TEMU AND EMMANUEL REHABILITATION PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED OF TEMU EMMANUEL PIPELINE REHABILITATION INTERVENTIONS BY NANYUKI WATER SERVICE PROVIDERS (WSP)

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



FINAL REPORT

Submitted by

DR REBECCA HN KARANJA

INTERNAL QUALITY CONTROL

Revision	Purpose description	Originated	Checked	Reviewed	Authorized	Date
Rev 1.0	Issue to Client	Rebecca	Purity	Rebecca	RN	7/7/24
Rev 2.0	From the Client	Stella	Rebecca	Rebecca	Purity	29/8/24
Rev 3	WorldBank	Stella	Rebecca	Purity	Rebecca	6/2/25

CERTIFICATION

We hereby certify that the content of this Environmental and Social Impact Assessment Report *for Temu and Emmanuel pipeline rehabilitation* of 24km from existing DN20 to DN90 and installation of 1448 consumer metres 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 Temu and Emmanuel project area is located East of Nanyuki town in a predominantly residential area. The project boarders the Nanyuki city centre and as a result it hosts a large population of people who mainly work in the town. Commercial and residential buildings have grown very fast with an increasing trend of construction multi-dwelling units of residential buildings putting a stretch to the existing infrastructure. Both Temu and Emmanuel area have sewer network hence good water supply is critical for safe waste water management.

The Project involves rehabilitation of Temu and Emmanuel pipeline which covers 24km. The old pipes will be replaced with DN20 to DN90 and 1448 consumer metres will be installed. The project activities will 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.

The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing 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 Policies namely, OP/BP 4.01 (Environmental Assessment); OP/BP 4.04 (Natural Habitats);World Bank OP/BP 4.10 (Indigenous Peoples); OP/BP 4.11 (Physical Cultural Resources); Involuntary Resettlement (OP 4.12);OP/BP 4.36 (Forests) , 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 Amended in 2015; The Environmental Impact Assessment and Audit Regulations, 2003; Water Quality Regulations, 2006*;* The Agriculture Act (Cap 318);Forest Act 2016; Water Act, 2016; and the Public Health Act (Cap 242).

Project Risks and impacts

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

- ✓ Disruption/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. An 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.

Issues to be monitored at operational phase include:

- ✓ Water quality for the piped water
- ✓ Health and Safety.

Project Cost

The Temu and Emmanuel project will be costed at Kshs. 13,543,046 (Thirteen Millions, five hundred and forty three thousands and forty six Kenya shillings).

Public consultations on the project

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 (5)of this report.

Conclusions and Recommendations

The conclusions and recommendations arising thereof are:

1. **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.
2. **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.

3. 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 water allocation and distribution may be controlled through setting of Peace/Grievances /conflict resolution committees. An outline of how the grievance redress has been provided in this report
4. **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.
5. **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.
6. **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.
7. **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.

8. **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.

The project pipelines are along a road reserve that has been recently recarpeted, therefore, consultations with relevant roads authority should be done at all stages of the project. As a result there are no structures along the road and no persons affected by the project. There are no livelihoods that will be disrupted along the pipeline.

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

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 monthly to NAWASCO on ESMP implementation. Monthly audit reports and incident reports especially on grievances should be reported to both the contractor and NAWASCO.

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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-1, 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 to:

- ✓ Upgrade and re-align Temu and Emmanuel pipeline (24Km) of various diameters from DN 20 to DN 90 of HDPE Pipe
- ✓ Replacement of 1,448metres

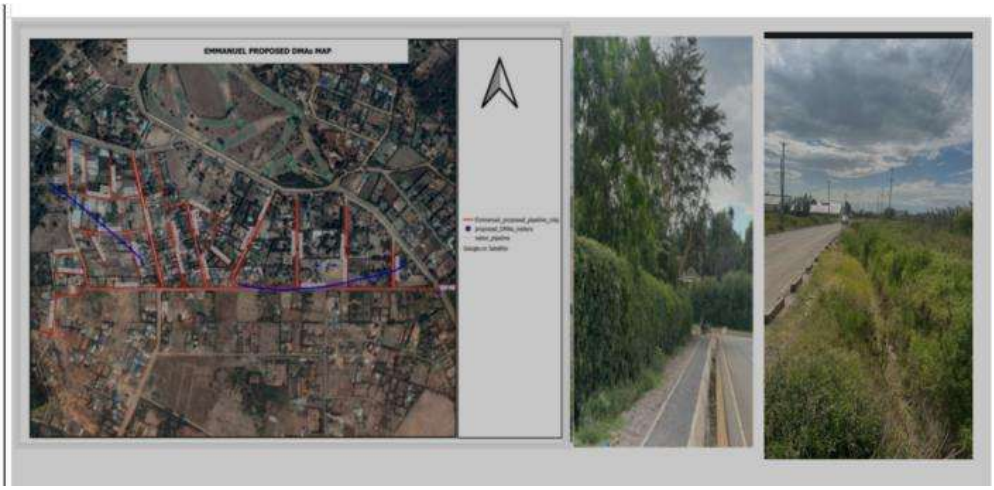


Photo 1 Temu-Emmanuel piping route

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 Temu and Emmanuel project area is located East of Nanyuki town in a predominantly residential area. The project boarders the Nanyuki city center and as a result it hosts a large population of people who mainly work in the town. Commercial and residential buildings have grown very fast with an increasing trend of construction multi-dwelling units of residential buildings putting a stretch to the existing infrastructure. Both Temu and Emmanuel area have sewer network hence good water supply is critical for safe waste water management. The area boarders the Nanyuki River.

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

According to the NAWASCO Terms of Reference (ToR), the project components includes:

- ✓ Upgrade and re-alignment of Temu and Emmanuel pipeline (24Km) of various diameters from DN 20 to DN 90 of HDPE Pipe
- ✓ Replacement of 1,448metres

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;

1.4. 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. During the time of the study, some people from the town environs, were found drawing water from Nanyuki river.



Photo 2 Evidence that the community draw water from the river

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.

1.5. 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 Temu and Emmanuel 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 was done and the project is rated as **Medium risk** project (improving water supply and distribution infrastructure: Upgrading and and re-alignment of Temu and Emmanuel pipeline (24Km) of various diameters from DN 20 to DN 90 of HDPE Pipe and replacement of 1,448 meters.

. ESIA is mandatory for the proposed development as it is highlighted in the Second Schedule of the Environmental Management and Coordination Act. (Part

4a-storage dams, 4b River diversions and water transfer between catchments, Part 8 (d) Pumped-storage schemes).

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 and also the borehole points. 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, 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 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 2002(Revised 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 4.36: Forests - During project development, there should be conservation and sustainable forest management;
- 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 4.10: Indigenous Peoples - This is geared towards ensuring that projects respect the rights and culture of indigenous peoples and provide them with opportunities to benefit from 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: Terrestrial plants were sampled by use of random and meander transect methodology.

Fauna: Large and Small mammals, amphibians and reptiles were visually observed, photographed and identified. Presence of mammals; birds; amphibians; and reptiles was confirmed through:Spoors, droppings;Hairs/feathers;Animal diggings; and local knowledge /Indigenous knowledge

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.

Socio- 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 Temu and Emmanuel area there are 1309 (Temu 838 and Emmanuel 471) 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 69 respondents were reached to through households surveys (Temu 44 and 25 from Emmanuel). Other respondents were reached through chief barazas and through gender disaggregated focus group discussions.

	Summary No of Accounts/ Households	No of Accounts
	Temu and Emmanuel rehabilitation project	1309
	5% of households	65

2.6.1. Study Task 13: Gender Analysis

Task objective: To investigate existing social 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 was entered using SPSS software package for ease of analysis, data were then exported to MS Excel, analyzed and used to prepare compensation matrix.

2.6.4. Study Task 16: Requirements for Public Consultation

The Consultant(s) organized a community meeting in Temu &Emmanuel 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 is therefore required to undergo environmental impact assessment. A Comprehensive Project Report will be developed as opposed to a Full Environmental and Social Impact Study Report

(ii)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.

3.2.3. Occupational Safety and Health Act, 2007

The Occupational Safety and Health Act, 2007 is comprehensive legislation aimed at ensuring safety, health, and welfare in workplaces across its various provisions. Applies to all workplaces where any person is employed, emphasizing safety, health, and welfare for everyone present.

Occupiers (those in control of workplaces) have extensive responsibilities: Ensuring safety and health through safe systems and procedures ,Providing safe equipment, substances, and environments ,Offering necessary information, training, and supervision, Conducting risk assessments and implementing preventive measures ,Stopping dangerous activities promptly and notifying authorities, Registering workplaces and complying with safety regulations and Penalties for non-compliance include fines and potential imprisonment.

Health Provisions (Part VI) Covers cleanliness, ventilation, lighting, and sanitary facilities. Manual Handling (Section 76(4)) Prohibits handling of excessively heavy loads likely to cause injury. Safe access and workplaces (Section 77). Fire prevention (Section 78) and safety measures for dangerous fumes (Section 79) and Procedures for fire safety and evacuation (Sections 81 and 82).

Relevance to the Project : At the start of the project construction, the pipe route and associated material storage areas will become work places. All activities conducted at such places will have to comply with the act. The proponent shall ensure that the provisions under this act are applied appropriately.

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. Waste Management Act (2021)

The Waste management Act 2021 was introduced to provide a comprehensive legal framework for waste management. It focuses on reducing waste generation, increasing recycling rates, and enforcing proper disposal 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. However,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.*

3.2.11. 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. A code of conduct will be signed by all the workers that there will be no sexual harassment. Sensitisation campaigns on ways of prevention of HIV infections will be done and awareness posters and campaign signanges will be pinned in the project site.

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. It was developed to address gender disparities and promote gender equality in all sectors of the country's development. This policy aims to ensure that both men and women have equal access to resources, opportunities, and decision-making processes.

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 Services Boards (WSB)

The Water Service Boards (WSBs) are tasked with efficiently and economically providing water and sewerage services in their respective jurisdictions. The Nanyuki Water and Sewerage Company (NAWASCO) operates under the governance of the Laikipia County government. There are eight catchment boards established under the Water Act of 2016. According to this Act, the Boards 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 Temu-Emmanuel water project is to improve access to clean and safe water for domestic purposes.

3.6.2. 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.

3.6.3. 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.

3.7. 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.

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. The World Commission on Environment and Development

The commission focuses on the environmental aspects related to development and requires all development projects to be sustainable economically, socially and environmentally. The principle of the organization emphasis that development project should have no permanent negative impact on the

biosphere and particularly the ecosystems. It is recommended that the project proponent incorporates mitigation measures to ensure that the project impacts on the ecosystem are reduced.

Relevance: The consultants used participatory methods to involve the target group and concerned stakeholders in order to inform and enlightened them on the likely negative environment and social impacts for them to prepare mitigation measures so as to ensure the proposed project is sustainable throughout its life span.

3.8.4. 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 Temu and Emmanuel rehabilitation 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.

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;
- √ 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.

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 does is not triggered in this project because it is located within the public land and land belonging to the different Water Service Providers , and therefore does not involve involuntary acquisition of land or assets. There *is no economic displacement since the project area had its roads recently recarpeted by county government of Nyeri and the people who may have settled in the road reserves may have been requessted to move.*

OP/BP 4.36 (Forests)

The forest safeguards policy aims to harness forests' potential to alleviate poverty sustainably, integrate them into economic development, and safeguard their crucial environmental services. One of its principles involves early screening for impacts on forest health, quality, and the well-being of forest-dependent communities*. This project does not trigger the safeguard since it does not intersect with any forested areas. However a few herbs and shrubs including Vachellia drepanolobium will be cut.*

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.

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

Flora

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

The vegetation is primarily grassland, bushland, woodland, and dry forest. Riparian forest is scarce.

- Grass species such as *Cenchrus ciliaris* (African foxtail grass) and *Pennisetum mezianum* (Napier grass) are prevalent and important for grazing livestock.

Riparian Vegetation:

Along Nanyuki river and seasonal streams, riparian vegetation thrives, including species such as *Ficus sycomorus* (Sycamore Fig) and *Ficus nataliensis* and various species of palms and shrubs.



Photo 3 Ficus nataliensis along river Nanyuki

Desert and Semi-Desert Vegetation:

- In the more arid parts of Laikipia County, desert vegetation types are found, characterized by drought-resistant shrubs, succulents, and small trees.
- Species like *Balanites aegyptiaca* (Desert Date) and Commiphora species (Myrrh trees) are adapted to survive in harsh desert conditions.

Agroforestry and Cultivated Areas:

- In the residential areas and in agricultural areas, exotic/introduced tree species are cultivated for food, fuel wood, and shade. The main tree species was *Grevillea robusta* and *Eucalyptus saligna.*

Fauna

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.

Aquatic Life

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

Agriculture

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.

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.

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

Poultry: Chicken farming for eggs and meat is common.

4.1.10. Tourism

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.

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 appendices). 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 Temu and Emmanuel within Nanyuki municipality. Data were collected in Temu and Emmanuel.

4.7. BIODATA/ DEMOGRAPHIC CHARACTERISTICS

Most of the respondents sampled during the survey were female accounting for 55% of the interviewees, the males were at 45% . This is not surprising since most males migrate to towns in search of jobs and carry along their wives who are mostly house wives.

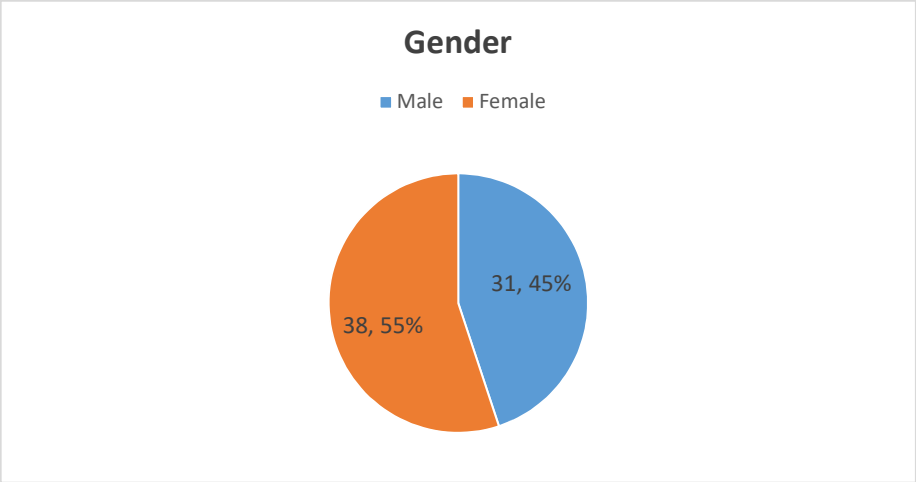


Figure 2 Respondents gender

Respondent's Age as per the Last Birthday.

The highest number of respondents at 30% were between 36 Years to 45 Years followed at 22% by 26 Years to 35 Years and 46 Years to 55 Years at 22% . The other age groups occupied 7.3% for 18 Years to 25 Years, 10% for 56 Years to 65 Years and 6% for above 66 Years. This is because most of the people living in urban areas are the youthful who migrate to towns seeking employment.

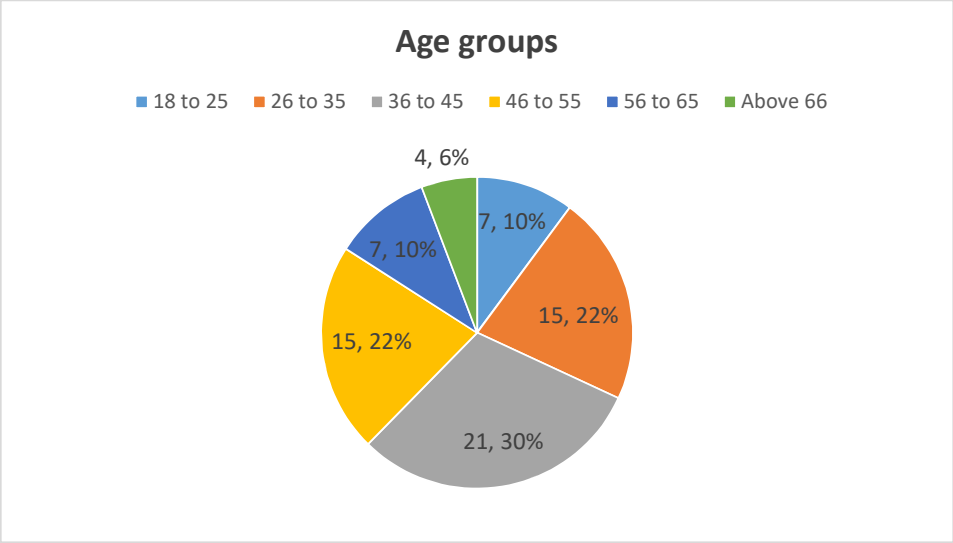


Figure 3 Age of respondents

Household Members

Adults

Most respondents' households (92%) have below 5 adult members and 8% have between 5 to 10.

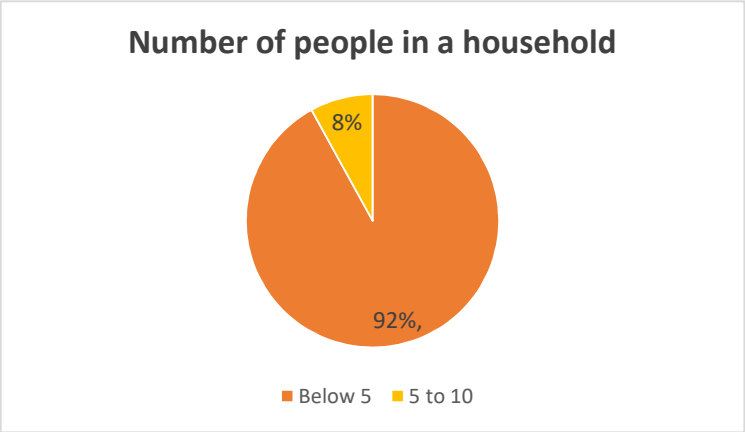


Figure 4 Adult members in a household

Household members (children).

Most of the sampled households (82%) 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.

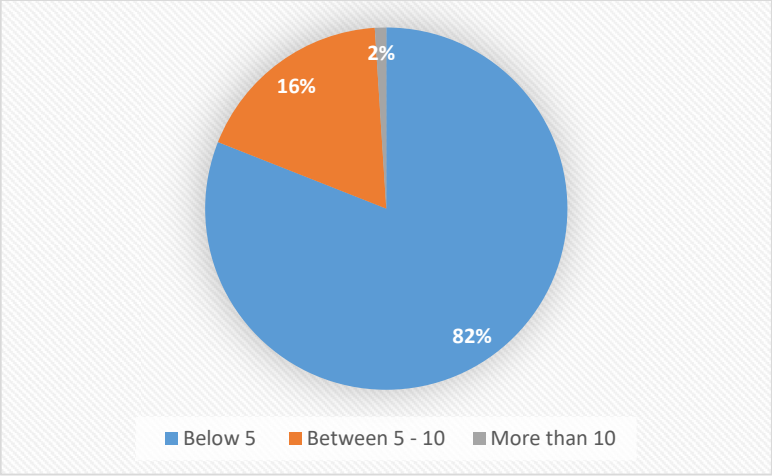


Figure 5 Number of Children in a Household

4.8. Formal education

In this study, 97% 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.

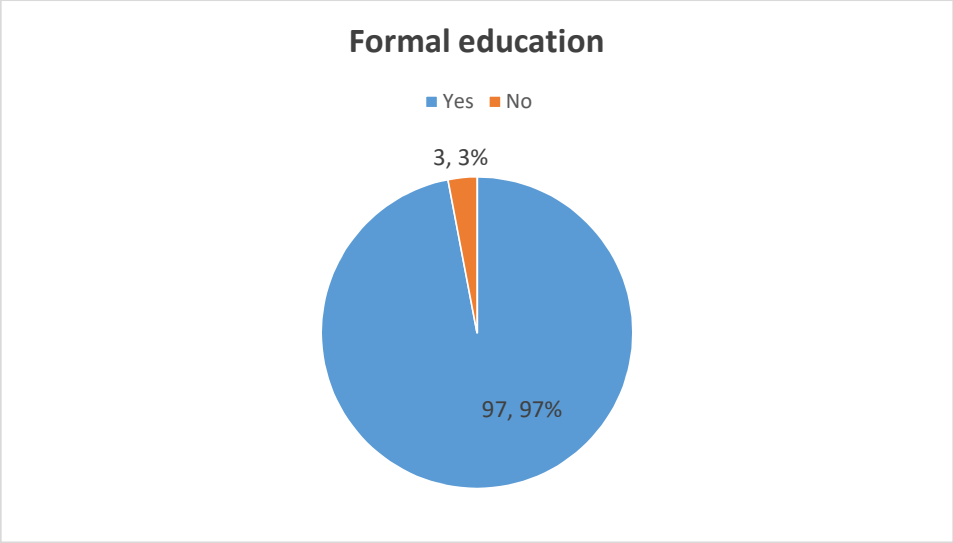


Figure 6 Respondents who have formal education

4.8.1. Education Level

Most of the respondents (41%) had Upper Secondary education, 24% University, 13% Technical/Vocational College, 9% Upper Primary, 6.7% 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.

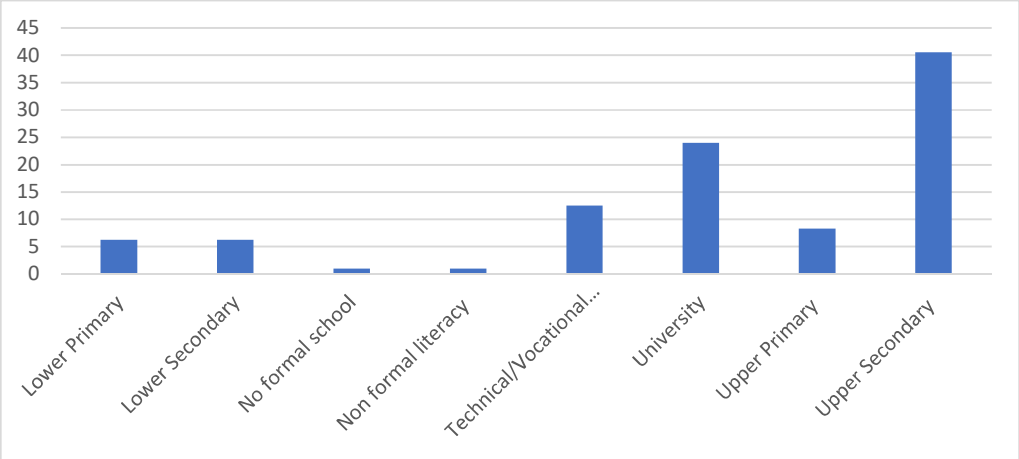


Figure 7 Respondents Education Level

4.8.2. Spouse's Education Level

A high number (33.4 %) of the respondent's spouses indicated they had Upper Secondary education level, 10.9% Lower Primary, 6.8% Lower Secondary, 9.9% No Formal School, 1.5% Teacher Training School, 6.3% Technical/Vocational College, 22.9% University, 8.3% Upper Primary.

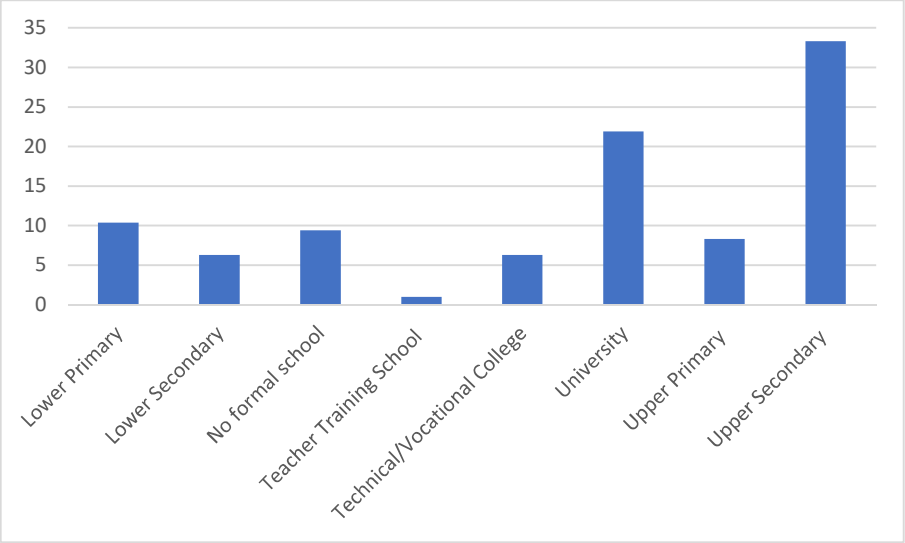


Figure 8 Education level of respondent's spouses

4.8.3. Children's Education level.

Majority (32 %) of the respondents children had Lower Primary education, 29.1% Upper Primary, 4.2% Lower Secondary, 18.7% 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.

