kumi elder welcomed everyone to the meeting and called on the community members to share their views so as to ensure that the project will have optimal value to the community.

MIN 1. INTRODUCTION

Introductions were done by representative of the various groups that were in attendance. The groups included:

Nanyuki Water & Sanitation Company team

- ✓ Nura Bonaya- The Finance Manager
- ✓ Catherine Mwenda-Internal Auditor
- ✓ Liban Guracha-Assistant Technical Manager

Consultant Team

- ✓ Purity Muthoni
- ✓ Eunice Mwaria

Community Members

- ✓ Women/men/ youth
- ✓ Community based organization members

MIN 2: BRIEF OF THE PROPOSED PROJECT FROM NANYUKI WATER & SANITATION COMPANY

The Nanyuki Water & Sanitation Company representative gave a brief of the proposed project. He highlighted the following:

i. The proposed project would entail upgrading of the existing pipeline to ensure increased water supply in the area
ii. The project was initiated against a background of water shortages, water intermittency & population increase
iii. The project will entail excavation of pipeline, pipe laying & back filling, metering and operation.
iv. The anticipated benefits include: increased water supply in the area and reduced intermittence.
v. The company will endeavor to improve its operations to enhance customer satisfaction. Towards this, additional field officers have been deployed to address technical issues.

MIN 3: PROJECT CONCERNS & RECOMMENDATIONS BY THE BENEFICIARIES AND HOST COMMUNITY

The Consultant provided a brief of the assignment. It is an environment and social impact assessment. The specific activity is public consultation where the host community is informed about the proposed project against which they raise the concerns, indicted expected benefits, anticipated impacts and recommendations for enhancing the project.

The community members were invited to raise their concerns and give their views. The following issues were noted:

a) Joseph was concern about the water charges. He indicated that this infrastructure upgrade should come with improved efficiency in billing. There is a feeling that the current system doesn't reflect the actual amount of water used -the bills are usually very high while most of the times the taps are dry.
b) Godfrey Njagi observed that the increased water supply will further aggravate the sewer problem that residents are facing and urged the Company to upgrade the existing sewer system. There is also need to have regular monitoring of the sewer line to address the challenge of sewer overflows

c) NAWASCO should have regular engagements with the community so that they can address issues as they arise. The current state of the area -Kilimo is deplorable due to sewer overflows and damaged pipes
d) The community should be given priority in employment during the construction phase since there are many jobless youths in the area
e) The community requested to have the open pipes that were damaged by the heavy rains to be closed for safety purposes.
f) Francis Wainaina observed that pipe laying should be done to considerable depth to to ensure they are not exposed to damages and breakages
g) Proper installation should be done to mitigate against vandalism of pipes and meters
h) The project is welcome since the area has experienced rapid population which has led to water shortages
i) The Company should also invest in drainage systems and direct rain water into boreholes to mitigate flooding and also lower the salinity levels of borehole water.
j) The community urged the Company to assure them of regular water supply when the project commences and also requested for the old piping to be changed.
k) For the people who have constructed Kiosks along the pipeline the consultant informed them that a survey around the area would be done to assess how many kiosks were on the road reserve and discuss with the affected persons how they can be compensated for the disturbance they will experience during the construction works.
l) A meeting with the persons will be scheduled for 17th June 2024 which will also be the project cut off date.

The consultant concluded this session by highlighting the key issues that had been raised. Further, she commended the community for their active participation in this public participation forum.

MIN 4. A.O.B

The County Executive Committee Member -Water & Environment was invited to make some remarks. The CECM indicated that she was on her way to inspect other projects hence the unannounced attendance. She applauded the community in Kilimo for attending the baraza in large numbers. She further mentioned that she will accord this project her support.

There been no other business the meeting ended with a word of prayer from Mr. Kirimi

MINUTES SIGNED BY:

Client ---------- Date: 13/6/2024

Consultant ---------- Date -------13/6/2024----------

WaterFund
Financing the Water Sector

MEETING BETWEEN WSTF ESIA CONSULTANT AND NAWASCO ON CLSG II PROJECT

DATE: 13TH JUNE, 2024
TIME: 9.00 A.M.