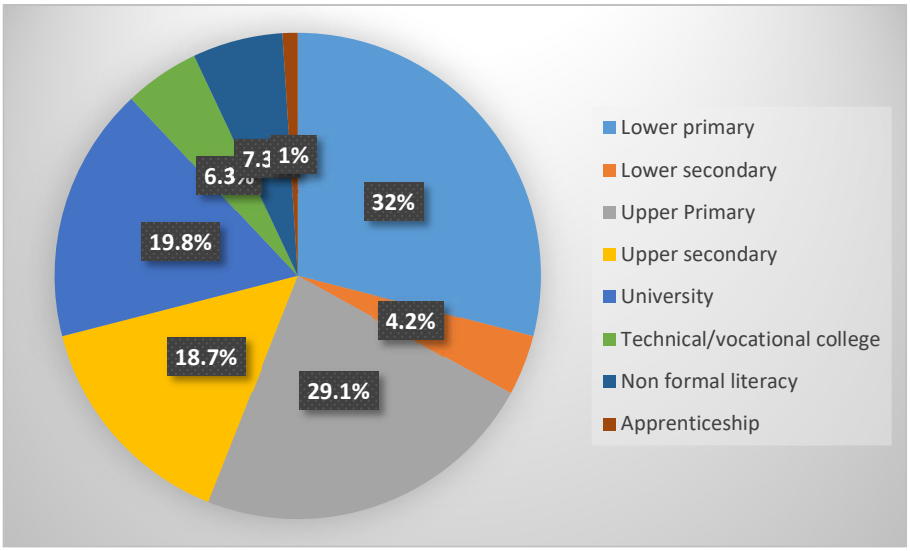


Figure 9 Education level of children in a household

4.9. Occupation and Sources of Livelihood

4.9.1. Socio-economic activities

Twenty nine (29%) of the respondents are in Business/Trading (20%) are casual domestic laborers, 7% are crop farmers followed by construction 12(17%) and teaching at 12%. The motorcycle (boda boda) industry recorded a low number 9% of respondents. This was surprising since boda boda industry is 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.

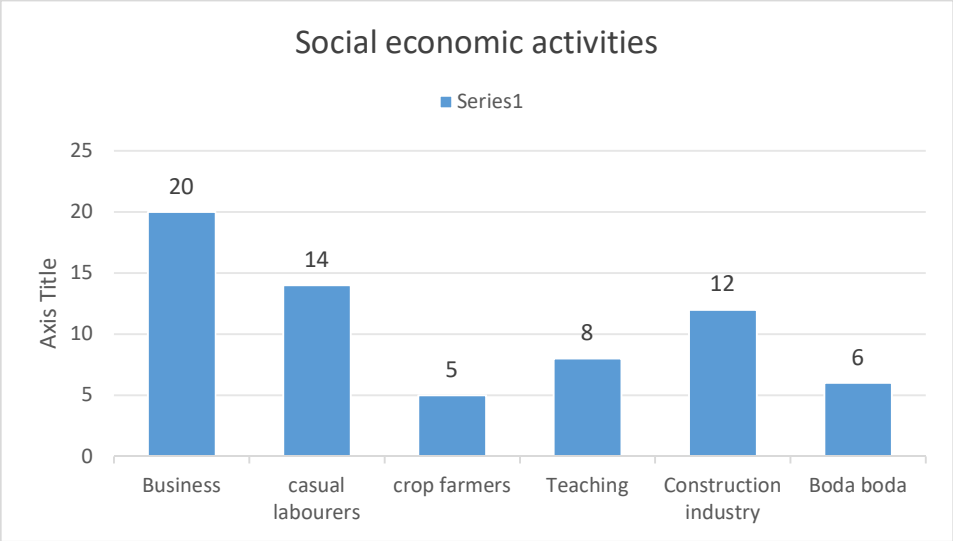


Figure 10 Socio-economic activities

4.9.2. Household Incomes when all sources are considered

The study revealed a heterogeneous nature of income levels. The income levels reflect the community's social economic activities with most of the respondents (32%) falling under the category of those who earn Ksh 10,001 to 15,000; followed by 5,001 – 10,000 at 23% less than 5,000 and 15001 to 20,000 followed at 14% with the lowest category at 3% being those who earn Sh 100,001 to 250,000 .

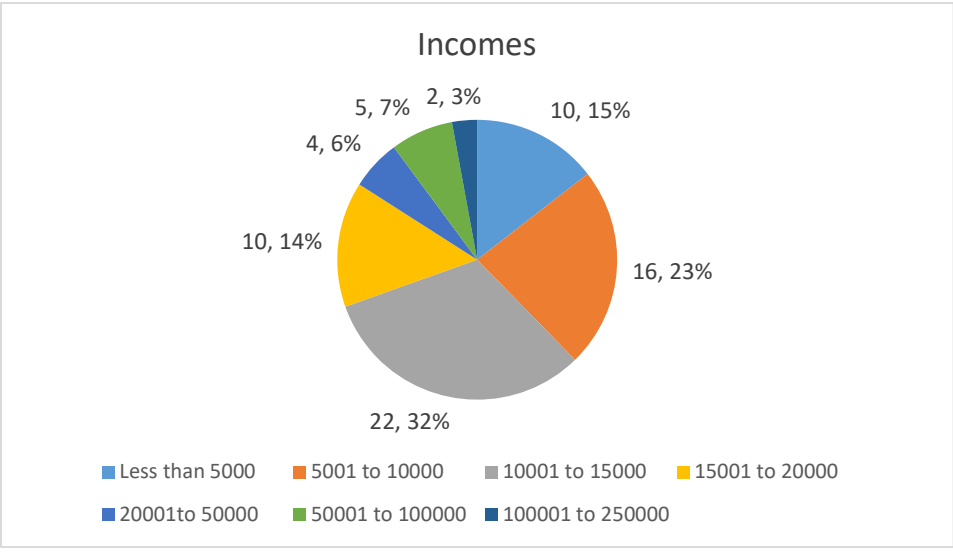


Figure 11 Household Incomes from all Economic Activities

4.9.3. Income from agricultural activities per year

Most of the respondents (72.5%) 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.

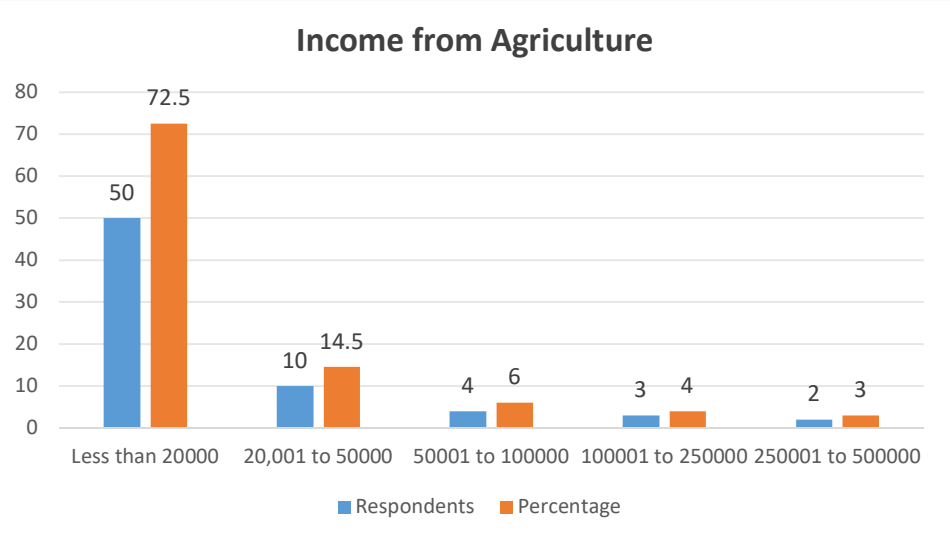


Figure 12 Income from Agricultural Activities

4.9.4. Monthly expenditure

In this study, most (58%) of the respondent's monthly expenditure falls under the Ksh 15,001 to 20,001 category. This agrees with the income levels of the community bearing in mind most of them are in the informal sector.

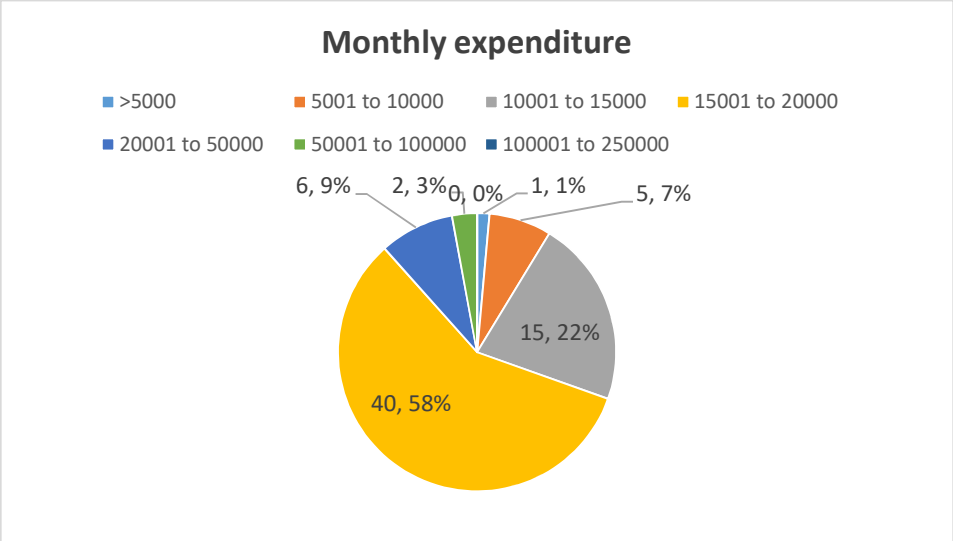


Figure 13 Monthly Expenditure

4.9.5. Major Types Of Household Expenditure

On being asked about the major types of household expenditure 100% of them mentioned food, 58% education expenses, closely followed by water at 43% and medical expenses at 38% among other expenses. This means that buying water is putting a financial strain on the community members.

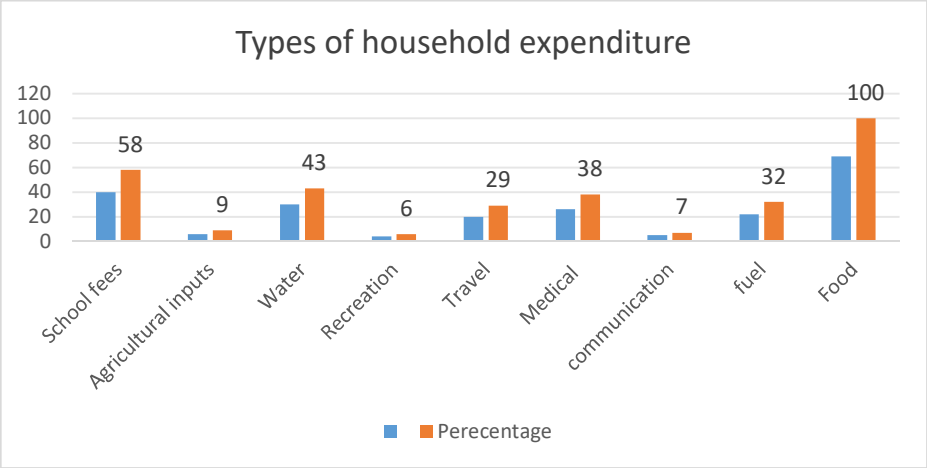


Figure 14 Types of Household Expenditure

4.10. Food Security

4.10.1. Households Dietary Habits

The common meal in most of the households was vegetables each 26%, milk 15%, maize at 20 (14%), beans 12%, meat 15% and rice 8% among others. The dietary profile agrees with what is staple in Nanyuki and in Laikipia County in general.

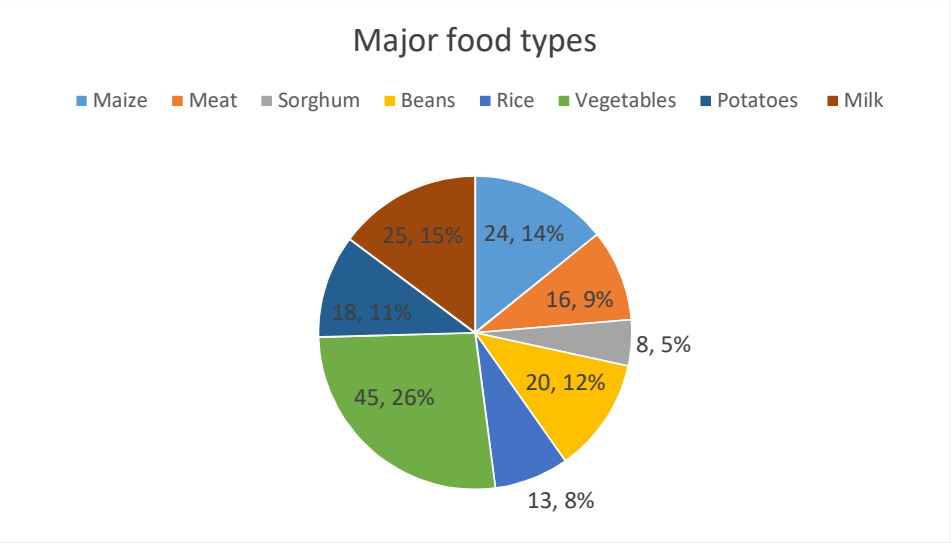


Figure 15 Common Food Items

4.10.2. Sources of Food

Most (83%) of the respondents indicated that they buy the food they consume, 14% grow it themselves and only 3% receive food aid from the government or NGOs. The statistics agree with what happens in urban centres.

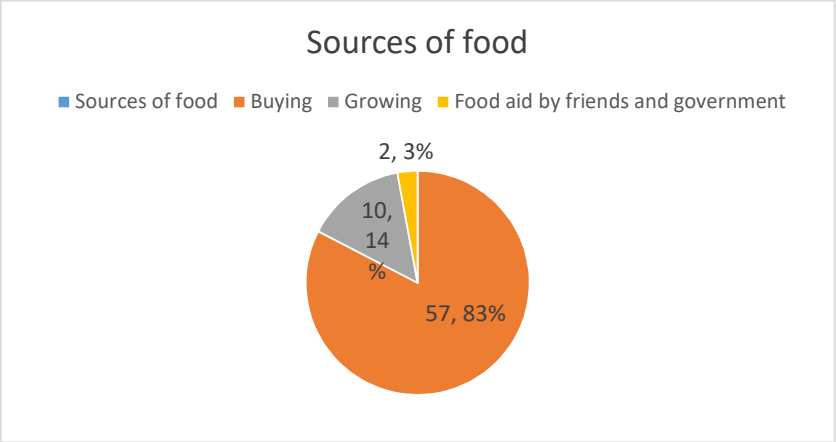


Figure 16 Sources of Food

4.11. Housing

4.11.1. Length of stay in the current area

Most (38%) of the respondents have lived in the area for 1-5 years, 22% for 6 to 12 months and 17% for 5 – 10 years. Only 9% of the respondents had lived in the area for 10+ Years. This trend agrees with the the pattern found for people living in urban areas where most don't stay for long if the necessary facilities lack or if they have to migrate for job related purposes.

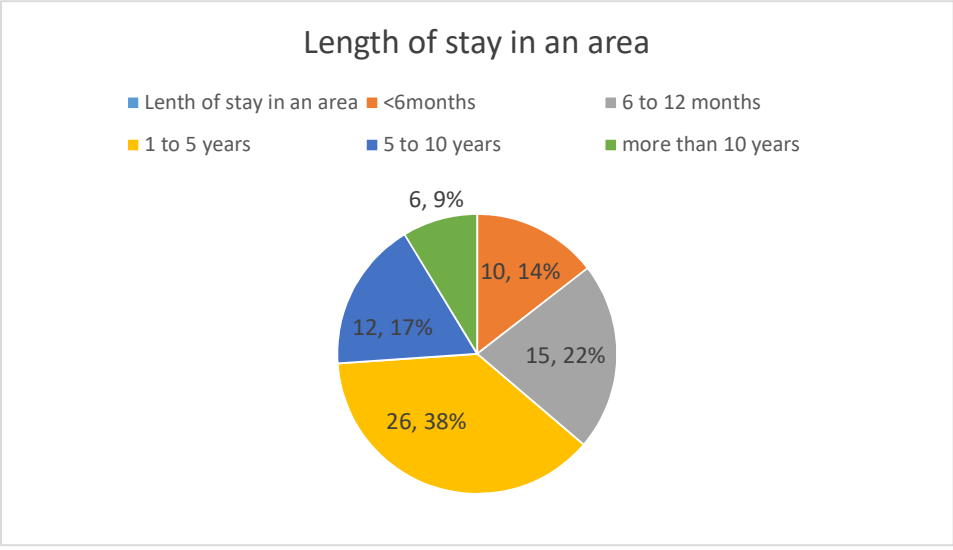


Figure 17 Length of stay in the current area

4.11.2. House Ownership

In the project area, 36% of the respondents indicated they were living in rental houses. The ones who owned houses were 64% 33% of the houses were co-owned by husbands and wife, 22% husbands with only 9% owned by wives. The high number of persons renting houses in the urban area is not surprising since most people come for work purposes in urban areas. House owners were also a large number and most of them live within the same compound with their tenants and are interested in the outcome of the water project thus stayed around to respond to the questionnaires administered.

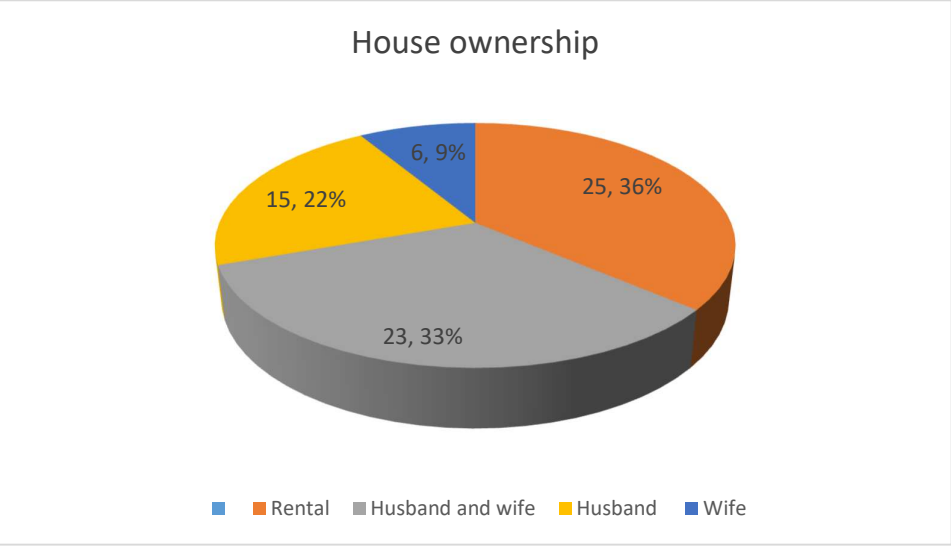


Figure 18 House ownership

4.11.3. Materials used in Constructing the House

48% of the respondent's house's walls are made of stones, 23% of iron sheets, 14% are made of timber, 9% of burnt bricks and 6% unburnt bricks.

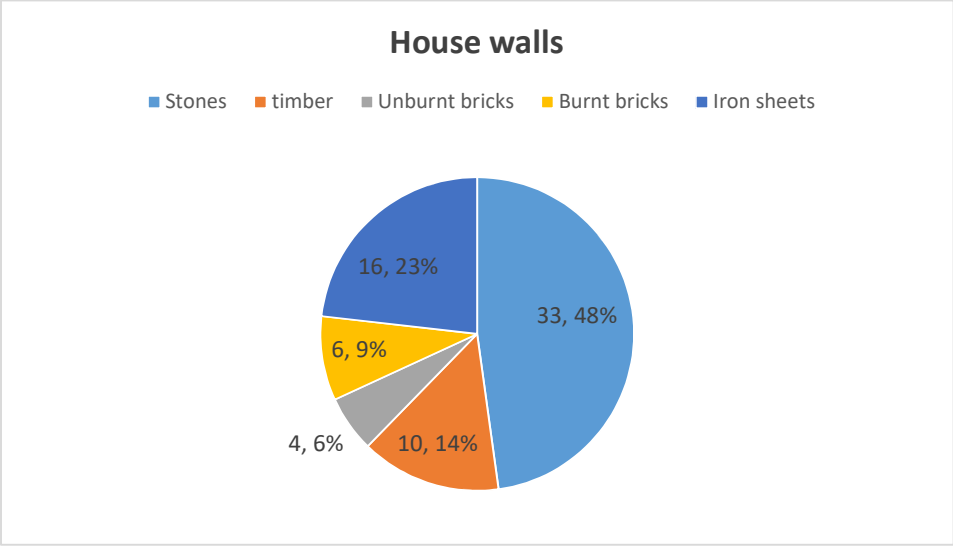


Figure 19 Materials used in Constructing the House

4.11.4. House Roofing Materials

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

4.11.5. House Flooring Materials

Majority (87 %) of the respondent's house floors were made of concrete slabs and 12% were made of Earth/clay and 1% were wooden.

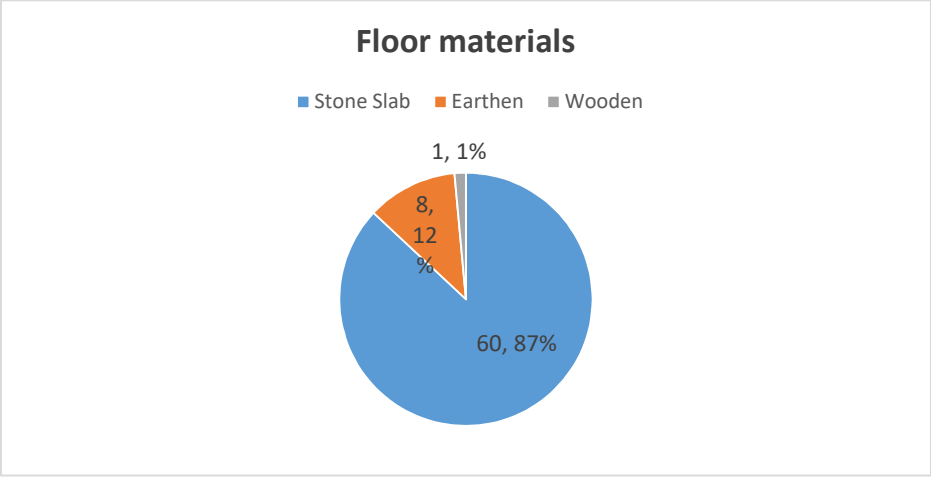


Figure 20 House Flooring Materials

4.11.6. General condition of the house.

In this study, 52 % of the respondent's houses were in good condition,12% were very good, 14% were fair, 17% were bad and 4% were very bad.

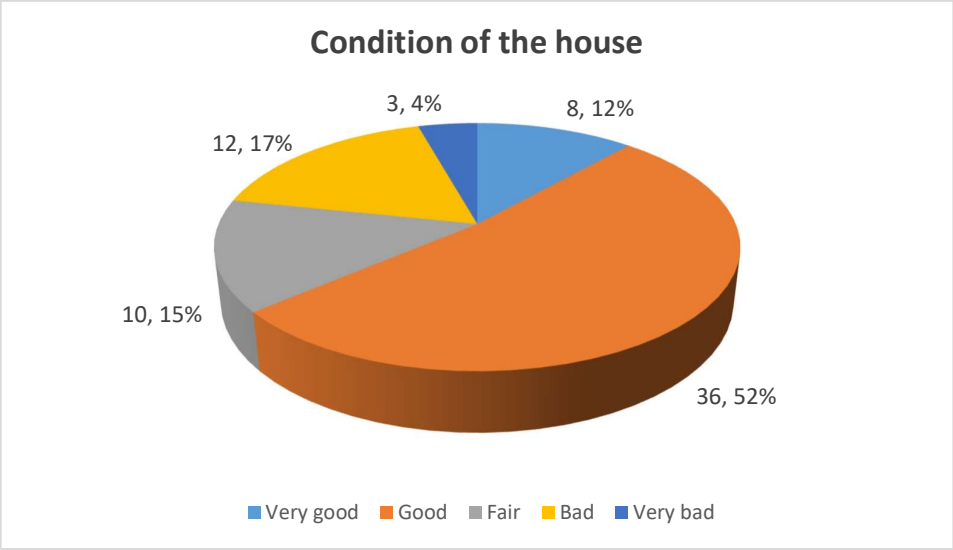


Figure 21 General condition of the house.

4.11.7. Other Uses of the House other than Habitation

Apart from dwelling in the current house, majority (75%) of the respondents indicated that they also use the house for storage, 22% f small businesses like salons and 2% share it with animals.

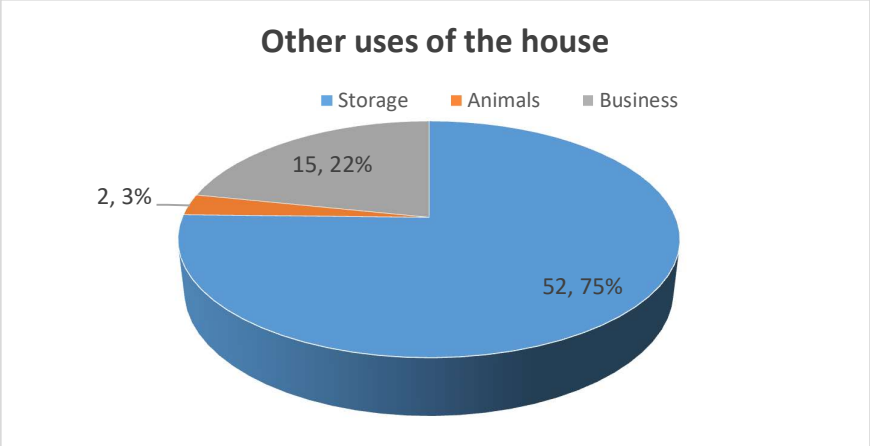


Figure 22 Other Uses of the House other than Habitation

4.12. ENERGY

4.12.1. Energy Sources for Cooking,

Majority (27%) of the respondents use kerosene and charcoal, 26% use Gas/LPG, and 19% use firewood and charcoal. Only 1% use biogas.

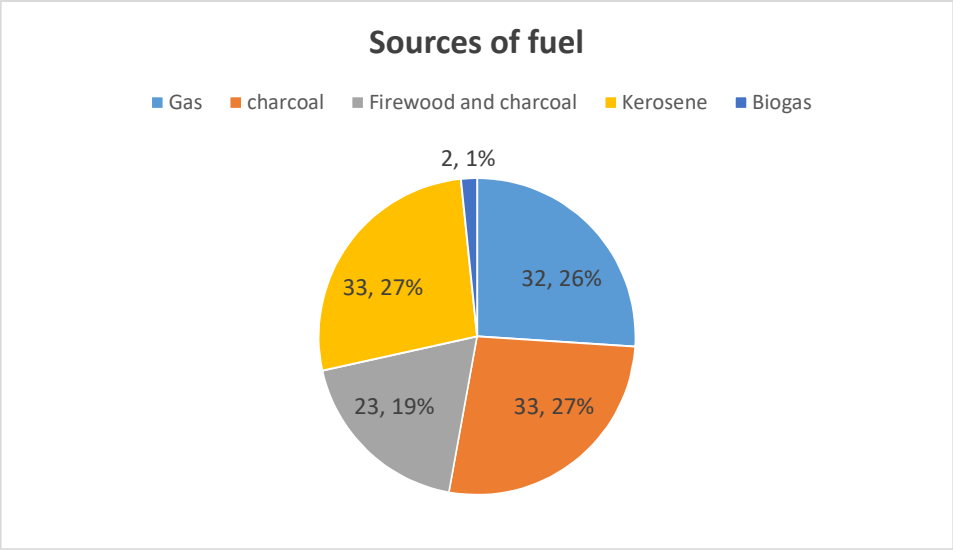


Figure 23 Energy Sources for Cooking,

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.

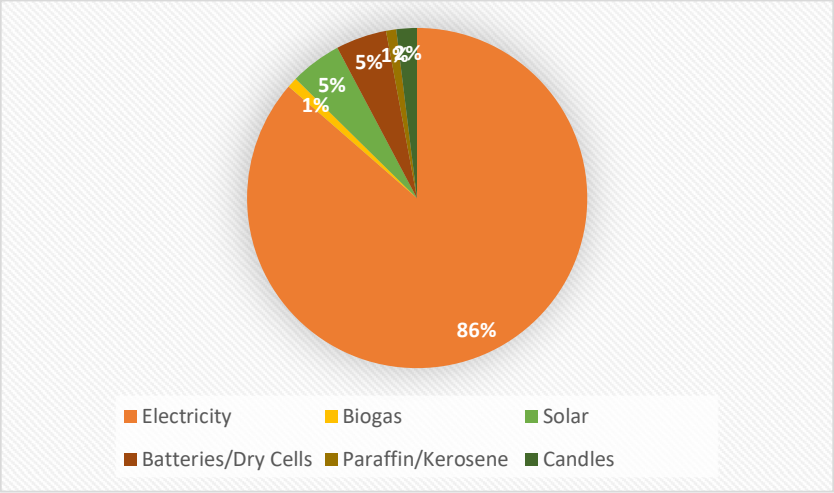


Figure 24 Sources of Energy for Lighting

4.12.2. 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.

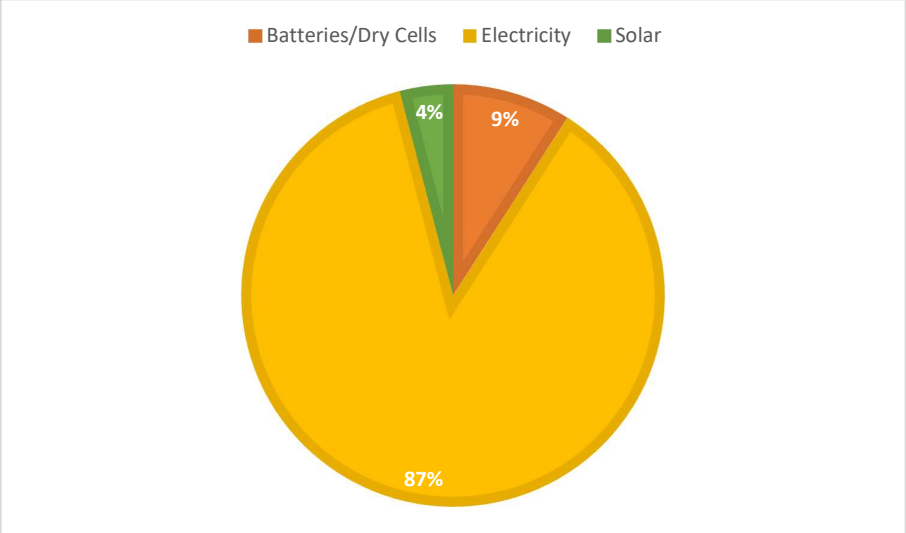


Figure 25 Sources of energy for Electronic gadgets/sound

4.12.3. Electricity Coverage

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

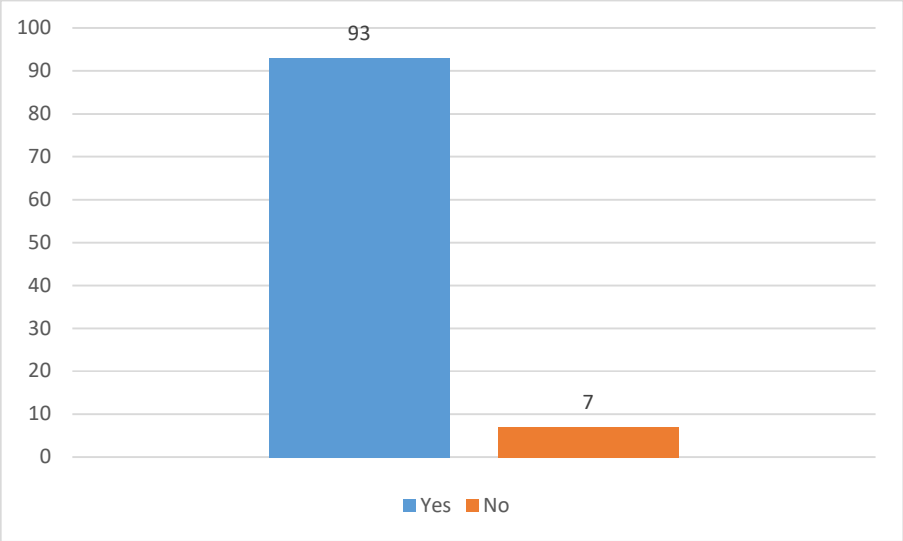


Figure 26 Electricity Coverage

4.13. Health

4.13.1. Disease incidences in the past one month

Majority (65%) of the respondents had not been ill or had an accident in the last 1 month while 35% been either ill or had an accident in the past 1 month.

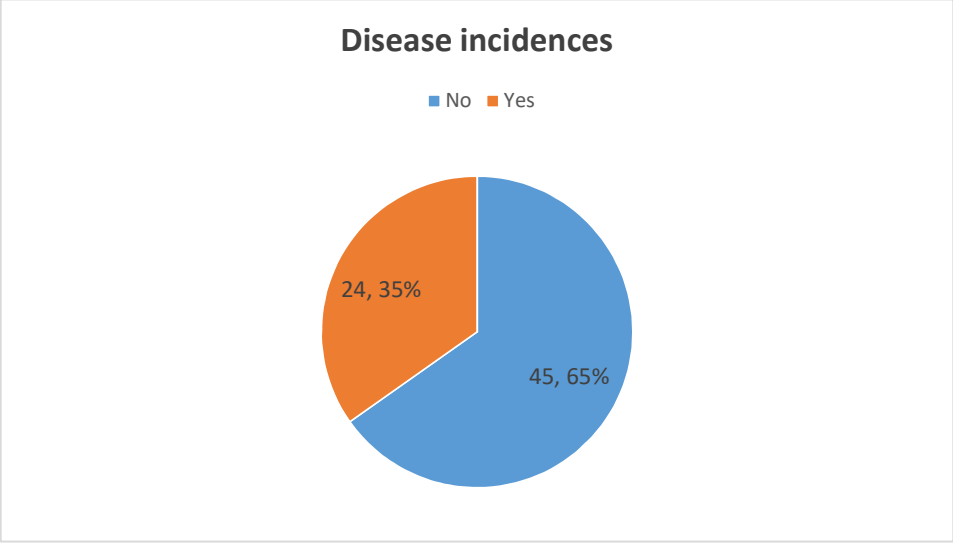


Figure 27 Disease incidences in the past one month

4.13.2. Common diseases and incidences of illnesses

At the time of the study, 46% of the respondents reported to have been ill from flu/cough, 22% Typhoid, 15% from diarrhea, chest pains 14%and 3% from malaria. The results show that waterborne diseases have been reported as common diseases and availability of water will reduce their incidences.

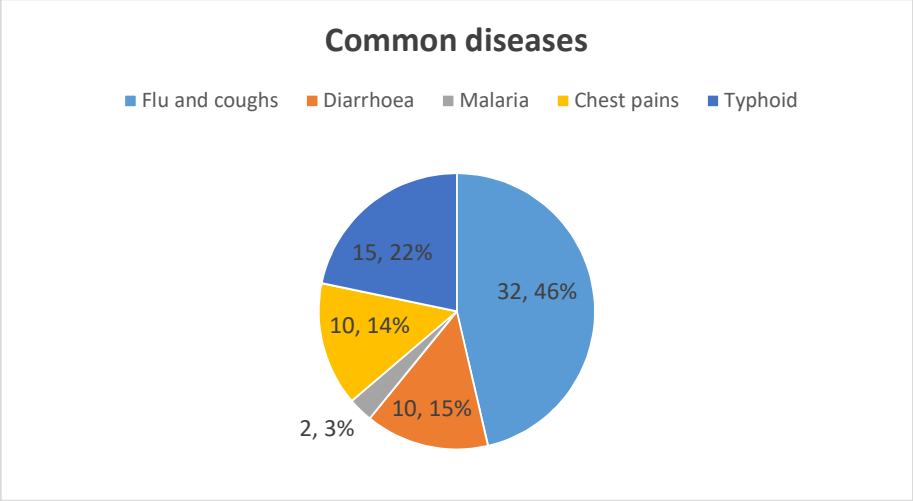


Figure 28 Common diseases and incidences of illnesses

4.13.3. Common Water Borne Diseases

Three common waterborne diseases experienced in the household over the last year at the time of study were assessed, 39% of the respondents had suffered from Typhoid , 32% diarrhea over the last year, 25% from amoeba and 4% from malaria. These incidences may be due to water scarcity or consuming water that is not safe for human use.

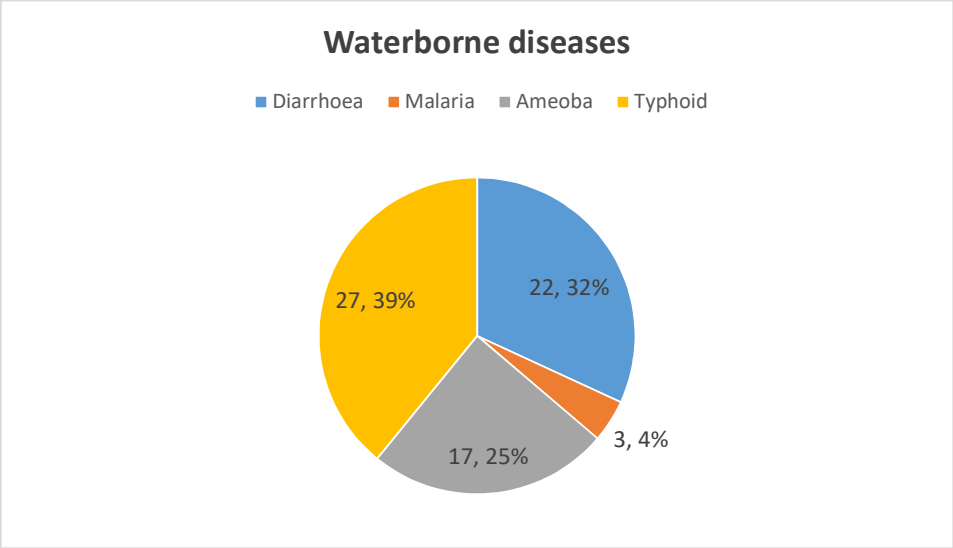


Figure 29 Common Water Borne Diseases

4.13.4. Available health facilities

Most families 38% of the respondents attended at government, 19% private clinics, 13% health centers and 9% at pharmacies.

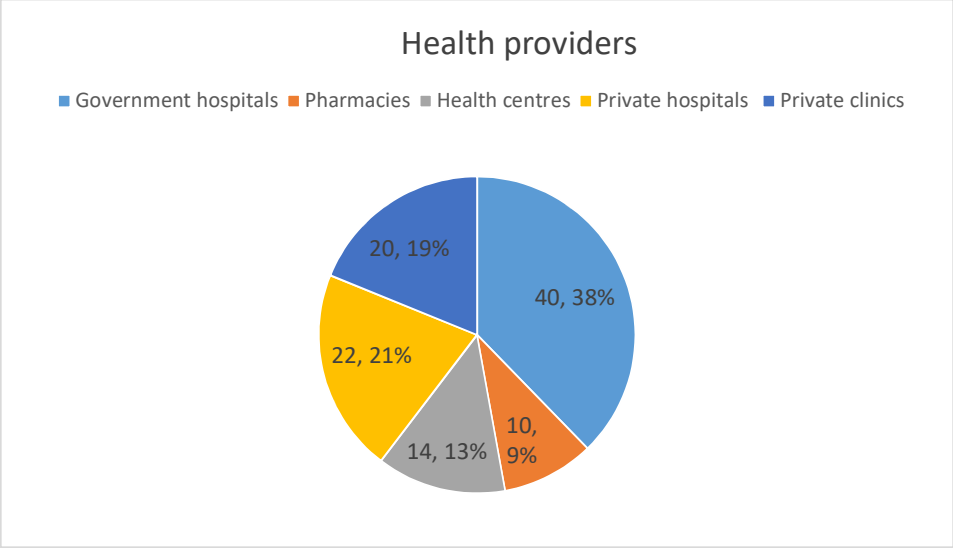
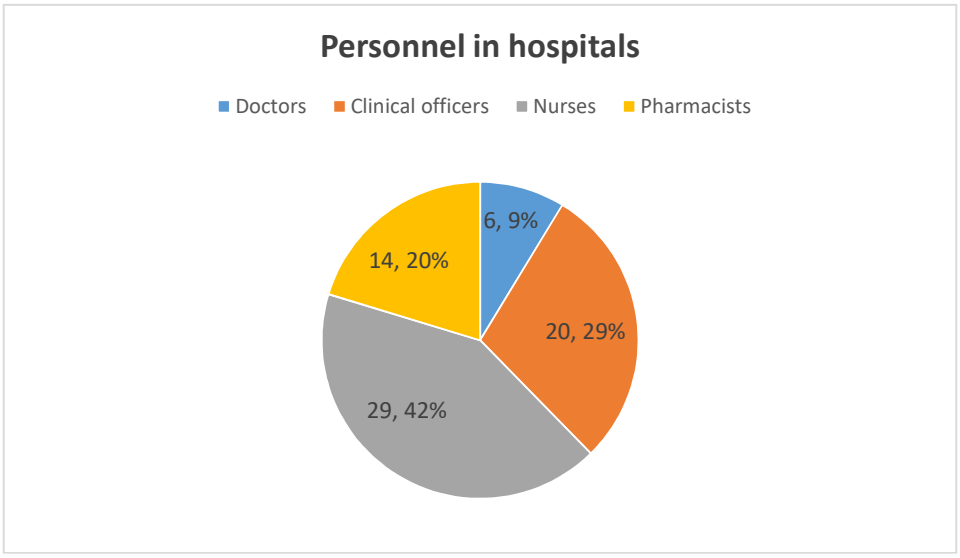


Figure 30 Available health facilities

4.13.5. Medical Personnel in the healthy facility

42% of the respondents who visited various healthcare facilities were attended by nurses, 29% by clinical officers, 20% pharmacists. and 9% by doctors.



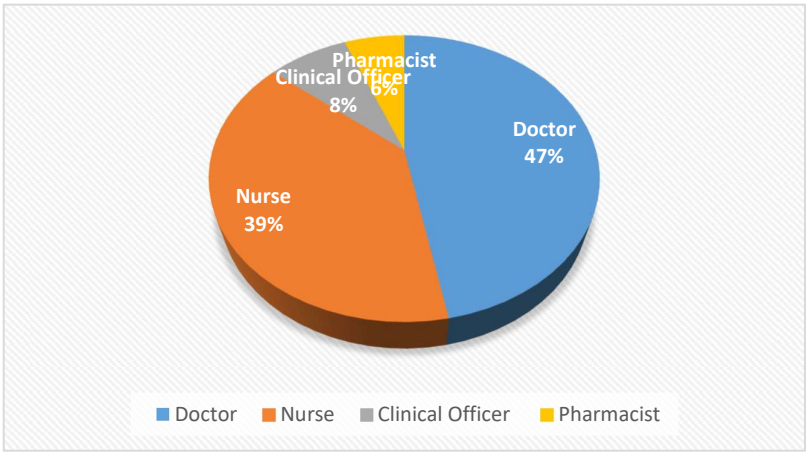


Figure 31 Medical Personnel in Hospital

4.13.6. Distance to the nearest health center in kilometers

Majority (94%) of the respondents travel between 1km – 5km to the nearest health center, 6% between 6km – 10km and there were no respondents who travelled over 10km.

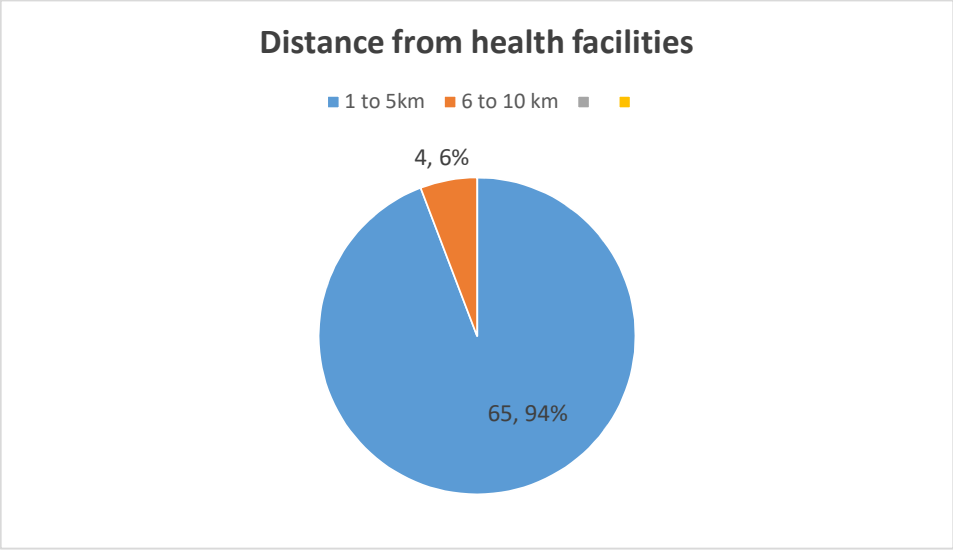


Figure 32 .Distance to the nearest health center in kilometers

4.13.7. Time taken the nearest health facility in minutes

Majority (91%) of the respondents travel for less than 15 minutes, 6% for between 15 – 30 minutes and 3% for over 30 minutes to reach the nearest health facility.

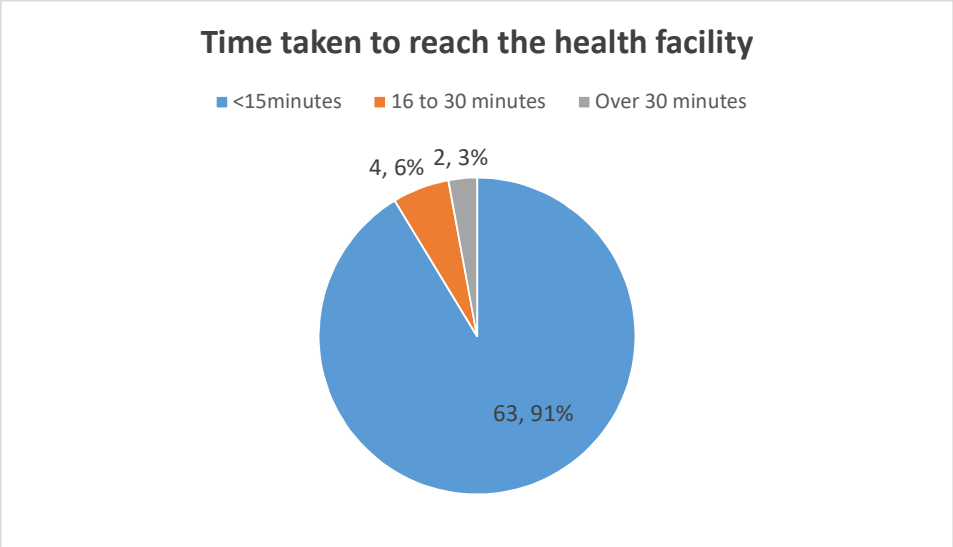


Figure 33 Time taken the nearest health facility in minutes

4.13.8. HIV / AIDS awareness

When asked whether they were aware of any HIV/AIDS campaign strategies in the area, 97% of the respondents are aware of the HIV/AIDs campaign.

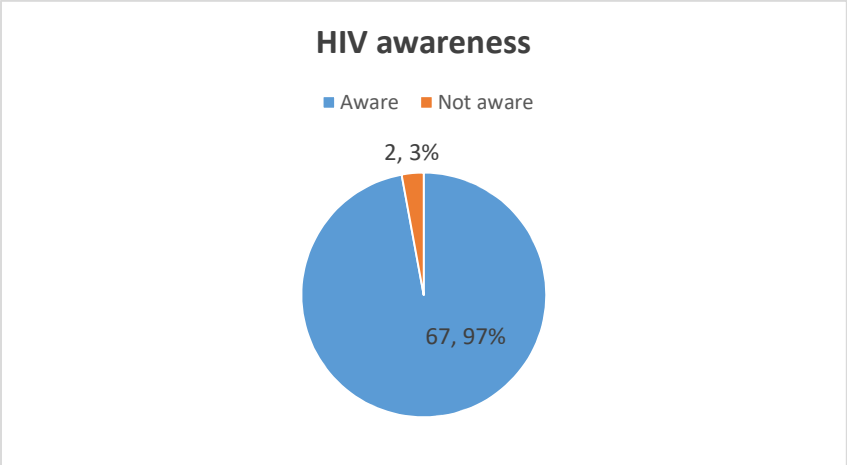


Figure 34 HIV/AIDS Awareness

4.13.9. Medium of the HIV/AIDS Campaigns

Majority of the respondents received the information through clinics (38%) , HIV/AIDs campaign through radio(36%), 20% through public notice and 6% through newspaper.

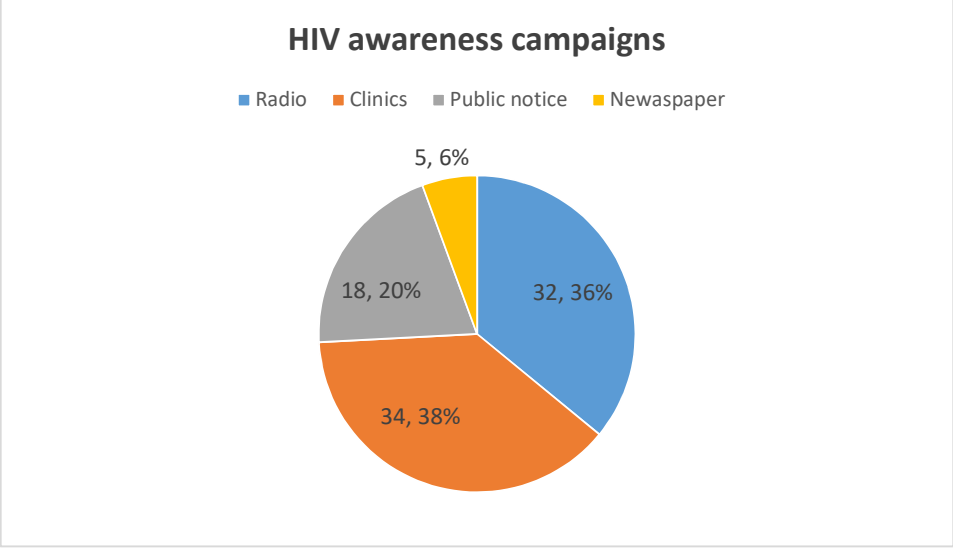


Figure 35 HIV/AIDS Awareness Campaigns

4.13.10. Transmission and Prevention of malaria

The study sought to know if the respondents knew how Malaria is transmitted and control measures. Majority (93%) of the respondents indicated that they know and 7% said no.