VENUE: NAWASCO BOARDROOM

ATTENDANCE LIST

No.	Name	Organization & Position	Phone No.	Email	Signature
1.	Rebecca Karanja (Dr)	Water Sector IF Consultant	0722618449	rebeccakaranja3@gmail.com	
2	DR. PURITY MUTHONI	"	0725896329	Puritymuthoni2023@gmail.com	
3.	Dr. Florence Ngari	(Biodiversity)	0700406016	ngariflo@gmail.com	
4.	EUNICE KIBARIA	Water sector	0725914389	Kiwanaeunice@gmail.com	
5.	LYDIAH KAIRU	NAWASCO C.R.O	0728106965	lydiamichael12@gmail.	
6.	Joseph Muthoni	NAWASCO D/M	0722978691	Mamamuthoni@gmail.com	
7.	Martha Wambui	NAWASCO - M&E	0726966916	wambui@gmail.com	
8.					
9.					
10.					
12.					

9.6. Evidence of Consultations

WaterFund
Financing the Water Sector

NAIROBI WATER AND SANITATION COMPANY NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

DATE: 13TH JUNE, 2024
TIME: 9.30 A.M. – 12.00 NOON

VENUE: KILIMO CENTRE

ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	GODFREY KAMANDA	BLUE GUM	0722641115	3282985	
2	Zainabu Haji Dhem		0745546510	0053660	
3.	HAPPI NATO	RUAI	0710408868	0630954	
4.	Daniel Gakunge	Kilimo	0721694946	8762504	
5.	Lloyd Ombati	Kilimo	0716037881	25776686	
6.	Daniel Kariri	Teachers(Ruai)	0725127870	23770443	
7.	JOHN KANYOI	Ruai	0726211630	4342710	
8.	NELSON GATHINJI	Kilimo	0710824619	4347317	
9.	Jane Wakhu	Kilimo	0722479700	10796887	
10.	Fabiha Wanja	Kilimo	0720275034	3467707	
11.	SAMUEL Ndungu	Teachers(Ruai)	0723239530	9934616	
12.	Wilson Mwamiti	Kilimo	0721816517	3552056	

WaterFund
Financing the Water Sector

NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

DATE: 13TH JUNE, 2024
TIME: 9.30 A.M. – 12.00 NOON

VENUE: KILIMO CENTRE

ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	Philip Tibegika	Kilimo	0750414745	21358817	
2	JUDY Sananda LETURA	KILIMO	0725211712	27061262	
3.	Kennedy Omondi Otieno	"	0721 758 062	11895460	
4.	JENIFER NJERI	KILIMO	0721260335	23939517	Njeri
5.	FRANCISCA MURIUKI	KILIMO	0726396145	04627620	
6.	IRENE WAINAINA	KILIMO	0759142610	70388	
7.	Irungu Kamungunds	Bluegum	0720670673	8653314	
8.	PETER Ndegwa Mwaura	BLUEGUM	0722-555882	11266029	
9.	RISCO NJUGUNA GATHURA	TEACHERS	0726922915	0891066	
10.	MIRIAM M. KABUTU	KILIMO	0726781034	55099	
11.	JACKLINE MUKIITE	KILIMO	0720 138 572	22015719	
12.	STEPHEN MURIITHI	BLUEGUM	0714 261 539	8207745	

WaterFund
Financing the Water Sector

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

DATE: 13TH JUNE, 2024
TIME: 9.30 A.M. – 12.00 NOON

VENUE: KILIMO CENTRE

ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	SAMUEL KIUMBIA MWANGI	KILIMO-MALINDI	0716615787 samuelkiumbia@gmail.com	31094643	
2	JOEL MURITHI MIKWA	KILIMO	0723510566	20075159	
3.	Job K. M'itaru	Kilimo	0721318796	4477588	
4.	John wachira Maweki	KILIMO	0721406259	6398906	
5.	JOYCE NJERI NDEGWA	~~KILIMO~~ MALINDI	0712410226	92406648	
6.	ESTHER MERCY	KILIMO	0721932835	23117906	
7.	LUCY KANJANJA	KILIMO	0720571019		
8.	Florah Mugane	Kilimo	0727710425	8859350	
9.	ATAIL KETTLERE	KILIMO	0721683929	1158757	
10.	JULIUS NYATIGO N.	KILIMO	0721978200	10908219	
11.	CECILIA NGANGA	KILIMO	0717267338	0091157	
12.	Beatrice Kaburu	Kilimo	0721935764	13952884	