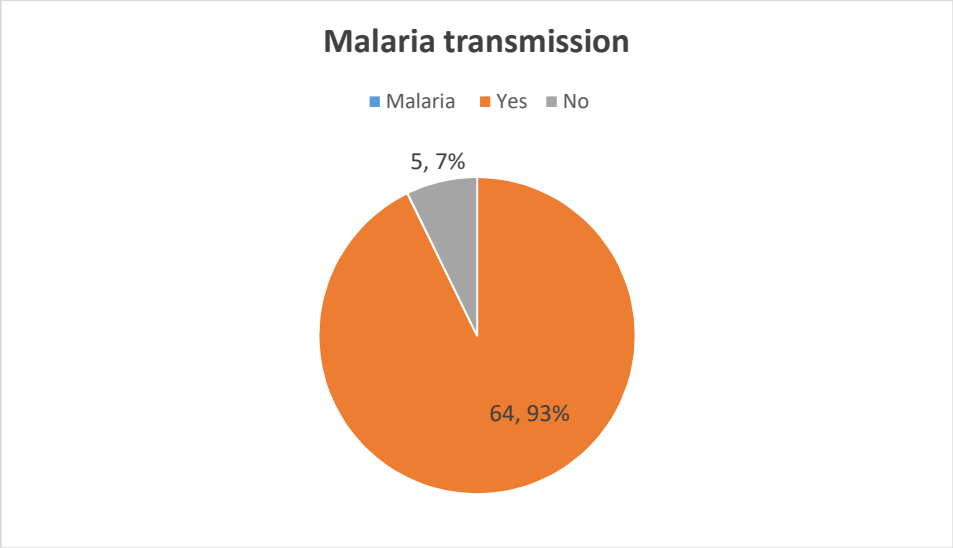


Figure 36 Knowledge of Malaria Transmission

4.13.11. Actions taken to control mosquitoes

Majority (46%) of the respondents indicated that they use mosquito nets, 23% of the respondents use mosquito repellents to control mosquitoes, 12% through drainage of stagnant water, 10% through clearing bushes and 9% nothing.

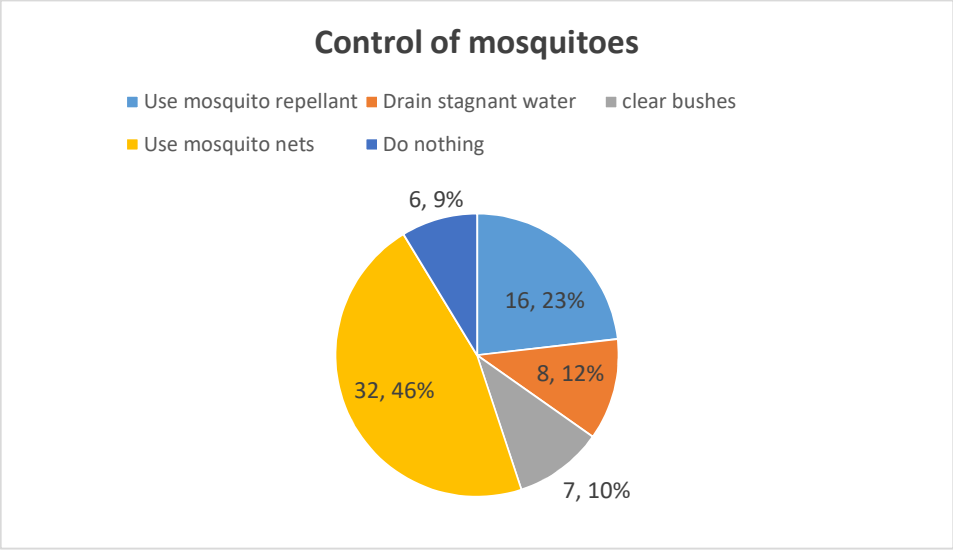


Figure 37 Other actions taken to control mosquitoes

4.14. Water Access, Facilities and Sanitation

4.14.1. Sources of drinking water

Many (36%) respondents use a public tap, 26% taps outside their house, 15% use pump/borehole, 14% uses streams and rivers and 9% use tap inside the house as their main source of drinking water,

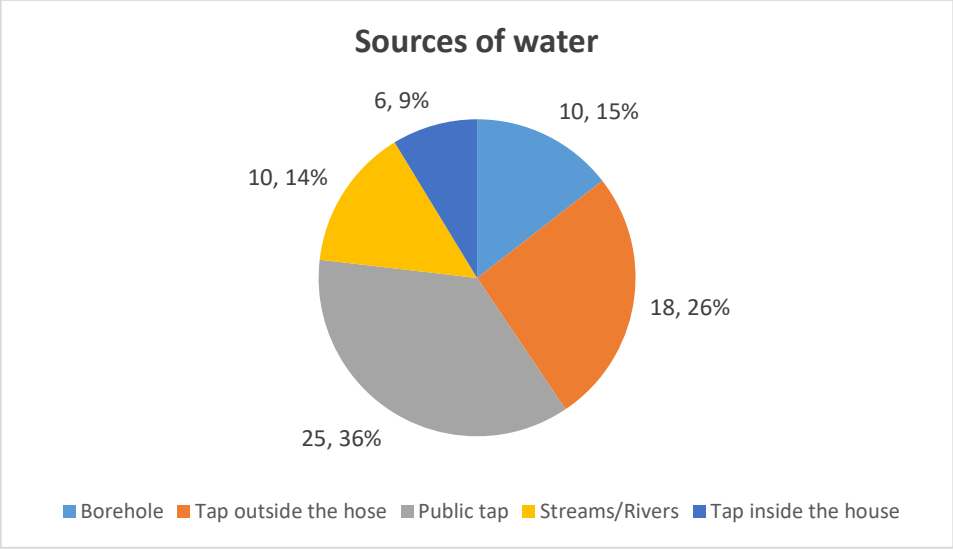


Figure 38 Sources of drinking water

4.14.2. Respondents preferred water source

Majority (72%) of the respondents preferred to use a tap inside their house and 12 % preferred a tap outside their house and 3% preferred a pump/borehole. The lowest preference was for rivers and streams and commercial water vendors.

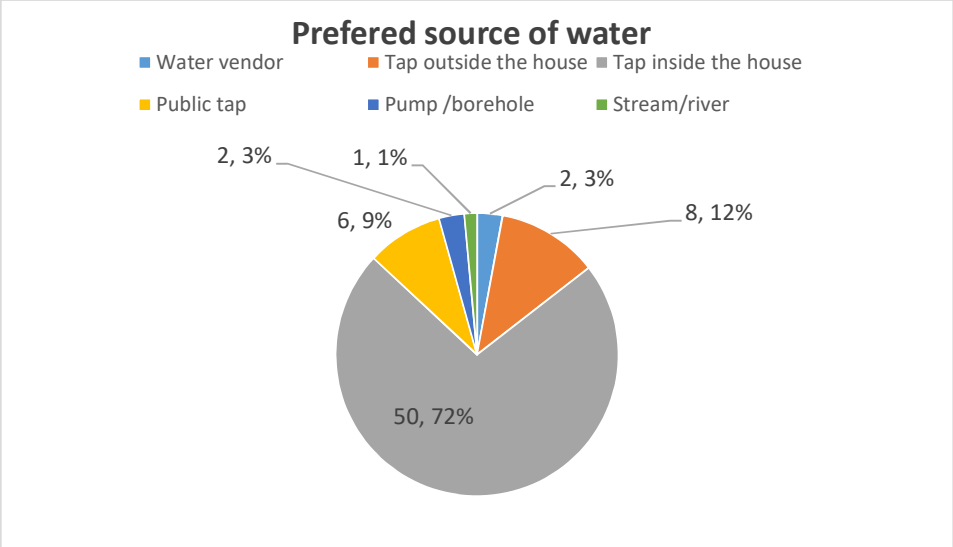


Figure 39 Preferred source of water

4.14.3. Nearest source of water for drinking

Majority (91%) of the respondents travel for less than 1km to fetch water and 9% travel between 1km – 5km. There was no score for more than 5km.

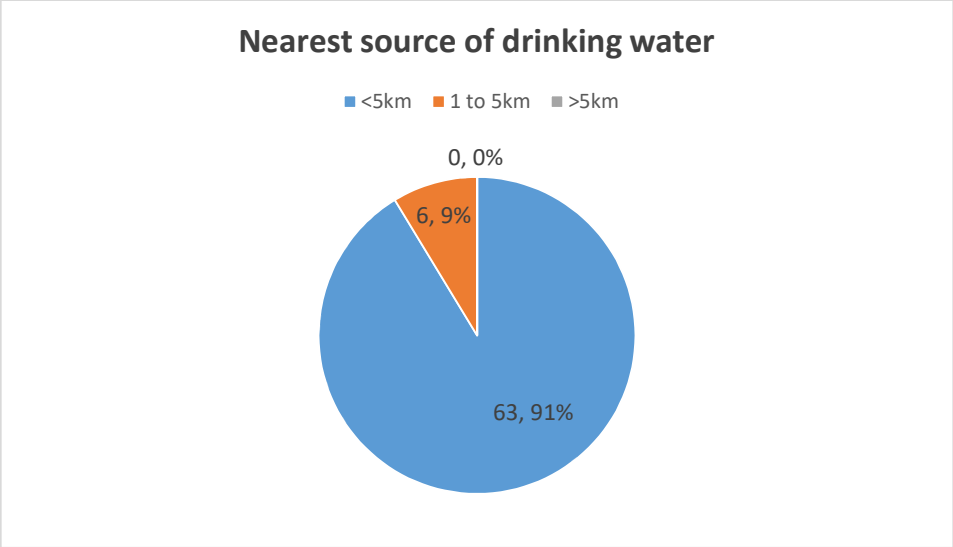


Figure 40 Distance Travelled in search of Water

4.14.4. Time taken to water source during the wet season

89 % of the respondents travel for 0 – 15 Minutes to the nearest water source during the wet season indicating that water scarcity issues are not severe in the wet season.

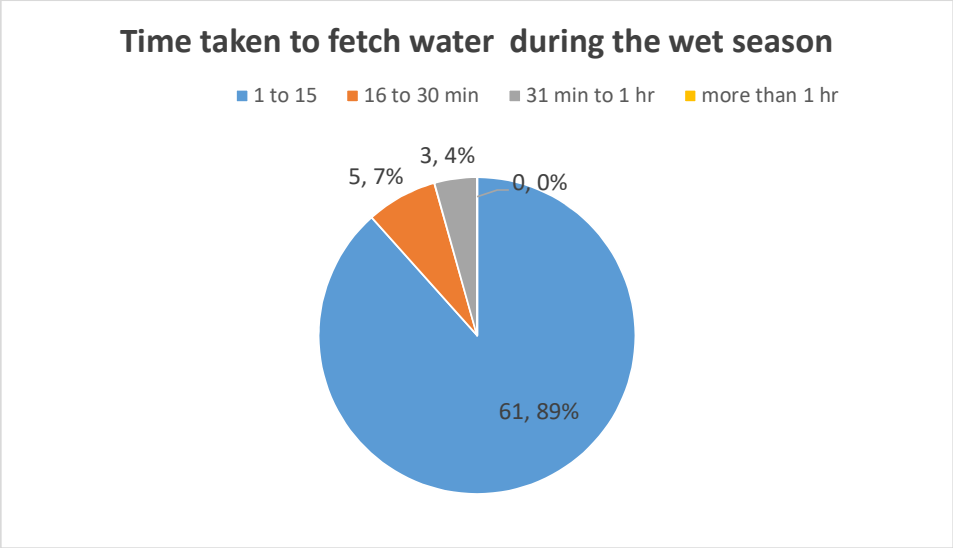


Figure 41 Time taken to water source during the wet season

4.14.5. Time taken to water source during the dry season

During the dry season , 36% of the respondents travel for 31 – 60 minutes to the nearest water source, 23% for more than 1 hour, 22% for 16-30 and 19% for 1 to 15 minutes. This indicates that the gathering effort for water increases in the dry season as some of the sources dry up and rationing sets in.

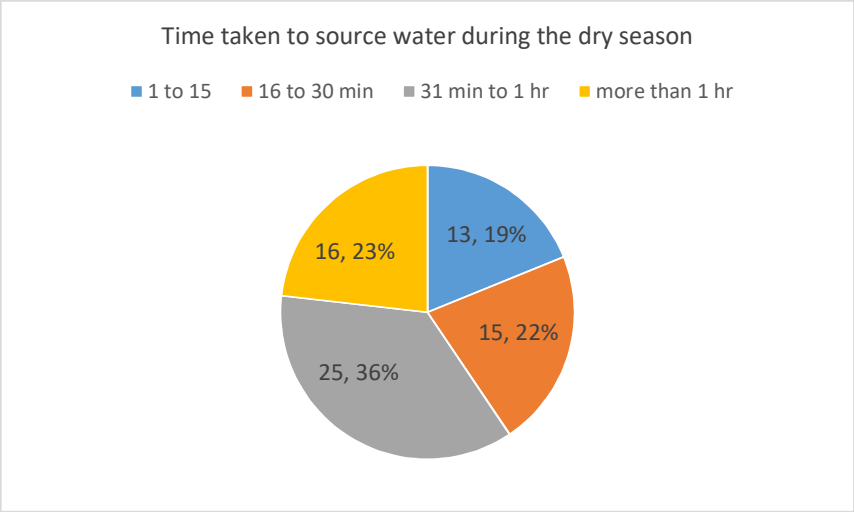


Figure 42 Time taken to water source during the dry season

4.14.6. Quantity of Water Used in Households

Majority (51%) of the respondents use less than 100 litres per day, 28% use 101 litres – 200 litres, 16% use 201 litres – 300 litres and only 5% use above 301 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. 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.

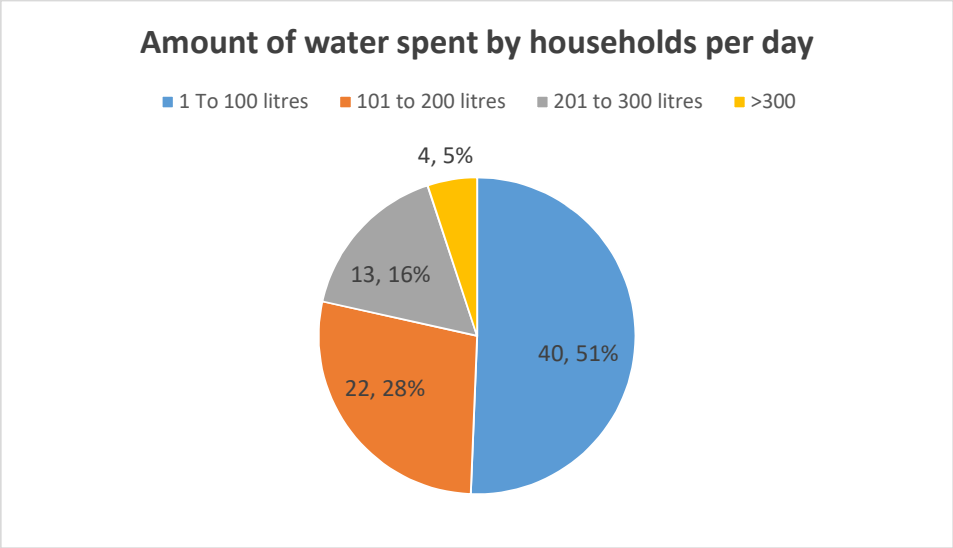


Figure 43 Quantity of water used in Households

4.14.7. Households using Water from Nanyuki Water and Sewerage Company

Majority (94%)of the respondents get their water from Nanyuki Water and Sewerage Company with no other source unless they buy from vendors. With the high water demand and low supply experienced, this project will be a game changer in the area.

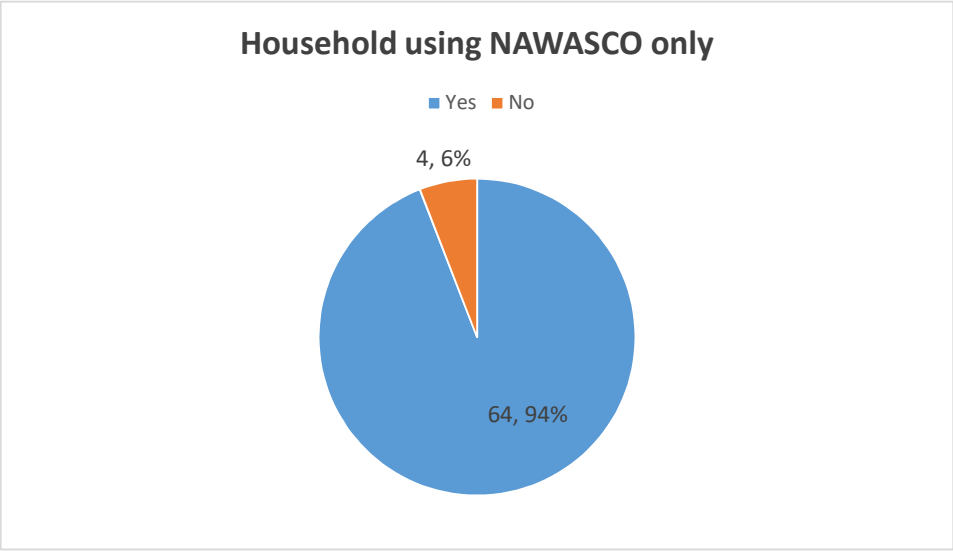


Figure 44 Households using Water from Nanyuki Water and Sewerage Company

4.14.8. Payment for the WSP water you consumed

All the 96% the respondents pay for the WSP water they consume and 4% buy from commercial vendors throughout the seasons. This sows a high dependence on NAWASCO water.

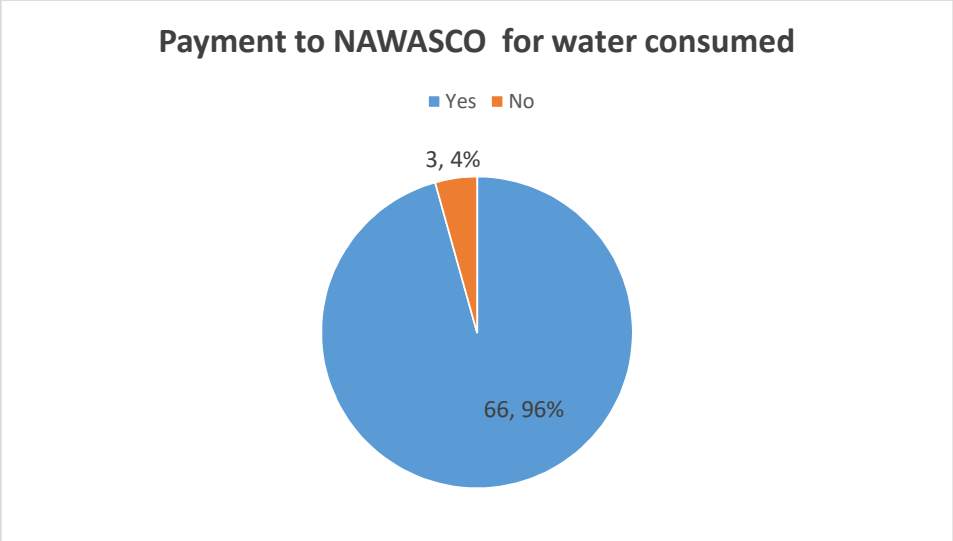


Figure 45 Payment for the WSP water you consumed

4.14.9. WSP Monthly Bills to Consumers

Majority 49% of the respondents pay ksh 501 – 1000, 29% pay Ksh100 to 500 monthly for the water they consume, 15% 1000 t0 1500 and 7% pay ksh 1501 – 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.

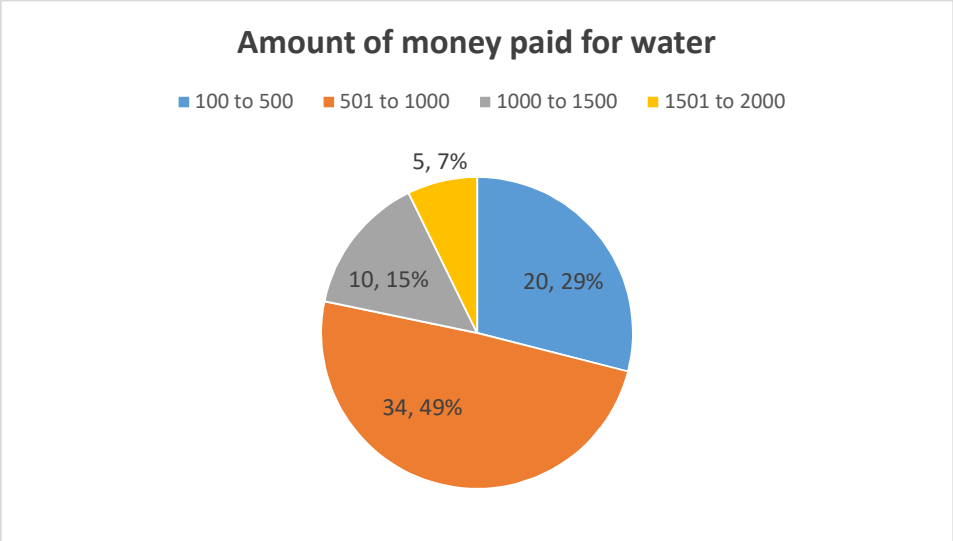


Figure 46 WSP Monthly Bills to Consumers

Satisfaction with the current water supply in the area 33% are satisfied and 9% are highly satisfied while 3% were non committal. This means that improvement of the water service will lead to a highly satisfied clientele. The reason stated for dissatisfaction was water rationing and low pressure.

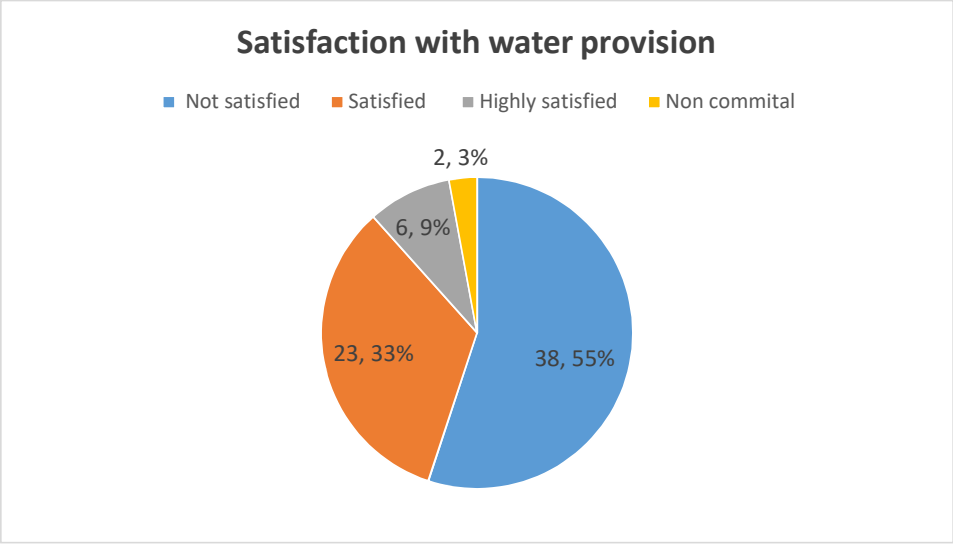


Figure 47 Satisfaction with the current water supply in the area

4.14.10. Change or improvement of the current water supply

Majority (94%) of the respondents want the water supply changed. The 6% who would not want the water supply to be changed are maybe those who indicated that they were highly satisfied with the current water supply.

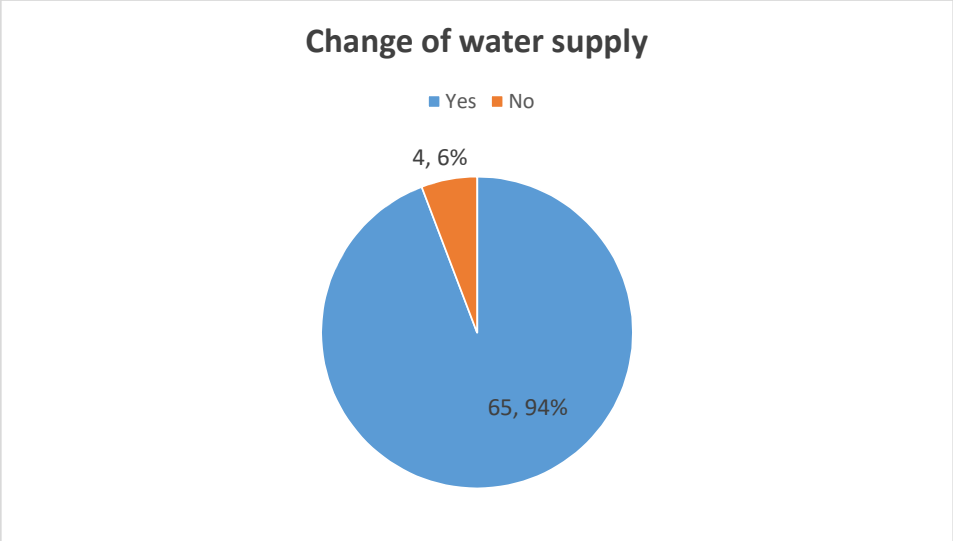


Figure 48 Change or improvement of the current water supply

4.14.11. Willingness to pay for improved water services

Majority (61%) of the respondents are willing to pay for improved water services. The 39% not willing to pay for the service may be the ones who are very satisfied or satisfied with the current water supply.