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No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	Susan Nyaguthii Macharia	Kilimo	0771306525		
2	Evelyne Kathuro	Kilimo	0712088685	22391903	
3.	DAVID KOMU	KILIMO	0727286771	5960599	
4.	Jane Karuga	Kilimo	0721871932	3211272	
5.	LILIAN LEMAGU	Kilimo	0715043320	24813065	
6.	Dr. Purity Muthoni	WATER FUND CONSULTANT	0725896329	24070617	
7.	EUNICE NDUARIA	Sociologist	0725894329	25[illegible]	
8.	Leah Nyeri	CECM-Water	0723233223	10088429	
9.					
10.					
11.					
12.					

WaterFund
Financing the Water Sector

NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

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ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	James Ngatia Kariuki	Kilimo	0725279171	9668541	
2	[illegible]	[illegible]	0724-[illegible]93	24602806	
3.	Valentine Ngeleso	Kilimo	0723 876112	21969786	
4.	Kennedy MJOZA	Kilimo	0721420831	21843 46	
5.	FRANCIS WAMAIHA	Kilimo	0703276344	0803468	
6.	Simon Wanjohi Macharia	Kilimo	0700339271	9013682	
7.	NICHOLAS KIOMAN	KILIMO	0710142804	0183727	
8.	ASSUNTA GALGITELE	LOWER KILIMO	0713349254	21016465	
9.	MERCY MUGANA	TRS KILIMO	0721464507	13016021	
10.	CHRISTIAN KABUGI	Kilimo	0743321072		
11.	Philip Maina	Kilimo	0758 320145	[illegible]	
12.	Mary Muthoni	Kilimo	0728213223	1992747	

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NAWASCO

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No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	FAIDAH MAKENA	KILIMO	0706134266	33776477	
2	Jacinta Mwangi	Kilimo	0710473209	24164098	
3.	Susan M Muchiri	Kilimo	0724236032	3279850	
4.	Sauda Adhiambo	Kilimo	0721405008	09792?0	
5.	Regina Wawera	Kilimo	0728981931	2361894	
6.	JANE BAGOTHO	KILIMO	0722210123	11418926	
7.	Gladys Gakenia	Kilimo	0727598617	14866741	
8.	Jacklin Senta	Kilimo	0706660193	32850608	
9.	Abdullahi Adan	Kilimo	0722427741	41330301	
10.	CALESIO KIRIMI	KILIMO	0721997792	13754486	
11.	Perpetua Ruoro	Blue Gum	0720466121	0343340	
12.	Kennedy O. Otieno	Kilimo	0721750062	11895460	

WaterFund
Financing the Water Sector

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN KILIMO AND TEACHERS

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ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	MARY NTERI Kanyetha	Kilimo	0713907673	3209066	
2	Loise Ngatia	"	0751108578	13542640	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED INTERVENTIONS FOR ISIOLO NANYUKI AND MANDERA WATER SERVICE PROVIDERS (WSP)

NAME OF THE WSP NANYUKI WATER & SEWERAGE COMPANY

Name	Designation	Tel/ID Number	Signature
Dr Rebecca Karanja	ESIA/ Biodiversity Expert Water Trust Fund	0722601849	
Joseph Irungu Mbiu	T.S.M	0721967137	
James Kirumba	Giso	0708223507	
Martha Wambui	M & E	0726906916	

MINUTES OF MEETINGS HELD WITH THE PERSONS AFFECTED BY THE PROJECT.