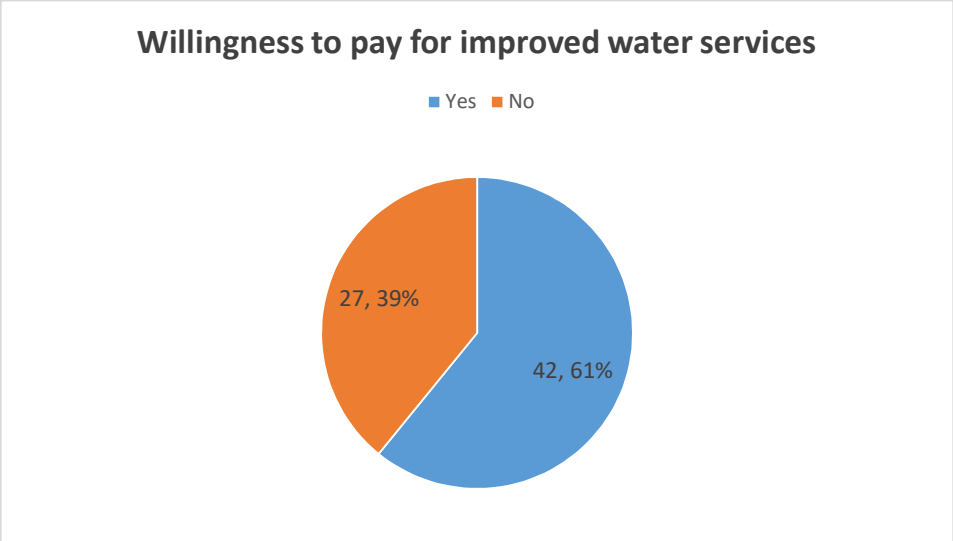


Figure 49 Willingness to pay for improved water services

4.15. Water and Gender Issues

4.15.1. Responsibility of fetching water in a household

Majority (57%) 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 (17%), hired help (14%), girl child at 9% and adult men at 3% .

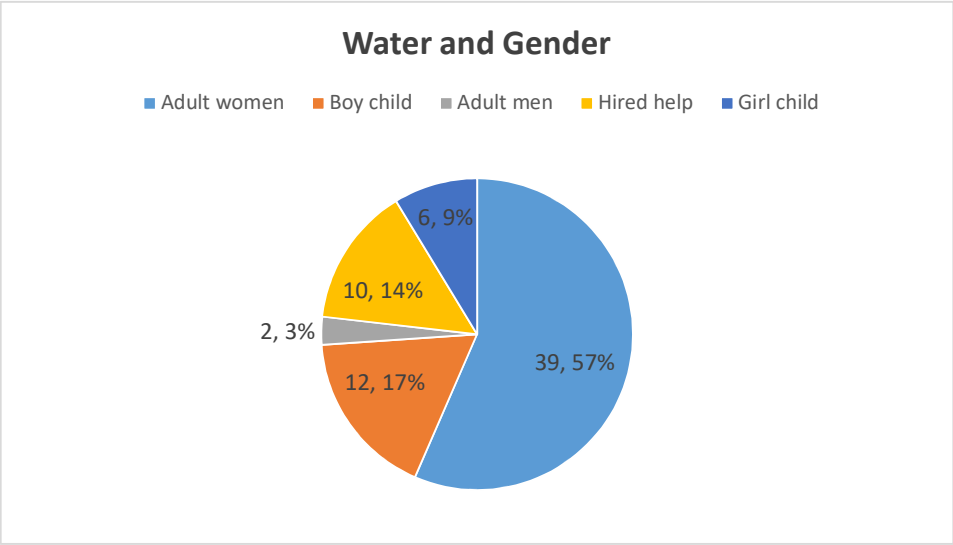


Figure 50 Water fetching and gender

4.16. Sanitation Facilities and Services

4.16.1. Hand washing

Majority (38%) of the respondents wash their hands after using the toilet, 21% after a meal, 13% after working, 18% before meals and after handling an infant.

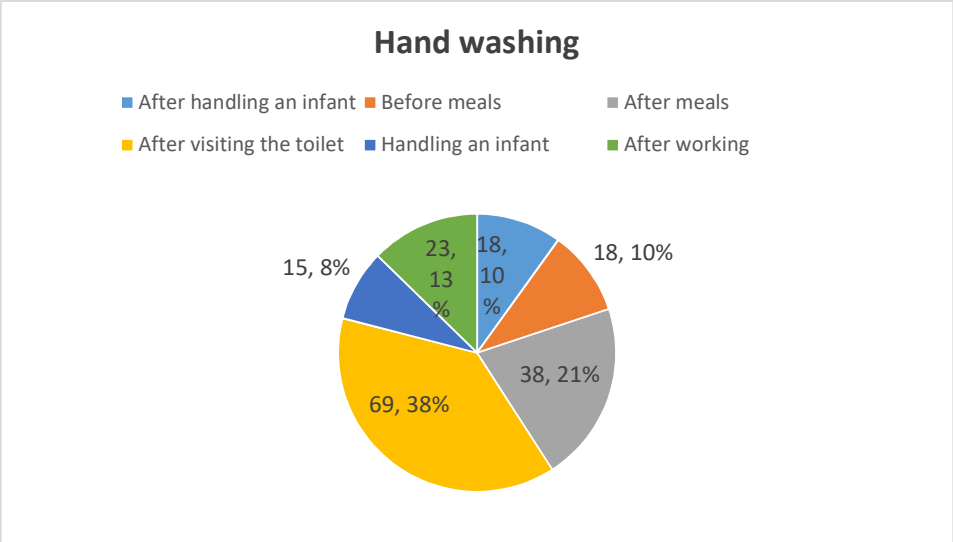


Figure 51 ***Hand washing***

4.16.2. Types of latrine/toilet facility

All households sampled had a latrine/toilet facility.The majority of the respondents have private flush toilets (38%) and pit latrines (327%) with wall and roofs as their toilet facilities and 21% use a communal toilet.

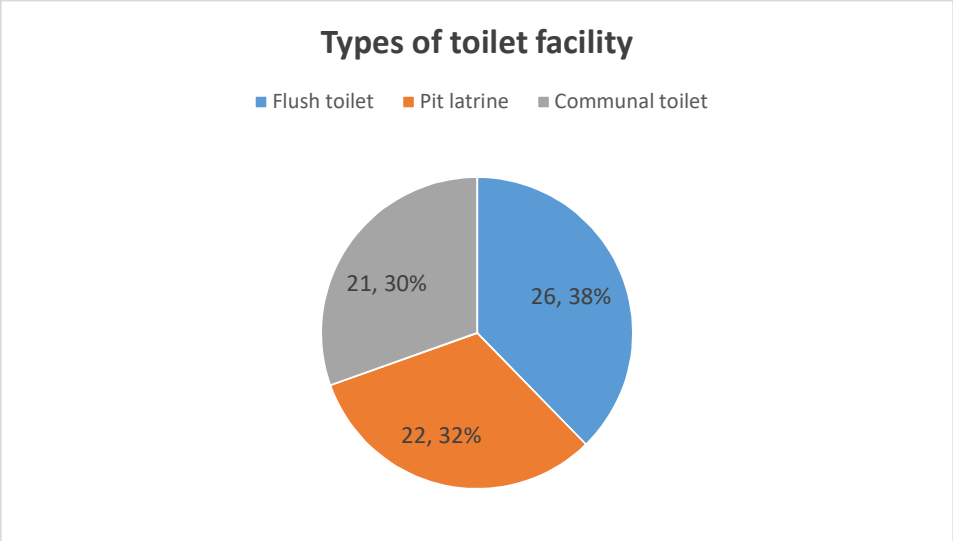


Figure 52 Type of toilet

4.16.3. Status of the latrine/toilet.

The status of the toilets was clean at 43% were fair, 23% clean and 19% dirty and 15% said they are very clean. With improved water sources the hygiene levels will improve.



Figure 53 Status of the toilet

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

Most (90%) of the households have a hand washing facility next to the latrine and 10% don't have one.

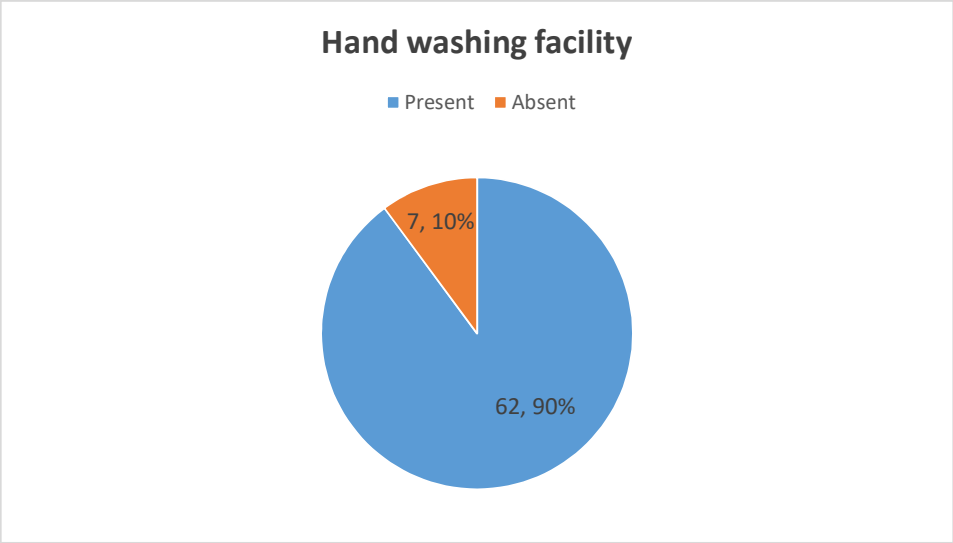


Figure 54 Presence of a hand washing facility

4.16.5. Presence of a bathroom/bath shelter in Households

94% of the respondents were in households that have a bathroom facility

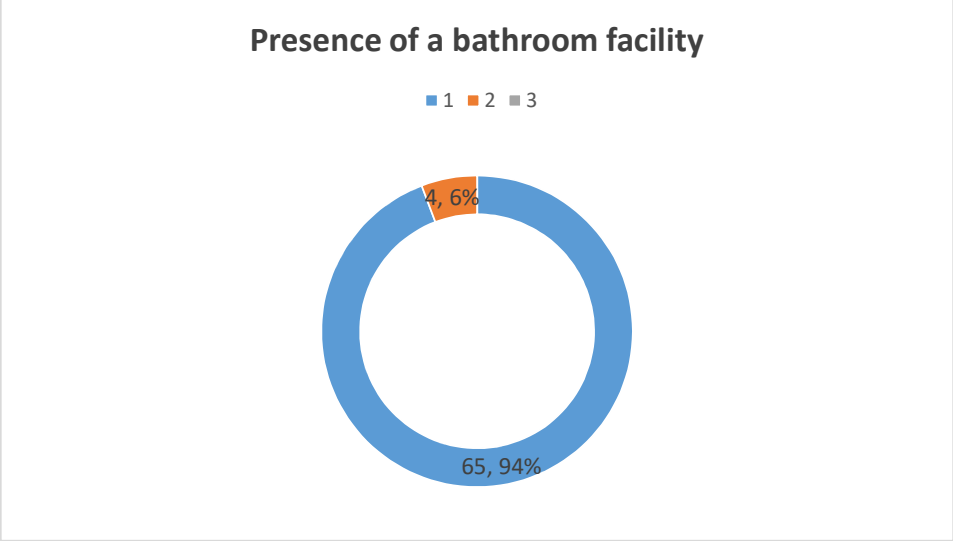


Figure 55 Presence of a bathroom facility

4.16.6. 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

4.16.7. 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.

4.16.8. 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 36% belong to women groups, 24% mixed merry go rounds, 21% youth groups, 12% men groups, 4% conservation groups and only 2% are members of farmers cooperatives. Of the respondents who are in support groups or organizations the main reasons include: credit services through table banking popularly known as merry go rounds and other forms of social support.

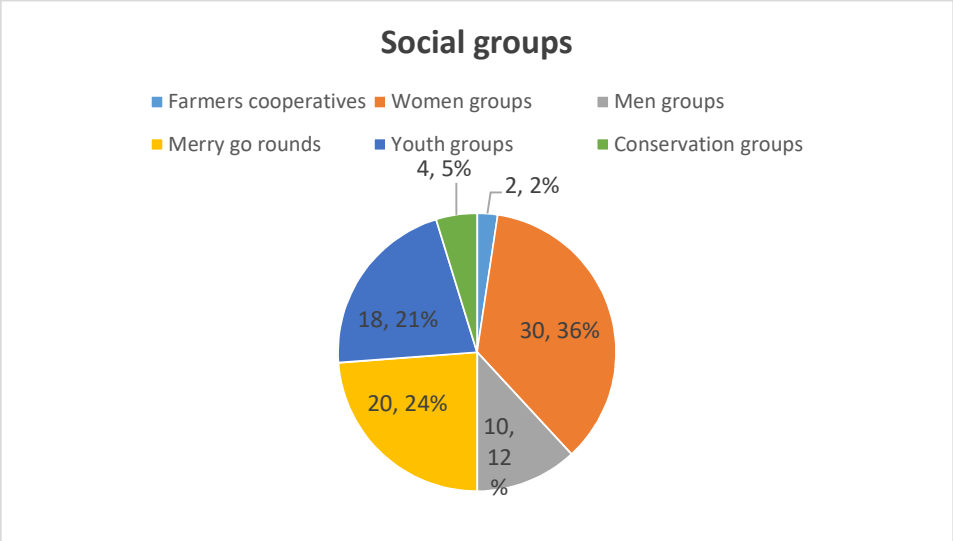


Figure 56 Social groups in the area

4.16.9. 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.

4.16.10. Social and cultural values

Most of the respondents (83%) indicated that there are is a site associated with religion. The ritual ground mentioned is near River Nanyuki where there is a huge Mugumo tree (*Ficus thonningii*) 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. 14% indicated that there are ritual

grounds and 3% graves. The respondents indicated that male circumcision was the most conducted ceremony in the community.

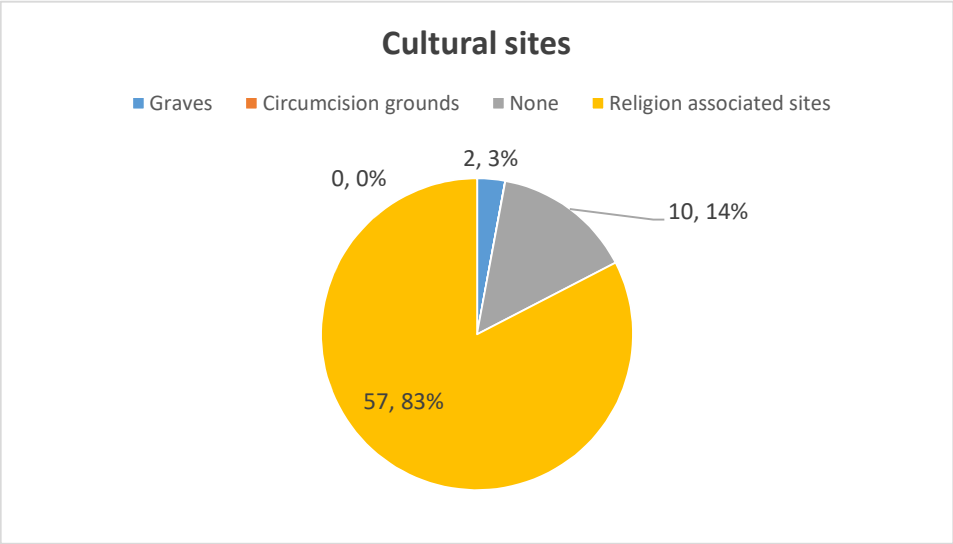


Figure 57 Cultural sites

4.17. ENVIRONMENTAL ISSUES

4.17.1. Solid waste Disposal

Majority (78%) of the respondents dispose of their solid waste through burning , 15% just dump the wastes in open land and 7% compost it.

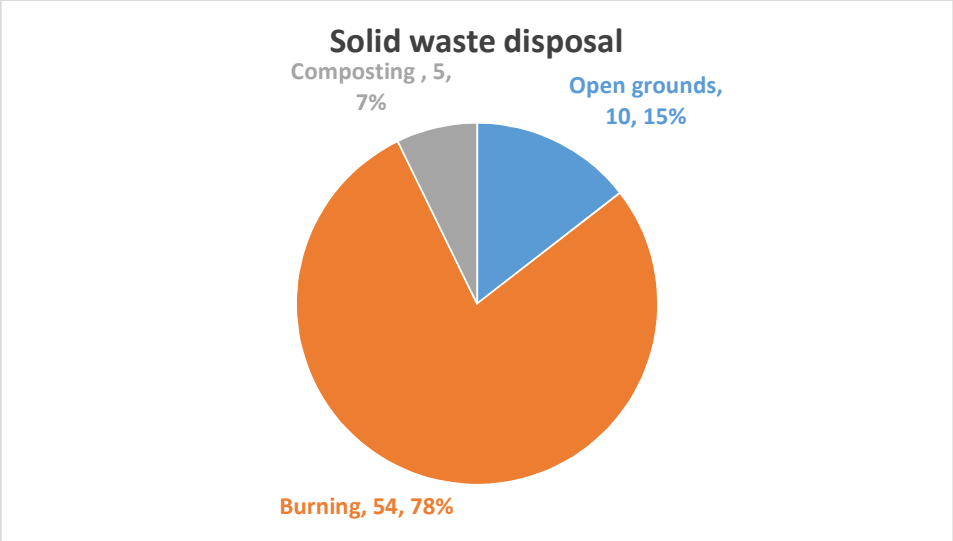


Figure 58 Solid waste disposal

4.17.2. Wastewater disposal

Majority (45%) 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 (19%), open land 17% and open grounds 14%.

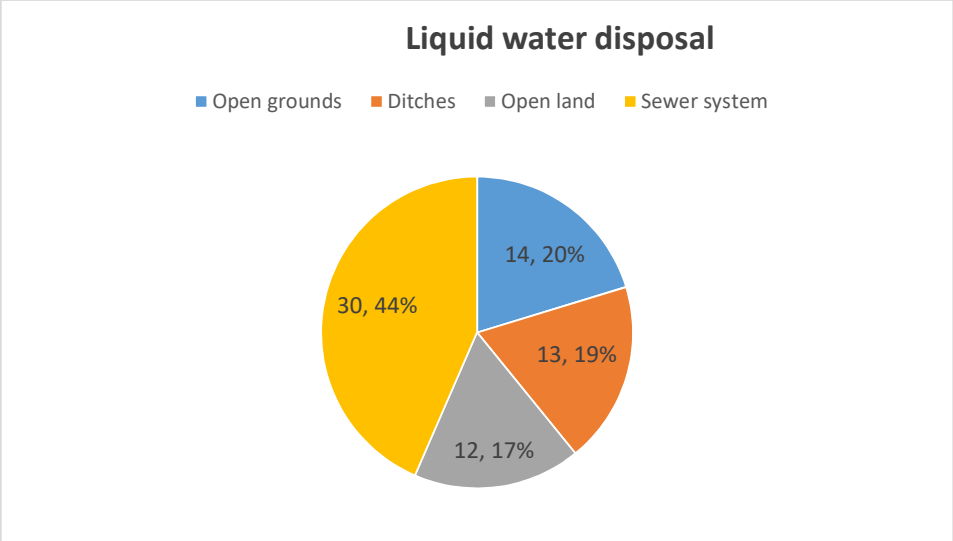


Figure 59 wastewater disposal

4.18. Environmental problems

Most (22%) of the respondents mentioned poor waste disposal and 16% climate change as the leading environmental problem in the area, 13% poor drainage, 11% drying of rivers, 8% deforestation,11% water borne diseases among others.

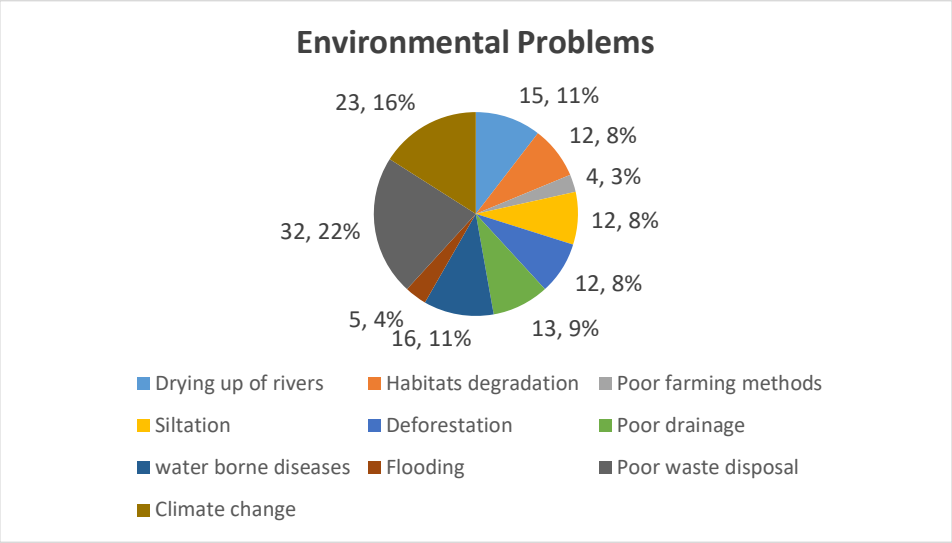


Figure 60 Environmental Challenges in the area

It was surprising that the community did not mention invasive plant species namely *Opuntia stricta*, Sodoms apple and *Senna spectabilis* (spectacular cassia). The project area at Temu and Emmanuel had a few invasive species .



Photo 4 Solanum Incanum and *Senna spectabilis* in Temu and Emmanuel pipeline area.

4.18.1. Mitigation of environmental problems

The community respondents mentioned that improving access to water (41%) is key to mitigating environmental problems. Others included: public education (18%), reforestation (18%) and heavy penalties on polluters among others.

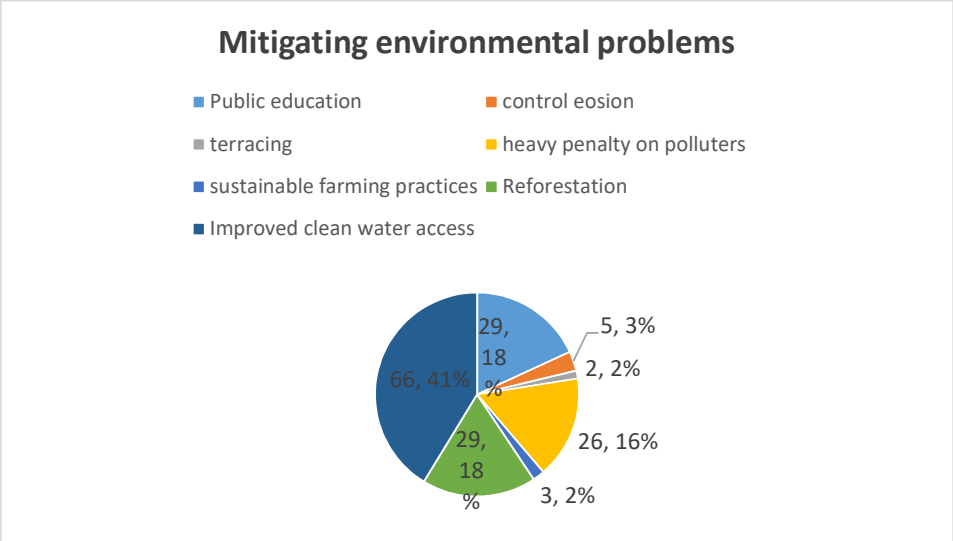


Figure 61 Mitigation of environmental problems

4.18.2. 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%).

4.19. Flora and fauna of the project area

4.19.1. 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*).



Photo 5 Acacia drepanolobium and *Opuntia stricta* growing together in the project area

The respondents indicated that they use trees in the area for firewood; fruits sale of timber, ornamental purposes and making vessels.

4.20. 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.

4.20.1. Wildlife in the area

Majority (97%) of the respondents reported that there are no wildlife in the area. However 3% 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.

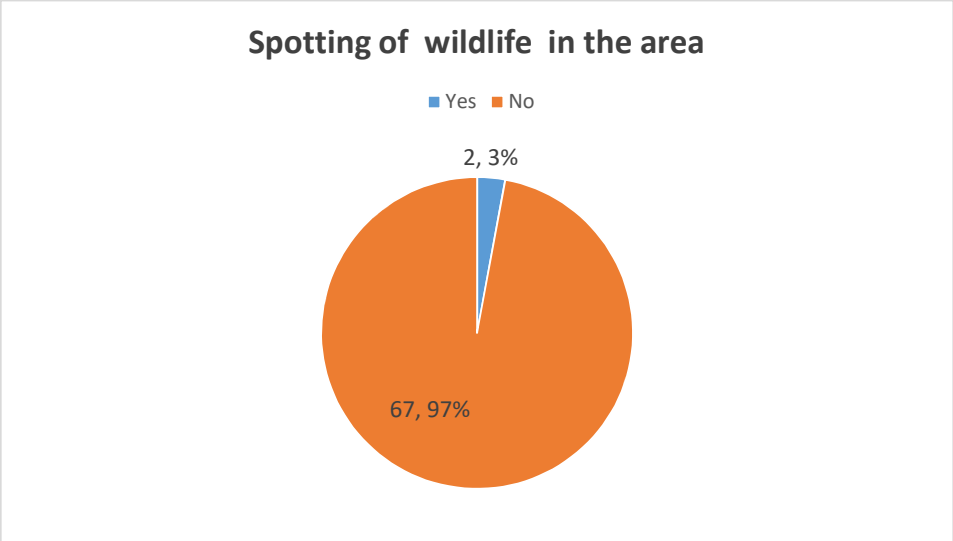


Figure 62 Presence wildlife in the area

4.21. Human Wildlife Conflicts

Human-wildlife conflicts are not common in the area with 97% of the respondents reporting no conflicts.