MINUTES OF THE PROJECT AFFECTED PERSONS (PAPs) MEETING FOR THE PROPOSED UPGRADE AND REALIGNMENT OF DN20 TO DN90, 45KM KILIMO - TEACHER'S PIPELINE IN NANYUKI TOWN, LAIKIPIA COUNTY

PRESENT

S/N	Name	Designation
1.	Farad Karanja	PAP
2.	Elizabeth Mwangi	PAP
3.	Juliet Matecho	PAP
4.	Charles Wahome	PAP
5.	Asha Ibrahim	PAP
6.	Keneth Mwenda	PAP
7.	Patrick Mahinda	CHIEF
8.	Jane Kagotho	Village Elder
9.	Joseph Irungu	NAWASCO
10.	Martha Wambui	NAWASCO
11.	Frank Wandia	NAWASCO
12.	Joel Karani	NAWASCO
13.	Purity Muthoni	ESIA Consultant

APOLOGIES

S/N	Name	Designation

1. Contolla Opar PAP
2. Ann Njoki PAP
3. Charity Nduta PAP
4. Lilian Kendi PAP

AGENDA

5. Introduction
6. Brief of the proposed project from Nanyuki Water & Sanitation Company
7. Consultant Brief
8. Project cut off date
9. Project Concerns & Recommendations by the Project Affected Persons
10. A.O.B

MIN 1: PRELIMINARIES

The meeting started at 10:20am with welcome remarks from the area chief. The NAWASCO team leader invited the consultant and PAPs for introduction.

MIN 2: BRIEF OF THE PROPOSED PROJECT FROM NAWASCO

The NAWASCO team leader gave a brief of the project. She informed the Project Affected Persons (PAPs) of the proposed project which would entail upgrading of the Kilimo-Teachers Pipeline. The major project activities will include: excavation along the old pipeline, replacement of the pipeline with a new pipeline, back filling and installation of new meters.

It was noted that a public consultations meeting was held and household interviews conducted to inform the wider community of the proposed project. The PAPs were reminded that the cut off date of the project was 17th June 2024. The community concerns were recorded and considered in the Environment and Social Management Plan. During this public consultation process, it was observed that there were some structures that would be affected in the course of implementing the project. All the structure owners were enumerated and documented as PAPs. Therefore, the objective

of the meeting was to inform the PAPs on the project components, the timelines, the likely impact and the measures that NAWASCO will put in place to mitigate against the likely negative impacts.

MIN 2: BRIEF FROM THE CONSULTANT

The Consultant gave a brief of the on-going ESIA assignment. She noted that during the field visit, it was observed that there were structures constructed over the existing pipeline and as such they would be affected by the project. The PAPs meeting was to offer an opportunity for deliberation on how the interest of each party (NAWASCO and PAPs) will be considered. The consultant indicated that a comprehensive assessment of the level of disruption will be done where the consultant will record the name of the PAP, gender, type and level of vulnerability, business type, cost of disruption and the total cost of disruption.

MIN 3: PROJECT AFFECTED PERSONS CONCERNS & RECOMMENDATIONS

The Consultant invited the PAPs to give their comments, concerns regarding how their concerns will be addressed. The PAPs thanked NAWASCO and the chief for including them in the process. They acknowledged that this is the first time that structure owners in the area have been involved in a project. They appreciated that the project would benefit them as residents in the area and business owners and therefore they were ready to give way for the project to be implemented. They however requested to be informed prior to the project start so that they can make prior arrangement.

NAWASCO indicated that these concerns were well noted and they also noted that they would put in place measures to compensate for the disruptions that will be experienced during the construction phase.

The following will be done:

j) NAWASCO will inform the structure owners about excavation activities in their area ONE week prior to the start of the project upon which they will be required to pave way for excavation and pipe laying.
k) NAWASCO will communicate the project timelines TWO MONTHS prior to the project to enable the structure owners to plan accordingly.
l) NAWASCO will ensure the Project Affected Persons are given priority consideration to provide unskilled labour during excavation, pipe laying and back filling

m) Where possible, NAWASCO will apply manual excavation in the areas where the structures are established to minimize extensive damage to the structures

n) NAWASCO will provide temporary access structures (bridge like structures) where excavation is done in front of a structure to facilitate access and avoid disruption of business activities.

o) The structure owners are responsible for the removal of the structures to pave way for excavation, pipe laying and back filling.

p) NAWASCO informed the community that if their land occupancy was legal or if the they owned the land they occupy, they had a right to ask for compensation;

q) NAWASCO informed them that the project would set some money aside to construct temporary bridges to allow them to access their business premises during construction.

r) The affected persons signed a consent form that they would not interfere with the project .

MIN 4. A.O.B

The PAPs community thanked NAWASCO for convening the meeting. There being no other business the meeting ended at 11.50am with a word of prayer from Jane Kagotho

MINUTES SIGNED BY:

MINUTES SIGNED BY:

NAWASCO ..... Date .....

NANYUKI WATER & SANITATION COMPANY
MERU NANYUKI ROAD
27 NOV 2024
27/11/2024
P. O. Box 995 NANYUKI

CONSULTANT

Date

---------- 27/11/2024

LIST OF ATTENDANCE FOR THE PAPS MEETING

WaterFund

CLSG II PROJECT MEETING WITH PROJECT AFFECTED PERSONS AT KILIMO CENTRE

DATE: 27TH NOVEMBER, 2024

VENUE: KILIMO CENTRE

ATTENDANCE LIST

No.	Name	~~Organization~~ AREA	Phone No. / Email	I.D No.	Signature
1.	FAHMA KAHENDA	KILIMO	07237786 51	32103641	
2	ELIZABETH MWANGI	stadium	0712266837	28337196	
3.	JULIET MATECHO	KILIMO	0740123114	29507264	
4.	Charles Odhiambo	Pefa	0724883387	26999051	
5.	PATRICK MAHINDA	CHIEF	0721245978	[illegible]	
6.	Asha Ibrahim	Pefa	0791421393	0982766	Asha
7.	KENNETH MWENDA	Vision Stage	0713 455 341	30360823	
8.	JANE KAGOTHO	KILIMO	0722210123	11418926	
9.	Joseph Mwangi Naina	NAWASCO	0721969137	21765270	
10.	Martha Wambui	NAWASCO	0726906916	24984058	
11.	Frank Wandia	NAWASCO	0722833600	13233117	
12.	Joel K. Karani	NAWASCO	0798320990	33531740	
13.	PURITY MUTHONI	CONSULTANT-WSTF	0725 896329	24090617	

ESIA EXPERT CERTIFICATE



EAE 23061620

FORM 7 (r.15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/20611

Application Reference No: NEMA/EIA/EL/27771

M/S **REBECCA KARANJA**
(individual or firm) of address
P.O. Box 43844 - 00100 Nairobi