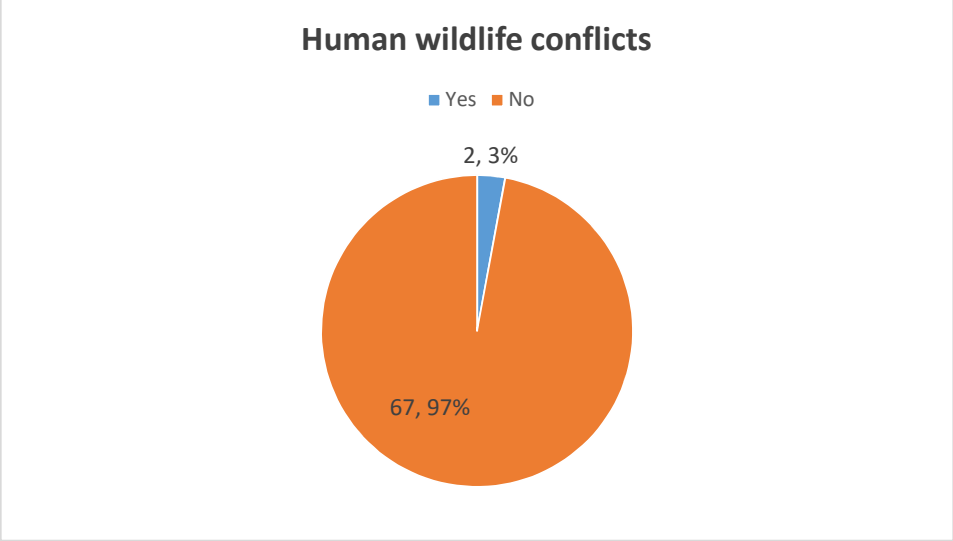


Figure 63 Presence of Human wildlife conflicts in the area

4.21.1. Main causes of Human Wildlife conflict

The most common causes of human-wildlife conflicts are due to wildlife damage to crops (15%), predating on domestic animals (9%) and attacking men (4%).

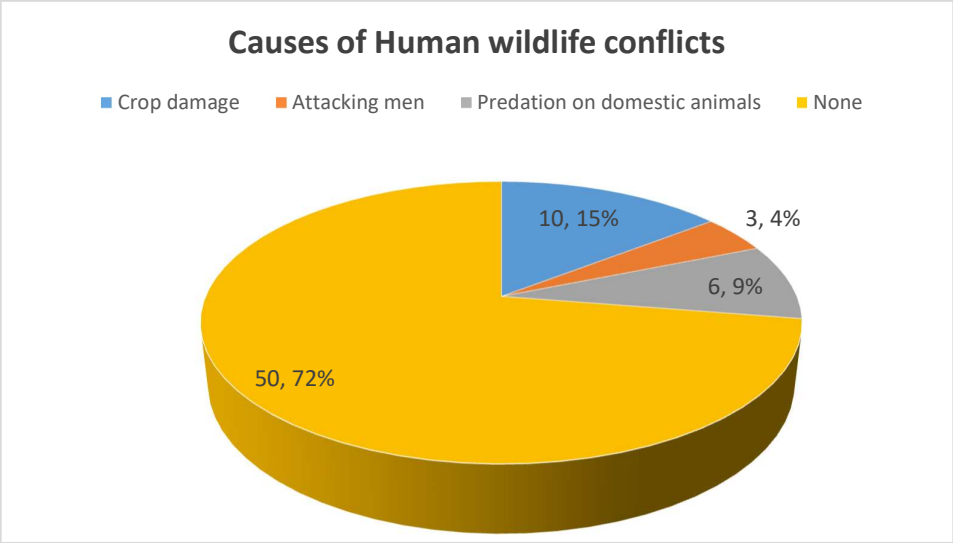


Figure 64 Main causes of human wildlife conflicts

4.21.2. Common conflict resolution mechanisms are available for use

Clan elders/chiefs (75%) are the most preferred by the respondents as a way of human-wildlife conflict resolution, religious leader were mentioned by 21% of the respondents and KWS (4%).

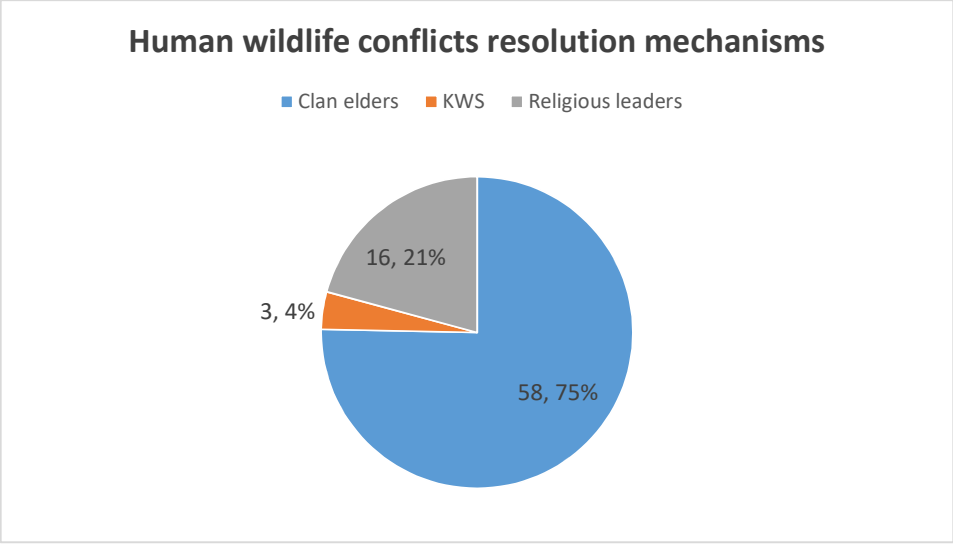


Figure 65 Available Conflict resolution parties

4.22. Notable sensitive habitats within the area

Majority of the respondents (81%)indicated that there are no sensitive habitats, 4% mentioned graves, 3% mentioned forests and 1% sloppy lands as the most notable sensitive habitats.

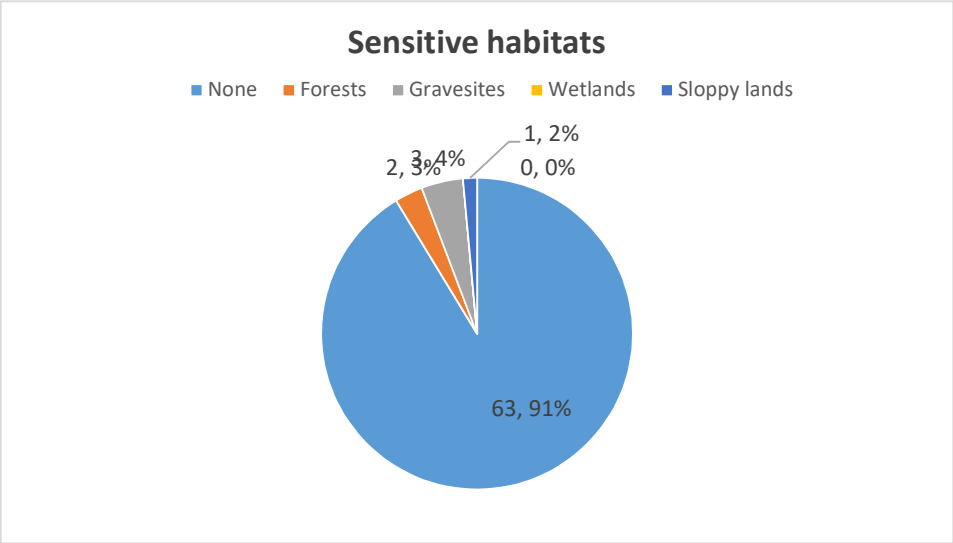


Figure 66 Sensitive habitats

Land Tenure System

Majority of the respondents (65%) are under Private Land (Freehold), 32% are under Private Land (Leasehold) and 1% are under Trust land.

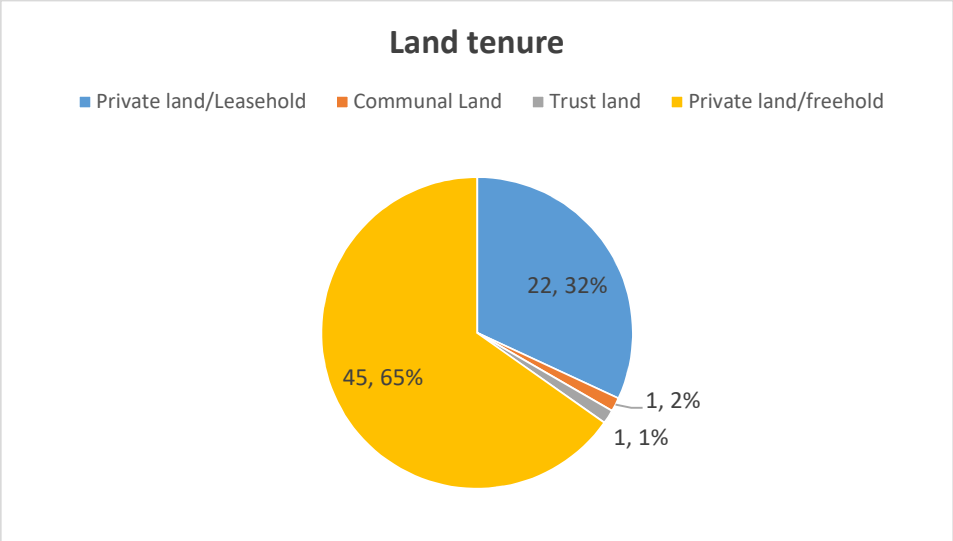


Figure 67 Land tenure

4.22.1. Category under which the household respondents Occupy the premises

Most (57%) of the respondents were land owners and 43% were tenants.

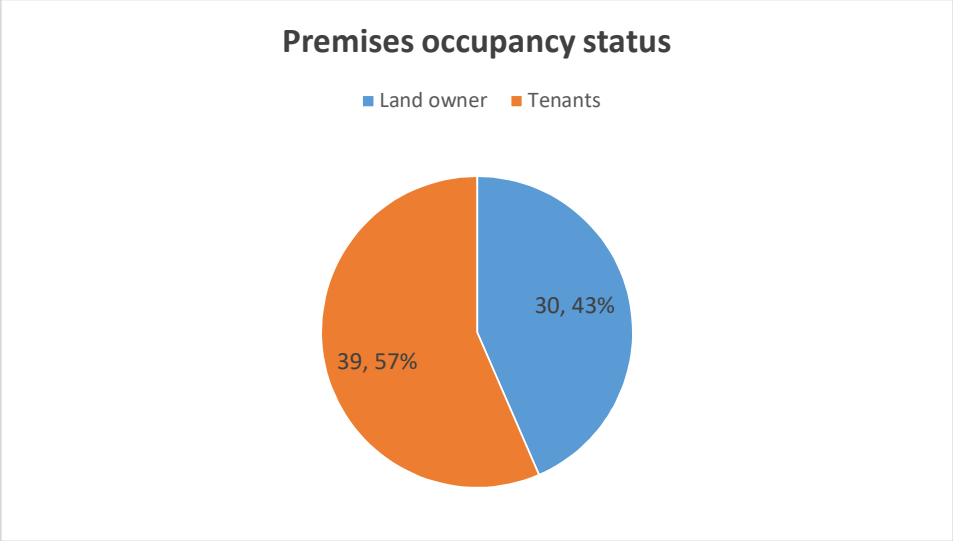


Figure 68 Premises Occupancy

4.22.2. Land use

The land is mainly used for residential purposes as indicated by 71% of the respondents followed by business premises (26%) and subsistence crop farming at 3%. No cash crop farming was reported.

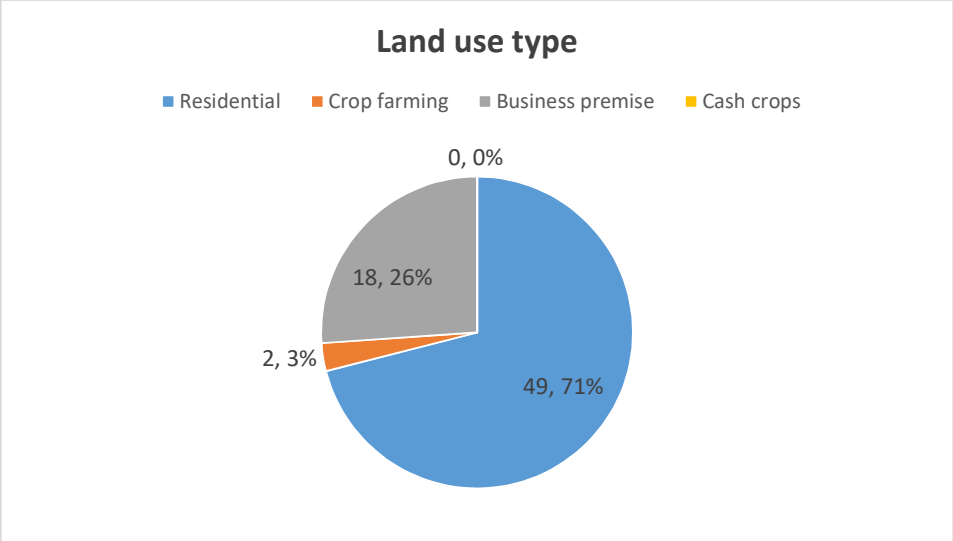


Figure 69 Land use

4.23. The Proposed Water Project

4.23.1. Awareness of the proposed Nanyuki Water Service Providers project

Majority 58% of the respondents sampled in households were aware of the proposed Kilimo pipeline rehabilitation 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.

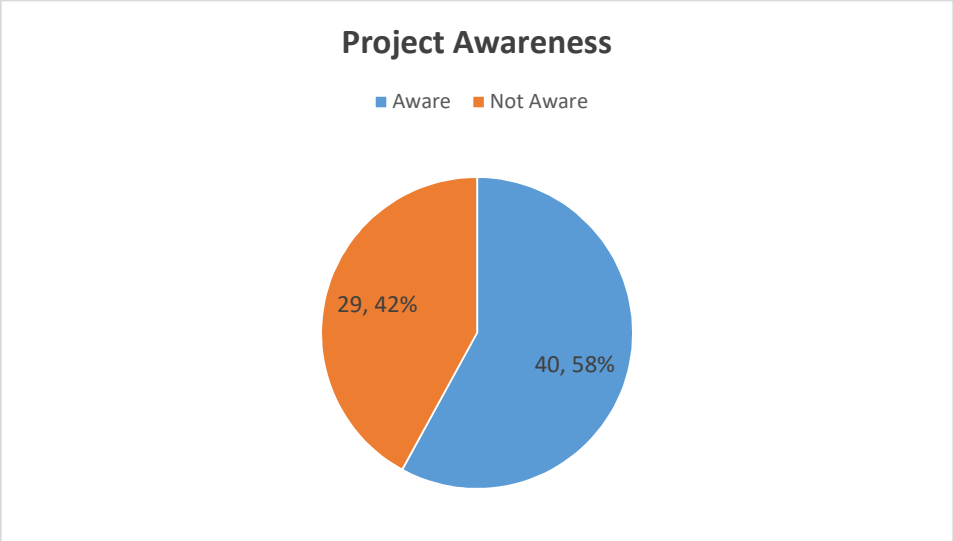


Figure 70 Project Awareness

Source of project information

Most information about the project was relayed to the community through village barazas (45%), NAWASCO 35%, local government/authority (17%) and radio (3%).

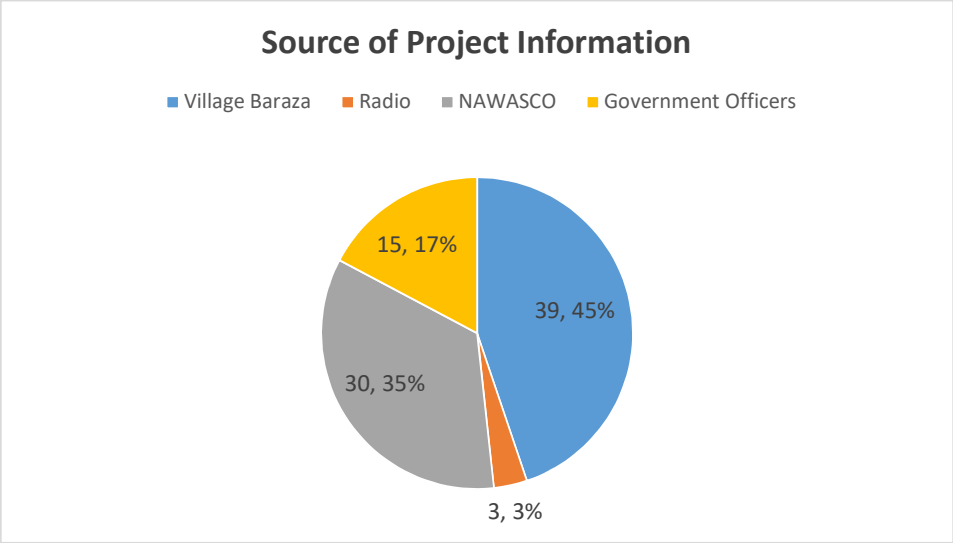


Figure 71 Source of information

4.23.2. Community support for the proposed project

During Household surveys, 93% of the respondents indicated that they would like such a project in their area and only 7% said no 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. . During the baraza held at the project sites, 100% of the attendees were supportive of the project.

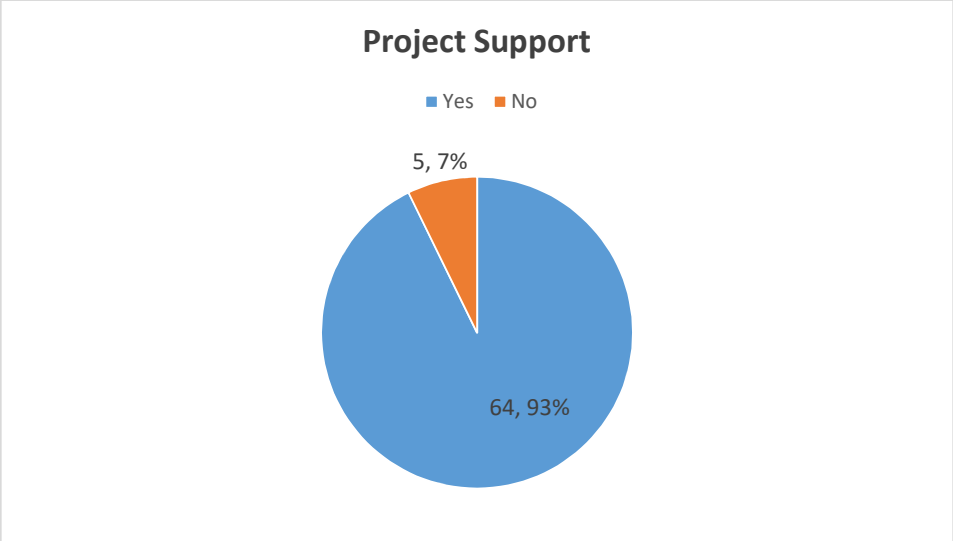


*Figure 72 **Community support for the project***

4.23.3. Project financing

The respondents indicated that both donors (32%) and government (36%) , NAWASCO (30) and community 1% should be the key financiers of the project.

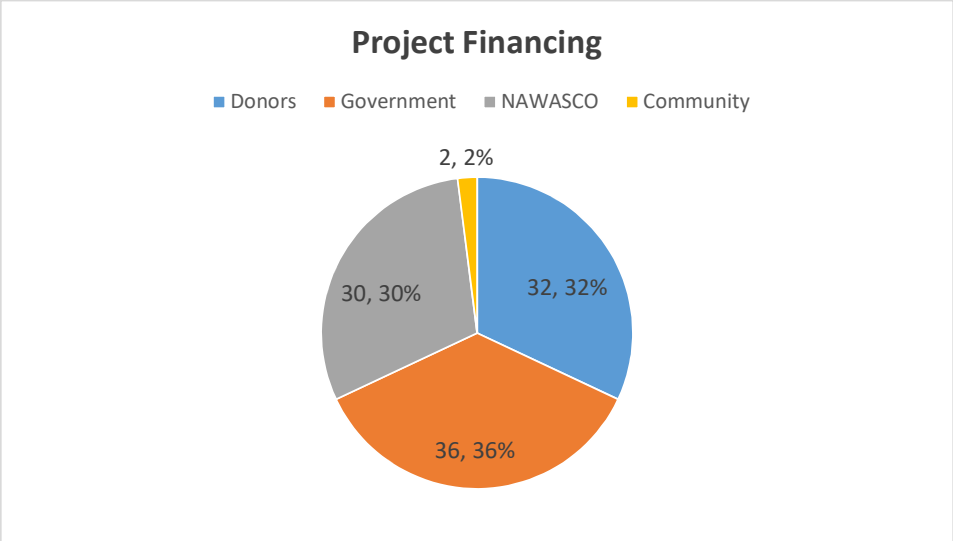


Figure 73 Project Financing

Willingness to contribute to the project

Majority (91%) of the respondents are willing to contribute to such a project. 6% indicated they were not willing to contribute and 3% were non committal. This may be because most of the residents in the area are migrant populations.

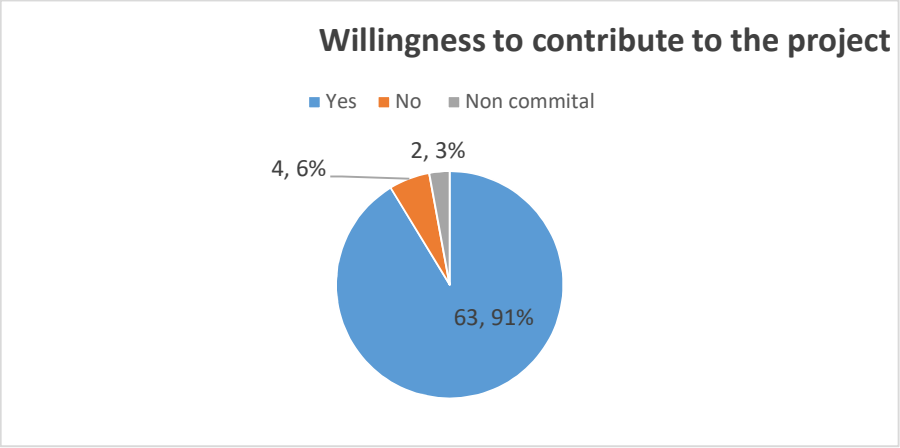


Figure 74 Willingness to contribute to the project

Majority (83%) of the respondents are willing to contribute to such a project either financially or in kind by offering labour. 17% indicated they were not willing to contribute. This may be because most of the residents in the area are migrant populations.

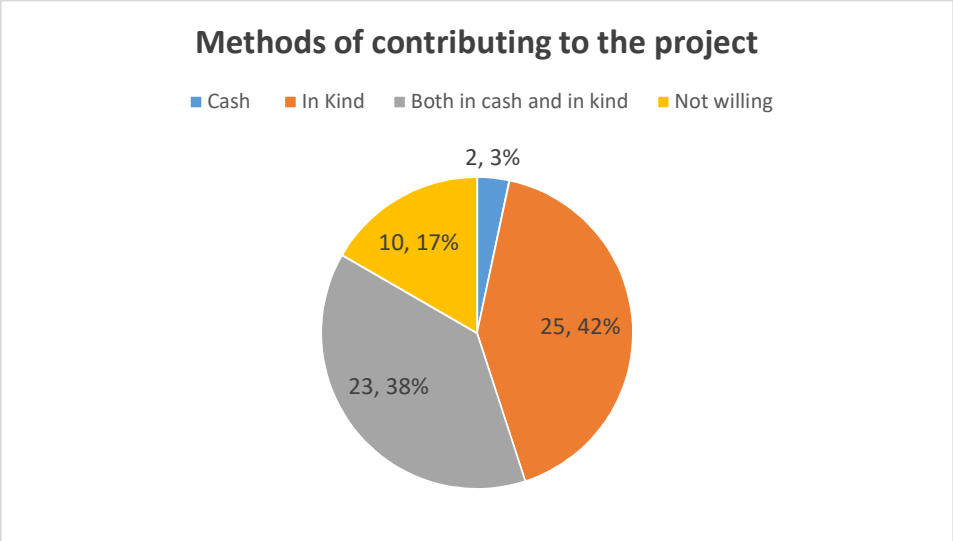


Figure 75 Modes of contribution for the project

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

- They do not own land in the area
- No finance to support the project.
- The government should fully fund such projects
- No trust in the project.

4.23.4. Benefits Anticipated from the project

The provision of safe drinking water (42%), improved water supply efficiency (39%), reduced waterborne diseases (15%) and improvement of hygiene standards (8%) are the major benefits anticipated from the proposed project.