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**

General

registration number **2860**

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

Issued Date: 1/25/2024 Expiry Date: **12/31/2024**

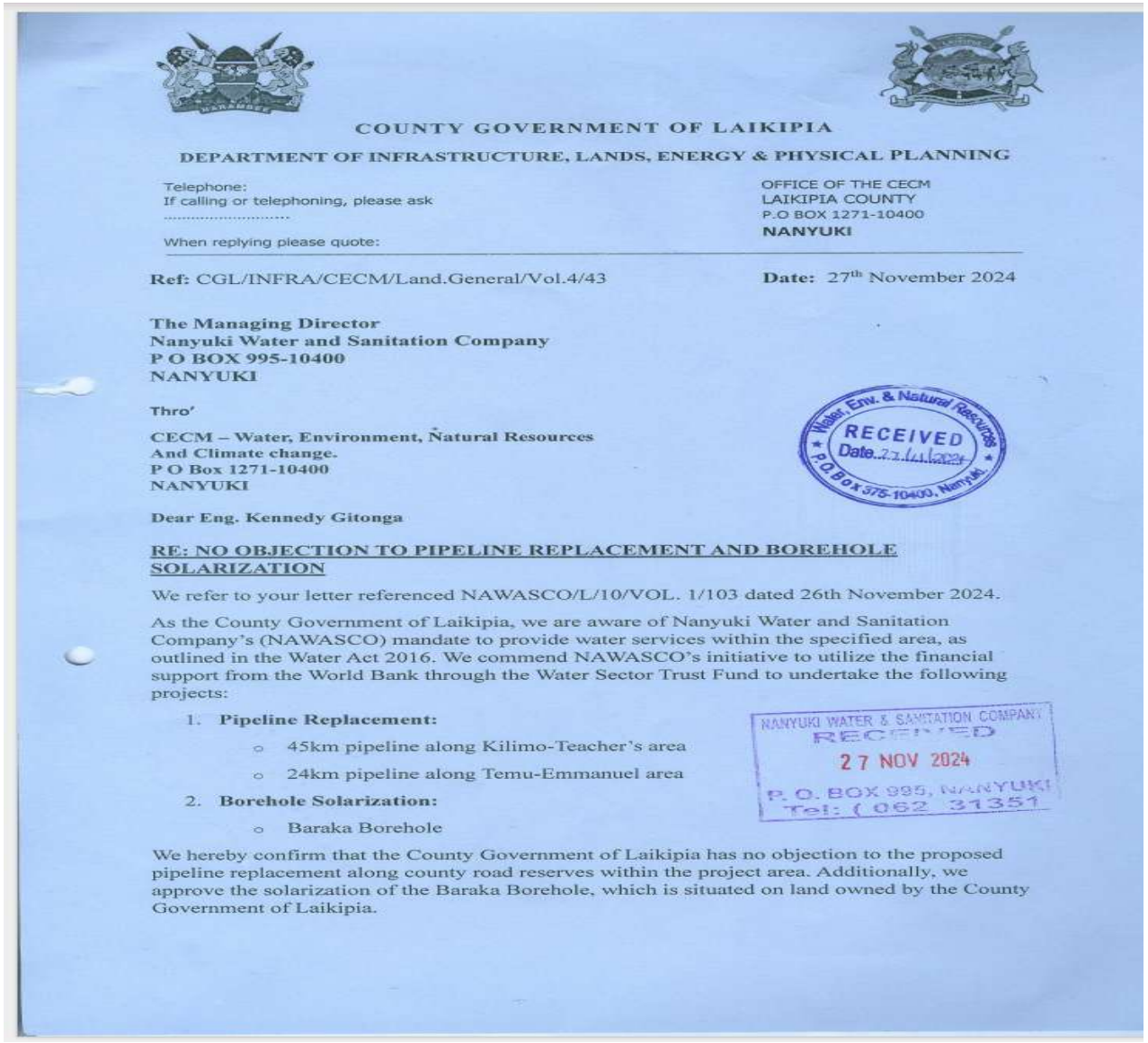
Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

9.8. No Objection letter



COUNTY GOVERNMENT OF LAIKIPIA

DEPARTMENT OF INFRASTRUCTURE, LANDS, ENERGY & PHYSICAL PLANNING

Telephone:
If calling or telephoning, please ask
.....

When replying please quote:

OFFICE OF THE CECM
LAIKIPIA COUNTY
P.O BOX 1271-10400
NANYUKI

Ref: CGL/INFRA/CECM/Land.General/Vol.4/43 **Date:** 27th November 2024

The Managing Director
Nanyuki Water and Sanitation Company
P O BOX 995-10400
NANYUKI

Thro'

CECM – Water, Environment, Natural Resources
And Climate change.
P O Box 1271-10400
NANYUKI

Water, Env. & Natural Resources
RECEIVED
Date 27/11/2024
P.O Box 375-10400, Nanyuki

Dear Eng. Kennedy Gitonga

RE: NO OBJECTION TO PIPELINE REPLACEMENT AND BOREHOLE SOLARIZATION

We refer to your letter referenced NAWASCO/L/10/VOL. 1/103 dated 26th November 2024.

As the County Government of Laikipia, we are aware of Nanyuki Water and Sanitation Company's (NAWASCO) mandate to provide water services within the specified area, as outlined in the Water Act 2016. We commend NAWASCO's initiative to utilize the financial support from the World Bank through the Water Sector Trust Fund to undertake the following projects:

1. **Pipeline Replacement:**
   - 45km pipeline along Kilimo-Teacher's area
   - 24km pipeline along Temu-Emmanuel area
2. **Borehole Solarization:**
   - Baraka Borehole

NANYUKI WATER & SANITATION COMPANY
RECEIVED
27 NOV 2024
P. O. BOX 995, NANYUKI
Tel: (062 31351

We hereby confirm that the County Government of Laikipia has no objection to the proposed pipeline replacement along county road reserves within the project area. Additionally, we approve the solarization of the Baraka Borehole, which is situated on land owned by the County Government of Laikipia.