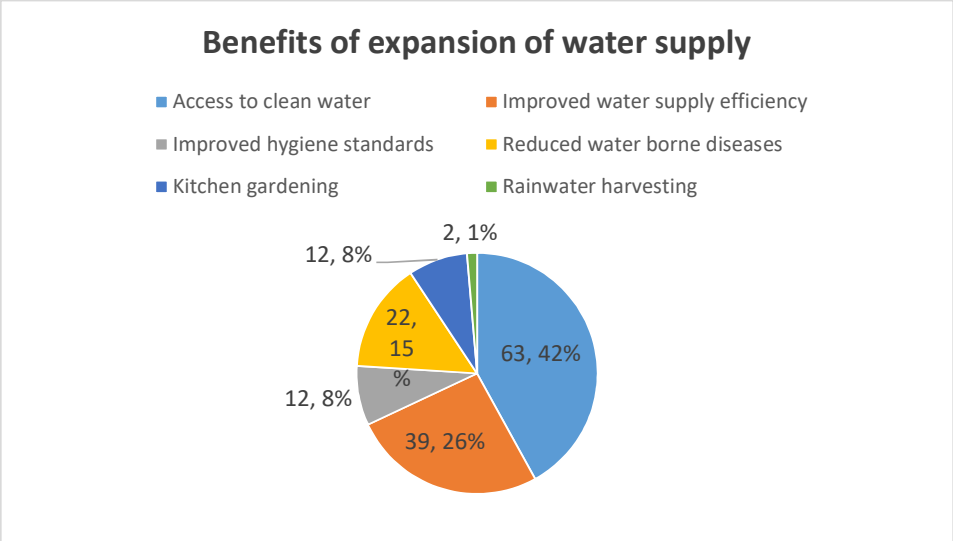


Figure 76 Benefits of the proposed Kilimo teachers project

4.24. Environmental problems anticipated from the proposed project

Some of the key environmental problems anticipated include dust generation, noise and vibration and drying up of rives. Other minor ones included: devegetation, soil degradation and water pollution among others.

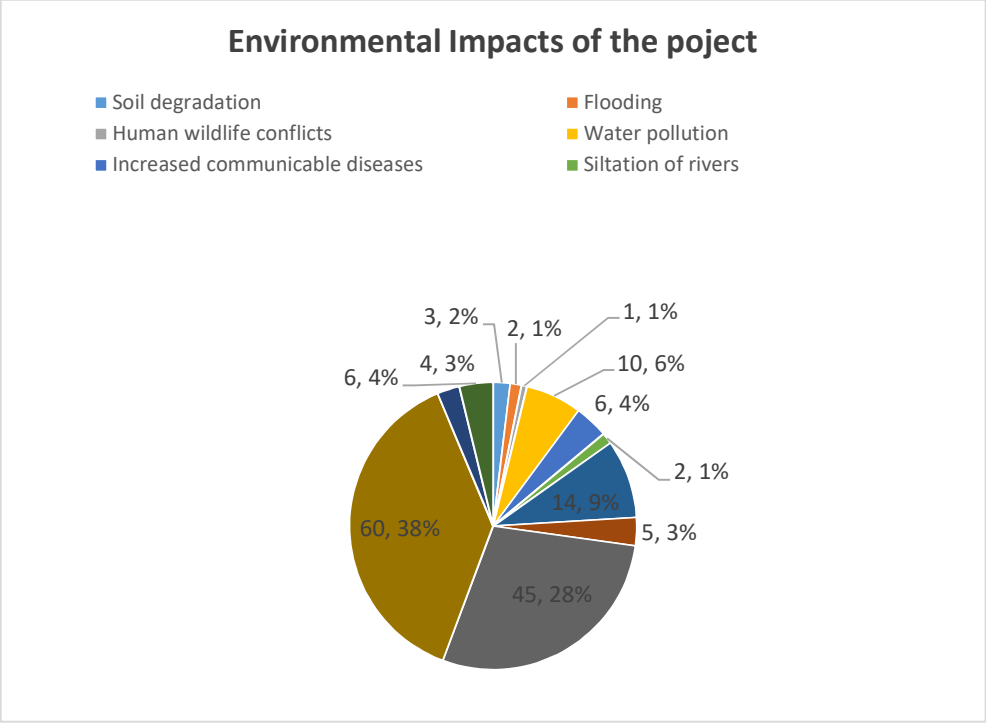


Figure 77 Anticipated negative environmental impacts

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.

4.25. Social problems anticipated from the proposed project

Majority (26%), of the respondents indicated that corruption may be a major problem especially during construction of the project. Others included human conflicts over water distribution, loss of aesthetic value of land, increased insecurity and cultural erosion.

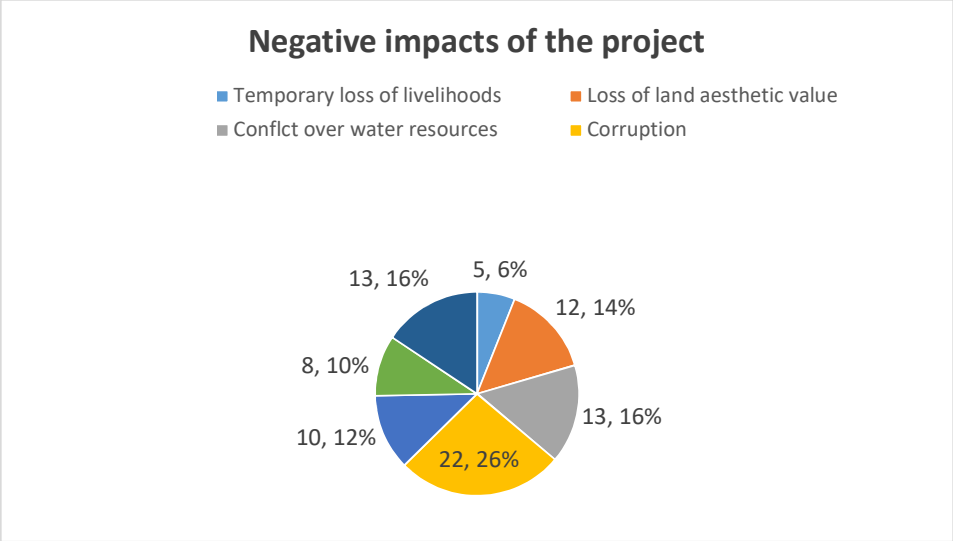


Figure 78 Social problems anticipated from the project

4.26. Gender Analysis

4.26.1. 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.

4.26.2. 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;

4.26.3. 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 wellbeing
- ✓ 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 three 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. In Temu-Emmanuel one Baraza was held.The local leaders gave their inputs on the proposed project and the way community support can be enhanced.

5.6. Community Sensitization Meetings

In summary, from the 3 areas where the barazas were held, 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.

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.

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.

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;
Devegetation due to access road construction	While opening new areas for access, the top soil shall be stockpiled and preserved for future restoration use; Seeds should be collected from seeding plants, for planting in alternate areas including upstream of the project / in the project catchment area
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 prioritised 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 redress mechanism will be put in place as part of the project initiatives
Increase in sexually transmitted diseases incidences	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..

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

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.

Community Meetings



Photo 6 *The consultants in a baraza at Temu & Emmanuel*

5.7. People Affected by the Project (PAPs)

During the field reconnaissance and the public meetings conducted with communities living within the project area and along the pipelines at Temu& Emmanuel. 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. There are no people encroaching on the road reserve. The roads along the area are recently constructed thus the informal settlements in the area may have been removed when the drainage systems were being constructed. There is no need for a livelihood restoration plan of a resettlement action plan.

5.8. Summary of Key Informants from the Government Line Ministries

1) County Government of Laikipia: Director of Environment
    - The director was not aware of the proposed project. He indicated that 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

- The office is not aware of the project of the proposed project. However the officer indicated that the project implementation in the area is ideal to 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 move people who have kiosks and other business ventures on the road reserves

3) County Government of Laikipia- County Commissioner Office

- The office is not aware of the project of the proposed project. However 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

- He indicated that he is not aware of the proposed project. However he indicated that the project 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.

6.1.4. Diverting the pipes to follow a new piping system

If this was to be chosen as an option, it would 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

Base on all the above consideration, 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

CONSEQUENCE *(Severity+ Spatial Scope + Duration)*															
LIKELIHOOD (Frequency of activity + frequency of impact)	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 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**

Decreased 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 on farm 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.

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

Temporary effect on persons living adjacent to pipes way leave

Some benefiting and non-beneficiary people living adjacent to the proposed project area will experience disturbances when the materials are being ferried. Some of the materials will also be placed in the road reserve temporarily interfering with mobility.

Impact Analysis

Impact without Mitigation	
Severity of impact	-1
Spatial scope of impact	-2
Duration of impact	-2
Frequency of activity / duration of activity	-2
Frequency of impact	-3
Result	**-25 Very low**

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.

Devegetation due to access road construction

To create access routes to the road reserves and also during pipes rehabilitation vegetation in the project area will be cleared. This may lead to loss of some plants.

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:

- There should be minimal disturbance of vegetation and agroforestry should be encouraged after commencement of the project.
- While opening new areas for road access or for the pipes, the top soil shall be stockpiled and preserved for future restoration use;
- The developer will utilize existing transport corridors whenever possible;
- Seeds should be collected from seeding plants, for planting in alternate areas including upstream of the project / in the project catchment area.

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 noise receptors include:

- ✓ Braeburn International School
- ✓ St Moses Primary School
- ✓ St Christopher School
- ✓ Nanyuki Cottage Hospital
- ✓ Emmanuel area has Mt Kenya Baptist 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:

- 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;

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 such as blocking access routes 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:

NAWASCO will set a budget as indicated in the ESMP for construction of temporary bridges.

The areas where there will be interference with access routes will be excavated last and backfilled first.

Loss of biodiversity

The proposed project will involve clearing of vegetation cover especially along the pipelines where there a few scattered indigenous trees.

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 on the area that will be cleared

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 about 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

Occupational health and safety concerns

Construction and operation activities of project that involve handling of heavy equipment, excavation with 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.
- To protect the workers from incidences of trench collapse, the following measures can be put in place: planning the trench depth, width, and slope based on soil conditions and water table levels; following occupational safety guidelines on trenching safety; . Protective Systems
- Sloping: Cut trench walls at an angle to prevent collapse (based on soil type).
- Benching: Create step-like levels in the trench walls for stability.
- Shoring: Use hydraulic or timber supports to reinforce trench walls.
- Shielding (Trench Boxes): Install protective trench boxes to prevent soil cave-ins.
- 3. Water Control
- Dewatering: Use pumps or drainage systems to remove excess water, which can weaken trench walls.
- Avoid Excavation During Heavy Rains to prevent soil saturation and collapse.
- Install Diversion Ditches to keep water away from excavation sites.
- 4. Safe Access & Egress
- Provide ladders, steps, or ramps at least every 7.5 meters (25 feet) for workers to exit quickly.
- 5. Regular Inspections
- Inspect trenches before work starts, during shifts, and after rainfalls or vibrations.
- Have a competent person conduct safety checks and approve excavation work.

- 6. Soil Pile & Heavy Equipment Positioning
- Keep excavated soil (spoils) at least 0.6 meters (2 feet) away from trench edges.
- 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:

- The spoil will be collected at a central location on the site and will be stored temporarily until removal to an appropriately permitted disposal site.

- Dumping within the surrounding area should be prohibited.
- The spoil from the site should be segregated by the contractor and disposed off in the recommended manner into different waste streams

Soil 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

There is also a possibility of disruption of cultural norms 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	-4
Frequency of activity / duration of activity	-1
Frequency of impact	-2
Result	**-24 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	-3
Duration of impact	-4
Frequency of activity / duration of activity	-1
Frequency of impact	-1
Result	**-18 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) are another potential direct effect from rehabilitation of the piping for the project. There is growing evidence that people increasingly value aesthetics in their daily life and environment. Recreation use of land will be substituted to farming activities due to presence of water for irrigation. Ground disturbance and vegetation removal may produce contrasts of watercolor, form and soil texture. Such disturbances could occur as a result of excavation for foundations and ancillary structures; trenching to bury pipes; grading and surfacing of the roads; clearing and leveling staging areas; stockpiling soil and spoils.

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.
- Maintenance of native tall trees around newly excavated areas shall be done to maintain the visual aspect of the area and to prevent visual intrusion.
- 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 cleared areas and pits will be backfilled and trees, grass planted at the end of construction of the irrigation, power and associated facilities to avoid further land degradation.
- Erosion control measures shall be implemented by the contractor to prevent siltation of the river which could affect its visual beauty.
- The contractor shall ensure that recreational activities close to construction sites are not interfered with.

Increase in communicable diseases amongst Project workers

During the construction period, increasing the number of workers population influx mobility, will affect environmental health. This poses a risk of exposure to communicable diseases such as respiratory diseases like Tuberculosis. It is important to ensure that health and sanitation issues are properly addressed by the contractor.

Impact Analysis

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

Grievances Redress during project construction

During construction grievances that may arise need to be attended to through a redress mechanism. The proposed grievances mechanism will entail:

- ✓ Engagement of an EHS Expert by the contractor who will act as a liaison person and expert in management of conflicts arising from the project.
- ✓ Documentation of all issues or matters arising during the construction phase so as to allow for follow up by NAWASCO and relevant stakeholders
- ✓ Sensitive Matters: If issues are beyond the control of the relevant persons or institutions, they should be referred to the court of law. This provides a formal legal avenue for resolving more serious or unresolved grievances.
- ✓ The Contractor will be required to prioritize local residents for recruitment, especially for unskilled labour positions.
- ✓ For specialized tasks, apprentices from the local community should be given opportunities, facilitating skills transfer and local capacity building.

- ✓ The Contractor is obligated to hold a meeting (at the inception) with community representatives and local administration. These meetings aim to communicate the project plan, design, and progress, ensuring transparency and continuous dialogue with the local community.

Operation Phase

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

Water pollution

Water pollution may arise from the increase in population putting a strain on NAWASCO water treatment infrastructure. Another source of pollution would be from sewage due to burst sewer lines and inadequate sewerage infrastructure.

Impact Analysis

Impact without Mitigation

Severity of impact	-2
Spatial scope of impact	-3
Duration of impact	-4
Frequency of activity / duration of activity	-3
Frequency of impact	-3
Result	**-54 low to medium**

To reduce the negative impacts will involve:

- Construction of sewer systems and soak pits to manage domestic waste water;
- Sensitize farmers on smart agriculture practices such as riverbank conservation and soil conservation;
- Educate farmers on pesticide contamination dangers and conservation of water bodies;

Influx of migrants

The establishment of temporary construction camps for the project workforce will increase the influx of migrants to Nanyuki project area. It is also anticipated that the promise of employment will draw residents from the neighboring areas in search of work. The influx could result in secondary effects such as increased strain on social infrastructure such as schools and hospitals; there will also be a rise in petty crimes.

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:

- Workers will be encouraged to abide by the set out company code of conduct while on duty to prevent risky interactions with community members;
- Workers will be transported to and from the construction site to limit unnecessary encounters with community members;
- The contractor will provide a communication forum with the local leaders, with women and youth groups to monitor any changes in social structure and population.

Social tensions and conflicts

These arise mainly due to:

- ✓ Acts of omission or commission by project Proponent or Contractor for example delay in honoring agreements.
- ✓ Employment opportunities.
- ✓ Misunderstanding amongst stakeholders.

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	-3
Result	**-35 Low**

Mitigation:

- Immediate action undertaken as soon as possible and within 24 hours of receipt of a complaint;
- Investigations completed within the number of days agreed upon by the

proponent and the contractors.

- All incidents or complaints about either environmental or social issues will be managed in accordance to the existing procedure in line with the legal framework.
- All incidents and complaints will be recorded in the contractors incident reporting system.

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:

- Formation of 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;
- Formation of a Grievance Redress Committee which will be responsible for ensuring proper conduct of the contractors teams and also act as a Grievance redress committee in case there are issues that may bring conflict between the community and the contractor teams.
- Water Users Association should be capacity built to resolve water use conflicts among all water users.

CUMULATIVE IMPACTS

The rehabilitation of Temu and Emmanuel 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;

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

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

GRIEVANCE REDRESS MECHANISM

A grievance log or 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 (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 Temu and Emmanuel Pipeline Rehabilitation 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)
Construction Phase						
Interference with physical settings	-Changes in the local topography during site grading and laying of pipes among others -Staging areas for drilling equipment can further impact the physical landscape	-The design shall in no way propose to implement developments that will hinder drainage, change the topography or introduce physical changes that are not in harmony with the physical setting of the Project area	-Contractor NAWASCO	Restoration of degraded sites	Minimal landscape changes	250,000 For landscaping the area along the pipelines and fixing stone barriers where the area is

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		-The structures to be developed should be aesthetically acceptable to blend in with the surrounding. -The proponent shall as much as possible complete the works in such a way that natural aesthetics shall be retained at the locations;				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)
		-Restoration shall be undertaken to ensure that the original setting is as much as possible retained.				
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	NAWASCO Contractor	-Sensitization meeting on code of conduct held -Evidence of awareness creation to locals e.g.	Zero reports of sexual abuse & exploitation	20,000 (meeting venue)

Impact domain	Impact description	Mitigation/s Remedial Action/s	Implementation agency/ies	Monitoring Indicators and Freq. (F)	Mitigation target	Mitigation Cost/s (KShs)
		locals about their rights and available reporting mechanisms		materials on the site		

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 inspection/ 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)
Disturbance and blocking access to homesteads	Excavation works may affect entry to some homesteads that are along the pipelines	• Provide a schedule of works to the community about the construction works to allow them to prepare appropriately	Contractor NAWASCO	The pipelines should be well mapped out to prevent unnecessary excavation	-Number of Sensitisation campaigns -Minutes of community meetings/barazas	80,000 to cater for community meetings and sensitisation campaign materials

		• Sensitize the community on the existing grievances redress mechanism to report any prolonged disturbance • Expedite the construction process to minimize the length of time that these impacts are experienced				and cater for construction of temporary bridges for access.
Noise Pollution	Generated from machines that will be used during	-Install portable barriers to shield compressors and other small	Contractor	Noise pollution is within	Minimal noise pollution	100,000 For hiring portable noise

	excavation of pipes and also moving the materials.	stationary equipment -Use of quiet equipment (i.e. equipment designed with noise control elements); -Construct mainly during the day;	NAWASCO	acceptable limits		barriers, and buying noise PPEs
		-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.				
		-The Contractor shall provide, free of charge, all employees with personal protective equipment	NAWASCO			
Site Safety, Security, and Health arrangements	The nature of the project brings into fore many safety, security	-The contractor shall provide a detailed safety, security and health plan for the project;	Contractor	Drafting meetings and Approved SSHP	Safety and secure sites	100,000 For safety PPEs, and hiring security

	and health issues. These range from accidental falls in the well, injuries from construction equipment or materials, poor hygiene etc.	-The project participants shall guarantee security of all the personnel working in the project; -Barriers shall be erected to prevent unauthorized access to the project sites	NAWASCO			personnel and first aid kits
		-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)	The Temu and Emmanuel project area is located East of Nanyuki town in a predominantly residential area. The project boarders the	-The Contractor and other project participants must ensure minimal or no disturbance to natural mainly grass and shrubs. The project will make provision for tree planting within	The Contractor	site visits reports	Restoration activities implemented	200,000 for tree nurseries establishment, landscaping and planting trees along the project

	Nanyuki city center and as a result it hosts a large population of people who mainly work in the town. Clearing of vegetation of conservation importance will be minimal because the area lies on a road reserve where the main vegetation is grass and	the site for site impovement.	NAWASCO KFS	Freq: continuous		area; sensitisation campaigns on conservation status and way forward.

	herbaceous weeds and a few scattered trees mainly exotic species.					
Water Quality	The selected sites are not located near waterways hence there is minimal impact on surface water. In the case of ground water, there is a probability of water pollution during the drilling process.	-Locate storage areas and compounds away from the well site -Designate an equipment servicing location away from the proposed site -Appropriate storage of fuel and materials on site	The Contractor NAWASCO Department of water- Laikipia County	Water quality assessment reports	Zero contamination	130,000 p.a (Water quality testing and waste collection)

	This may be caused by fuel leakages from equipment or vehicles and inappropriate disposal of wastes.	-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	-Create awareness to the community on the proposed project works to increase	NAWASCO	Stakeholder Engagement Feedback Mechanism		30,000

	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 affected significantly by dust emissions, school going children who are at risk of	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 -The contractor should have a watering schedule along the access road and on site to		Allocation Mechanisms		

	accidents and falls due to ongoing works, the elderly who may experience inconveniences from blocked routes and noise from machines. Vulnerable people may be sidelined during water provision.	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 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 supply, project activities, duration of the construction period,	-The project shall have in place a conflict/issues management strategy including engaging an EHS expert who will manage the project related conflicts -All matters or issues that may arise during construction shall be documented and presented to the	NAWASCO Contractor	Zero cases of conflicts Contactor's grievances management policy - Complete and accurate documentation of all construction-related issues. - Documentation and	EHS expert engaged to handle conflicts Grievances & Redress record book provided Evidence of how grievances are addressed	40,000 (EHS, grievances book , committee meetings)

	engagement of host community etc.	relevant persons- NAWASCO, Contractor, Administration Officers -Sensitive matters beyond control of the relevant persons or institutions shall be referred to the court of law. -The Contractor shall ensure that locals are given first priority during recruitment of workers. Unskilled labour opportunities		tracking of court cases. - Number of unskilled labor positions filled by locals.		

		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 completion and implementation.	-The project will provide for extensive public participation including the political class -The community shall be sensitized on negative political influence on projects implementation -The politicians shall be encouraged to desist from negative politics for the sake of the community	-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)

		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, HIV/AIDs policy element shall be expressly provided and written	The Contractor,	Visual surveys, records and sensitisation materials Grievances redresss policy - Contractor's policy on Sexual Harassment & Gender based violence	Low or zero HIV/Aids prevalence and sober and productive workforce	30,000

		-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 -Alcohol and substance abuse shall		HIV/AIDS Testing and counselling		

		be totally discouraged				
Operational Phase						
Vandalism 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 installed system, which	-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)

	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.				
Water Conservation	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 in place to	-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

	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.

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

CHAPTER 10. REFERENCES

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CHAPTER 11. APPENDICES

11.1.1. Appendix One: Household Questionnaire

HOUSEHOLD QUESTIONNAIRE FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED INTERVENTIONS FOR ISIOLO NANYUKI AND MANDERA WATER SERVICE PROVIDERS

	Date	Start time:	Questionnaire number:		
		End time:	Enumerator Name:	Initials:	
			Supervisor Name:	Sign:	

A: LOCATION

A1	County Name	A2) Sub County	A3) Location	A4) Village name

B	**BIODATA/ DEMOGRAPHIC CHARACTERISTICS**					
B1	Respondent Details	Name:	Telephone contact	ID No.	Relation to HH head	
B2	Sex (circle)	F	M	B3) AGE at last birthday (write figure)		
B4	Household Members	Adults	No:			
		Children	No:			
B5	Can you read and write?		1) yes	2) No		
B6	What kind of education do you have (*write figure of correct response in box provided across the page)*		1) lower primary 2) Upper primary 3) Lower Secondary 4) Upper secondary 5) University 6) Technical / vocational College 7) Teacher training school 8) No formal school 9) non formal literacy classes 10) Apprenticeship 11) Other (specify)			
	What kind of education does your spouse have					
	What kind of education do your children have					

B7	What is your main occupation/socioeconomic activity? Don't circle more than 2 responses:			
	1) Pastoralist 2) Crop farming 3) Mixed farming 5) Bee keeping 6) Hunting 7) Charcoal burning 8) Businessman/Trading 9) Teaching 10) welding 11) Police 12) Casual farm labour 13) Casual domestic Labour 14) Boda boda 15) carpentry 16) tailoring 17) construction,18) hairdressing, 19) health worker, 20) kiosk 21) security guard 22) Others (specify).			
C: FOOD SOURCES AND FOOD SECURITY				
C1	What does your household feed on daily?	1) Milk 2) Meat 3) Millet 4) Sorghum 5) Cassava 6) Beans 7) Pigeon Peas 8) Rice 9) Bananas 10) Vegetables 11) Sweet potatoes 12) Wild food 13) Others		
C2	Where do you get the food from?	1) Grow it ourselves 2) Buy 3) Provide labour for food 4) Exchange for other items 5) Borrow 6) Hunting/ wild food 7) Given by relatives/ friends/neighbours 8) Food aid from Gov. or NGOs 9) Other, specify		
D: HOUSING				
D1	How long has your household inhabited this dwelling	1) Less than 6 months 2)6-12 months 3)1-5 years 4)5-10 years 5) 10+years		
D2	Who owns the house you live in?	1)Self 2) Husband 3) Wife 4) Jointly owned (5) Rented (6) A relative (7) Friend (8) Other (specify)		
D3	Observe and write response in box provided to indicate what materials the walls, roof and floor of the Main House are made of	Walls	1) Iron sheets 2) Bamboo 3) Unburnt Bricks 4) Burnt bricks 5) corrugated Iron sheets 9) Earth/clay 10) Grass thatch / leaves 11) Hardened dung 12) Mud and acacia trees 13) Stone 14) Other (specify)	
		Roof		
		Floor		
D4	Comment on the general condition of the house/ household	1) Very bad 2) bad 3) neither bad nor good 4) Good 5) Very Good		
D5	Other than habitation what else do you use the house for	1) Storage 2) share with animals 3) Other (specify		
E ENERGY SOURCES AND USES				
E1	What sources of fuel / energy do you use for the following; (Write the response figures in the box provided)	For Cooking	1) Firewood 2) Charcoal 3) Paraffin/ kerosene 4) Charcoal briquettes 5) Electricity 6) Biogas 7) Grass / Crop residue 8) Gas/LPG 9) Solar 10) Batteries / dry cells 11) Cow dung 12) Plastic bags	
		For Lighting		
		For Electronic		

		gadgets / sound	13) Pressure lamp 14) Candles 15) Nothing 16) Biogas 17) Other (specify)	
E2	Do you have electricity in your homestead?	1) Yes	2) No.	
F: HEALTH:				
F1	Has anyone in your homestead been ill, had an accident in the past 1 Month? (circle response)	1) Yes	2) No	
F2 F3	What were the (3) most common illnesses, health issue in your Household this year?1) Malaria 2) Diarrhoea 3) Flue / cough 4) Intestinal worms 5) Pneumonia 6)Skin disease 7) Cholera 8) Eye infection 9) Kwashiorkor 10) Typhoid 11) Dysentery 12) Bilharzia 13) Amoeba 14) Jiggers 15) Dehydration 16) Farm accident patient 17) Motorcycle accident patient 18) Motor vehicle accident patient 19) Other (specify)			
F4	What were the (3) common water borne diseases experienced in the household over the last one year?1) Malaria 2) Diarrhoea 3) Cholera 4) Typhoid 5) Dysentery 6) Bilharzia 7) Amoeba			
F5	What kind of health facility do you and your family use? (Circle the response)	1)Government hospital / health centre 2) FBO Hospital 3) NGO Hospital 4) Private hospital 5) Private clinic 6) Pharmacy 7) Drug shop 8) Herbalist 9) Do not use any 10)Other (specify)		
F6	Who attends to you at this health centre / facility? (Circle the response)1) Doctor 2) Nurse 3) Clinical Officer 4) Nursing Aid 5) Pharmacists 6) Traditional Birth Attendants 7) Herbalist			
F7	How far is the nearest health centre in Kilometres? (write figure)			
F8	What time does it take to reach the nearest health facility in minutes?	1)Below 15 minutes 2)15-30 minutes 3)30-1 hour 4)1-2 hours 5) More than 2 hours		
F9	How satisfied are you with the services offered at the health facility?	1) Very satisfied 2) Satisfied 3) Indifferent 4)Not satisfied 5) Very dissatisfied		
F10	If not satisfied, what are the reasons for being dissatisfied?	1) Services are very expensive 2)No drugs 3)Doctors/nurses are not friendly 4)Delays in being attended to 5)Facility is dirty 6) Its very far 7)Other (specify)		
F11	Are you aware of any HIV /AIDS awareness campaign in your Community?	1) Yes 2) No		
F12	What is the medium of HIV/AIDS campaign	1) Posters/public notice 2) Radio 3) Baraza 4)Seminars 5) Newspaper 6)Clinics 7) Drama 8) (Other(specify)		
F13	Are you clearly knowledgeable of the HIV/AIDS means of contraction and effects?	1) Yes	2) No	

F14	Do members of your household have access to mosquito nets?	1) Yes	2) No (skip to F20)
F15	If yes, who sleeps under the mosquito net?	1) ALL HH members 2) Children below 5 years 3) Pregnant mothers 4) Visitors 5) Other (Specify)	
F16	What other actions do you take to control mosquitoes and prevent malaria?		
F21	What other important disease carrying vectors do you have in your area?		

G: WATER ACCESS; FACILITIES and SANITATION

G1	What is your main source of drinking water? (write figure in box provided)	1) Pump/borehole 2) Protected well 3) Unprotected well 4) Stream/ river 5) Protected spring 6) Unprotected spring 7) Stagnant pond 8) Public tap 9) Tap outside the house 10) Tap inside house 11) Rain water harvesting 12) Water vendor 13) Other, specify	
G2	Which is your preferred water source?		
G3	What is your main source of water for domestic animals?		
G5	How far is the nearest source of water for drinking? (Write in Km)		
G6	Time taken to water source and back during wet season?	1) 0 – 15 min 2) 16 – 30 min 3) 31 – 45 min 4) 46 – 60 min 5) more than 60 minutes 6) Other (specify)	
G7	Time taken to water source and back during dry season?		
G8	Do you use the same sources of water for drinking and for other household needs?	1) Yes (If yes skip to G10)	2) No
G9	If no, what is the main source of water for other household needs?	1) Pump/borehole 2) Protected well 3) Unprotected well 4) The river 5) Protected spring 6) Unprotected spring 7) Stagnant pond 8) Public tap 9) Tap outside the house 10) Tap inside house 11) Rain water harvesting 12(Other, specify	
G10	How many litres of water do you use per day?		
G11	Do you get you water from WSP (Nanyuki, Isiolo, Mandera)	1) Yes	2) No
G12	If yes, how often is the water supplied?	1) Daily 2)Alternate days of the week 3)Weekly 4) Irregularl	
G13	Do you pay for the WSP water you consume/use?	1) Yes	2) No (skip G 13)

G14	How much do you pay for water on a monthly basis (Ksh)?		a)100 to 500 b) 501 to 1000 c) 1000 to 1500 d)1501 to 2000 e) 0ver 2000	
G15	How satisfied are you with the current water supply in your area?	Highly Satisfied	5	Explain your response
		Satisfied	4	
		Neutral	3	
		Not Satisfied	2	
		Very Dissatisfied	1	
G16	Would you want the current water supply changed or improved?		1) yes	2) No
G17	Would you be willing to pay for improved water services?		1) yes	2) No (skip to G19)
G18	If Yes how much would you be willing to pay per month (Ksh)?			
G19	If no, why are you unwilling to pay for the improved water services? 1) Yes 2) No			
G20	Who is responsible for fetching water in your HH?		1) Boy child 2) Girl child 3) Boy youth 4) Girl youth 5) Adult men 6) Adult women 7) Hired help 8) Other Specify	
G21	Do you harvest rain water for use by your HH		1) Yes	2) No
G22	If Yes, how is water harvested		1) In tanks,2) Household containers (Jerry cans, basins, pots and pans) 3) shallow hand dug holes 4) Other specify)	
H	**SANITATION FACILITIES AND SERVICES**			
H1	When do you wash your hands? 1) Before eating2) After eating 3) after working outside 4) after using the toilet 5) before handling infants 6) after handling infants			
H2	Does the household have a latrine / other toilet facility?		1) Yes	2) No
H3	Specify the kind of latrine / toilet facility present		1) urinal with stones	2) pit latrine with wall and roof
			3) pit with raised slab	4) Pit with wooden floor
			5) Pit latrine without a raised slab	6) Ventilated improved pit (VIP) latrine.
			7) Flush toilet private	8) Grass thatched enclosure

		9(Flush toilet public (Go to H4)	10) Other (specify)
H4	Assess the status of the latrine/toilet		1)Very dirty 2) Dirty 3) Fairly clean 4) Clean 5) Very clean
H5	Do you have a Hand wash facility next to the latrine/toilet?	1) Yes	2) No
H7	Does your household have a bathroom / Bath shelter?	1) Yes	2) No
H9	What sanitation challenges do you face in your household?		
H10	What are your suggestions for improving sanitation in the area?		
H11	Who are the main water and sewerage service providers in the area?		

I: HOUSEHOLD INCOME

I-1	How much do you earn from agricultural activities per year?		
	1. Farm produce sold	Quantity	Income in KES/year
	2. Cattle		
	3. Goats		
	4. Sheep		
	5. Maize		
	6. Beans		
	7. Sorghum		
	8. Honey		
	9. Milk		
	10. Charcoal		
	11. Other Specify..		
	12. Other Specify…		
I-2	What is your household's average income per month when all	Less than Kshs 5,000 Kshs 5,001 – 10,000	

	sources of income are considered?	Kshs 10,001 – 15,000 Kshs 15,001 – 20,000 Kshs 20,001 – 50,000 Kshs 50,001 – 100,000 Kshs 100,001 – 250,000 Kshs 250,001 – 500,000
J: HOUSEHOLD EXPENDITURE		
J1	How much do you spend on the following per month (KES)	
	Food	
	Clothing	
	School expenses, uniforms, books	
	Travel and transport	
	Agricultural inputs, including animal care	
	Medical expenses (hospital visits, drugs)	
	Water	
	Savings	
	Communication	
	Recreational and culture	
	Fuel (kerosene, firewood, gas, charcoal, etc)	
	Miscellaneous goods and services	
	Other unclassified expenses	
P. SOCIAL CAPITAL AND CULTURAL VALUES		
P1	Which social support groups or organizations are you a member?	1. None 2. Women group 3. Cultural groups 4. Men's group 5. Farmers cooperative 6. Youth group

P2	Which type of support do you get from groups/organizations?	1. Credit 2. Extension services 3. Marketing
P3	Name the non-government organizations (NGOs) working in the area	1……2…… 3……4……
P4	Which cultural heritage/sites exist in the area?	1. Caves 2. Shrines 3. Ritual grounds 4. Graves
P5	Which cultural ceremonies are conducted by entire community?	1. Circumcision 2. Age-grade transition 3.
P6	Are there recreational facilities in your area?	1. Yes 2. No.
P8	If yes, name these recreational facilities	1……2……..…..3…….

Q: ENVIRONMENT

Q1	What are some of the major environmental problems in the area?1)Drying of rivers 2(Deforestation 3)Climate change 4)Degradation of the habitats 5)Poor water drainage 6)Flooding 7)Invasive species 8)Siltation 9)Water borne diseases 10)Landslides and earthquakes 11) Poor waste disposal methods 12)Poor farming methods Other(specify)		
Q2	What in your opinion can be done to Mitigate these environmental problems? 1)Public education 2)Re-forestation 3)Control of soil erosion 4)Terracing 5)Heavy penalty on polluters 6)Don't know 7)Improving access to clean safe drinking water 8) Sustainable farming practise 9)Nothing 10) God's intervention11) Other(specify)		
Q3	How do you dispose solid wastes from your homestead?	1)Compost pit 2)Burning 3)Open land 4)Other(specify)	
Q4	How do you dispose waste water from your homestead?	1)Sewer system 2)Open ditches 3)Open land 4)Other (specify)	
Q5	Main sources of information on environmental issues: 1) Meeting/training 2)Radio 3) TV 4)Educational Institutions 5) Internet 6) None 7)Others (specify)		
Q6	Common tree species on your land		
Q7	How are these trees used?1)Fruit/food 2)Sale of timber 3)Fetch firewood 4)Ornamental value 5)Medicinal value 6)Craft 7) Making household vessels 8) Others(specify)		
Q8	What are the common animals in the area ?		

Q9	What is the value / use of these animals?		
Q10	What are the notable sensitive habitats within this area? 1)Forests 2)Wetlands 3)Cultural sites 4)Dams 5)Sloppy lands 6) None 7) Others(specify)		
Q11	What are some of the manifestations of climate change in this area 1) None2) Flooding 3) Drought4) Drying up of water sources 5) increase in crop pests and diseases 6) Increase in human diseases 7) Increase in livestock diseases 8)Others (specify)		
R: LAND TENURE AND OWNERSHIP			
R1	What type of land tenure system are you under	1) Private land (freehold) 2) Private Land (leasehold) 3) Trust land 4) Government Land (define)	
R2	Which category do you fall under	1) Land owner 2) Tenant 3) Squatter 4) Other (specify)	
R3	What are the current land uses on site?1) Residential 2) Cash crop farming 3) Subsistence farming 4) Business premises 5) Pasture/ fodder/ grazing grounds 6) Graves/ burial site 7) other (specify)		
R4	What type of recognised RECORD does the landowner of this parcel of land have to prove legal rights to occupy or use this parcel of land? (circle the appropriate answer) 1)Do not know None 3)Title Deed 4)Sale Agreement 5)Allotment Letter 6) Share certificate 7) Lease Agreement 8) Others (specify)		
R5	If there is NO RECORD, what method does the landowner of this parcel of land use to claim legal rights to occupy or use this parcel of land? (circle the appropriate answer) 1)Do not know 2)None 3)Inheritance 4)Other (Specify)		
S: CONFLICTS ON LAND USE			
S1	What are the 3 most important resources for you on communally owned / common lands? 1) Forests 2) Wild life 3) Honey 4) Water points 5) Firewood 6) Timber 7) Wild food sources 8) Sand 9) Stone 10) Other (specify)		
S2	Do you have wildlife in your area	1)Yes	2)No
S3	If yes, which animals? 1)Elephants 2) Giraffes 3) Buffaloes 4) Rhinos 50 Leopards 6) Lions 7) Gazelles 8) Zebras 9) Warthogs 10) Waterbucks 11) Mongoose 12) Foxes 13) Monkeys 14) State any others		
S4	Are there animal migratory corridors in your area	1)Yes	2)No
S5	If yes, which animals usually pass through those corridors? 1)Elephants 2) Giraffes 3) Buffaloes 4) Rhinos 50 Leopards 6) Lions 7) Gazelles 8) Zebras 9) Warthogs 10) Waterbucks 11) Mongoose 12) Foxes 13) Monkeys 14) State any others		
S6	Do human wildlife conflicts occur in your area ?	1) Yes	2) No
S7	If yes, what is the main source of conflicts? 1) Wildlife attacking man 2) Predating on domestic animals 3) Damage to crops 4) Human death caused by wildlife		

S8	Has the conflict been addressed and/or resolved?	1) Yes	2) No
S9	What are the common conflict resolution mechanisms are available to use?	1)Family 2) Religious leaders 3) Clan / Elders/ chiefs 5) Courts of law 6) Don't know 7) Other (specify)	
T: PROJECT AWARENESS, COMMUNITY WILLINGNESS TO PARTICIPATE AND PROJECT BENEFITS			
T1	Are you aware of the proposed WSP project in your area?	1)Yes	2)No (Skip toT3)
T2	If yes, how did you get that information? 1) Local gov. / authority. 2)Traders 3) Radio, 4) TV, 5) newspaper 6) Extension workers 7) Local government officials 8) Local politicians 9) Local church 10) Village Baraza 11) Friends/relatives 7) Local Committees (specify) …… 8) Other(specify)		
T3	Would you like to have such a Project in this area?	1)Yes	2)No
T4	If No, Why?		
T5	If the proposed Boehole/pipelines, pass through your land, are you willing to cede the land?	1)Yes	2)No
T6	If No, why?		
T7	What do you propose to be the main use of the water from the project?	Rank in order of priority) 1. 2. 3. 4	
T8	In your opinion how such a project should be financed?	1) By donors 2)By govt. 3) Donors and Gov. 4) By Farmers 5) Farmers and Gov 6) Donors / Gov. /Farmers 7) Don't know. 8) Other (specify)	
T9	Would you be willing to contribute toward the project cost	1)Yes	2)No (skip to K 12)
T10	If YES, How?	1)In cash 2) In kind 3) Both Cash and kind 4) Other (specify)	
T11	If NO, why?		
T12	Anticipated Social Benefits of the proposed Project.	1) Safe drinking water 2) Decreased water borne diseases 3)Better hygiene/sanitation 4)Improved School attendance 5) Time Savings 6) Income Generation 7)	

		Reduced Burden on Women and Girls 8) Increased community Participation Improved Living Standards
T13	What are the environmental benefits anticipated due to the proposed project?	1)Provision of safe drinking water 2) Improvement of hygiene standards 3) Reduce water borne diseases 4) Control flooding 5) Rain water harvesting 7) Improve water Supply efficiency 8)Any other (specify)
T14	What are some of the Environmental problems you anticipate due to the proposed project? 1) Soil degradation 2) flooding 3) Human wildlife conflicts 4) Devegetation/deforestation 5) Water pollution 6) Increased Water borne diseases 7) Siltation of water bodies 7) Drying up of Rivers 8) Contamination of ground water 9) Generate noise and vibrations 10) Loss of aquatic and terrestrial fauna 11) Generation of dust 12) Soil erosion 13) Diversion of water sources 14) Blockage of drainage systems 15) Loss of biodiversity Any other (Specify)	
T15	How can you mitigate the anticipated environmental problems emanating from the proposed project?	
T16	What are some of the Social problems you anticipate due to the proposed project? 1) Temporary loss of livelihoods 2) Loss of aesthetic land value 3)Increased exposure of the community to Gender Based Violence (GBV) / Sexual Exploitation and Sexual Abuse (SEA) or STDs 5) Corruption of social cultural norms and practices 6) Lead to child delinquency (school drop-outs, child abuse, child labour) 4) Loss of cultural and religious sites 5) Human human conflicts 6) Human wildlife conflicts 7) Increased food prices 8) Displacement of people 7) Compromising safety 8) Increased Insecurity 9)	
T17	Highlight the mitigation measures that can be used to reduce the negative impacts from the project	

11.1.2. Appendix 2 Key informant Interview and Focus Groups Discussion Schedule

FOCUS GROUP DISCUSSION
Facilitator Instructions: The purpose of the meeting is to gather information on role in the household, livelihoods/jobs, health issues, challenges, perceptions on quality of life, education options for children, health care and project perceptions. Introduce yourselves, the project and explain the purpose of the meeting. Gather a representative sample of a maximum of 10 per group that include a combination of male, female, youth, elderly and disabled where appropriate. Keep the discussion focused and please probe for explanations for responses (what, where, when, why, how). Take lots of pictures. Ensure everyone participates in the discussion. Project introductory statement: The Ministry of Water, Sanitation and Irrigation (MoWS&I) is implementing 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 aims at improving water supply and sanitation services and improve the financial performance of Water Service Providers (WSPs) affected by the COVID-19 pandemic. We are undertaking an environmental and social impact study for

_____WSPs to gather information to understand the potential impacts of the project and gather feedback on the project. Show the participants the layouts/models				
Section A: General Information		Responses		
1	Date		time of meeting	Start time:
				End time:
2	Name of facilitators (include note taker)			
3	Number of participants			
Section B: The Project				
1	Are you aware of this water project? - How did you hear about it? - What do you know about the project			
2	What is your overall view/feeling on the project? (positive, negative, please explain why)			
3	What concerns or negative impacts do you foresee for the community?			

	- How do you think that the project could minimize or avoid negative impacts on the community?	
4	What specific benefits do you anticipate? - How can the project enhance its positive impacts on the community and environment?	
5	What are your expectations from the project developers and the government?	
Section C: Role of Women/men/youth		
1	What roles do men/women/youth typically undertake in the community? - Please consider roles in home and livelihoods.	

2	Do men and women have equal opportunities in the community, workplace, and education? (Provide specific examples of inequality/equality and contributing factors)	
3	What resources do women mainly have control of compared to men, and vice versa? (e.g., land, assets, natural resources) Please explain response.	
4	Do women/men feel safe in the community? (explain any specific safety concerns) - Are there any particular crimes that are common in the community? - Have you experienced any conflicts related to land in the community? Please explain your responses	
5	What challenges do women and girls/men face in the community?	
6	Approximate percantage of females headed households in the community - What is the main reason for this?	

	- Are there any specific challenges that female headed households face?	
7	How do you receive information about local issues and developments in the community?	
8	Are the roles of women and men changing? If YES, how?	
Section D: Institutions / Community Development		
1	Are women involved in decision making both at household and community level? If YES, how are they involved? a) To what extent do the youth play a role in decision making? - Do they feel that their voices are heard?	
2	Are any other governmental, NGOs/CBOs working here in water sector? - If yes, which ones and what do they do? How successful have the projects been?	

Section E: Economy/Income Generation		
1	From which economic activity do you get the majority of income? - What is the second most important source?	
2	Do women tend to contribute more or less than men to household income? Why? - What could women/men/youth do to have greater economic opportunities in this area?	
3	What economic changes do you expect from the project? (probes: employment opportunities, local business impacts, land value changes etc)	
4	What is the approximate percantage of uneployment in the community? - What potential of self employment are there? - What are the main jobs the youths have?	
5	Do you foresee any negative economic impacts? (E.g., displacement, loss of agricultural land, cost of living changes)	
Section F: Land Use		

1	What is the main land-based activities do you undertake?	
2	Do you practice Agriculture? YES/NO What percentage is for household consumption and what percentage do you sell?	If Yes, what are the main crops grown? % Household consumption: % For sale:
3	What are the main animals that people keep in the community? - is this a subsistence activity or an income-generating activity?	
	What experiences of gender-based violence (GBV) are there within the community?? - If YESl, what are the most common types of GBVs in the community? - What can be done to address GBV in the locality?	

	Do you have support centers for GBV cases (Government/ Non-government)	
Section G: Education, Literacy and Training		
1	How would you describe accessibility and quality of education in your community? - Average distance in km and the levels of schools accessed	
2	Can girls/women/men in the community generally read and write? YES/NO - What barriers to education exist in your community - What specific needs for educational improvement do you identify?	
Section H: Health		
1	How and where do you access healthcare? - Do the services available meet your needs?	
2	What are the top 3 health problems that girls/women/men face in the community? (Please	1.

	explain the reason for each of the health issues) - Are there any particular times of the year where these issues are more challenging? If so, please explain	2. 3.				
3	Are there any environmental issues that affect health in the community (e.g., water quality, sanitary conditions etc) Please explain					
4	Do community members prefer traditional medicine or going to the hospital? (explain your response)					
Section I: Access to Water						
1	Where do you get your water for domestic, irigation, and livestock uses?		Description of water source	Walking distance from dwelling (km)	Collection method (if applicable)	Description of quality/colour/taste/smell
	Do you pay for water? If yes, what is the rate and is it affordable?	Domestic use: (drinking, cooking, washing clothes and dishes, bathing				
		Livestock:				
		Irrigation:				

2	Are there times of the year when water runs out, runs low or the quality changes? (Please explain the water source and reason for the change in water levels)					
Section J: Sanitation and Hygiene & Waste Management						
1	What type of toilet facilities do households have? (E.g., flush toilets, ventilated pit latrine, un-ventilated pit latrine, hole in the ground, no latrine/use the bush etc). - Are these facilities shared or does each household owns them?					
2	Do women have access to sanitary facility/product? (E.g., sanitary towels- Explain your response)					

3	How/where do people dispose of household waste? (E.g>, Burn, open dumping, put in the river, other method- specify)	
Section k: Environmental and Social Aspects		
1	What environmental changes do you anticipate as a result of these projects (E.g., air quality, water quality, noise)? - Have you experienced any environmental issues from similar previous projects? If yes, please describe them.	
2	What are your concerns regarding health and safety during the construction and operational phases of the project?	
3	How can the project ensure the safety and well-being of community members, especially vulnerable groups?	
4	How do you think these projects will affect the local flora and fauna? (mostly probe on aquatic)	

5	How do you think the project will impact your daily life and the community's well-being?	
Section L: Cultural heritage		
1	What are the sacred/ historical or religious sites in the area? - Where are they located?	
2	Are there any cultural or historical sites that might be affected by the project? (E.g, Sacred sites, burial grounds, historical landmarks etc)	
Please take pictures of the meeting with a description below each photo:		

Key informant Schedules

Respondent	Organization :…… Designation: ……
Project Awareness	
Anticipated Positive Impacts	
Anticipated Negative Impacts	

Proposed Mitigation Measures	
Supporting Policy For The Project	
Technical Reasons Specific To The County For The Expansion Of Water Supply	
Project Sensitivities 1. Social/Cultural/Religious	

2. Environmental 3. Sensitive Habitats	
Project Challenges	
Any other comment concerning the project	

11.1.3. Minutes of Meetings

MINUTES OF BARAZA ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT HELD IN TEMU (NANYUKI) ON 13/6/ 2024

PRESENT

SEE ATTACHED LIST

MIN 1. PRELIMINARIES

The meeting started at 2:30 with a word of prayer from a community member Ms Frida Muringo. The chief of the area Mr Mwiti welcomed to the team to the project area and expressed his joy indicating that water challenges in the area had made development lag behind and also issues of the community dependiong on water vendors who sell water exorbitantly and the water may not be safe for human consumptions. Others draw water from Nanyuki river.

MIN 2. INTRODUCTION.

The NAWASCO team introduced themselves and introduced the key members of the consultant team:

- ✓ Dr. Rebecca Karanja (team leader)– Kenyatta University lecturer in environment science and conservation;
- ✓ Dr Purity Muthoni- Sociologist;
- ✓ Dr. Florence Ngari – Technical university of Kenya, lecturer in biological science.

The NAWASCO staff Mr Muthigani took the community through the introduction of the project. The area chief explained to the community the need for the project in the area to reduce water shortages and rationing. He indicated that the project area is located East of Nanyuki town and is predominantly residential.He indicated that the large population who mainly work in the town have overstretched the capacity of NAWASCO to provide water regularly for all

the beneficiaries and that has necessitated water rationing. The pipe system is dilapidated leading to water losses. There was therefore an urgent need to improve the water supply capacity. Both Temu and Emmanuel areas have sewer network and thus the need of a constant supply of water cannot be overlooked.

MIN 3. ANTICIPATED PROJECT IMPACTS

Through the discussion with the community, the project was noted to have both positive and negative impacts. The positive main positive project impacts mentioned included:

- ✓ Continuous supply of clean and safe water
- ✓ Reduction of water borne disease such diarrhea, amoebiasis and typhoid
- ✓ Improvement of rental income

Negative impacts that would emanate from the project though of minor scope were highlighted to be:

a. Insecurity and vandalism of water delivery infrastructure;
b. Misunderstandings between the community and contractor teams;
c. Increased cases of immorality leading to sexually transmitted diseases
d. Dusty conditions leading to allergies

MIN 4. COMMUNITY CONCERNS

The community members were requested by the consulting team to air their concerns and they indicated that the proposed project may lead to:

a. High water bills that are not consistent with water consumption
b. River Nanyuki drying up due to overabstaction due to the improved piping
c. Water rationing due to increased demand as population grows
d. Increased house rent due to improved water supply.

The NAWASO team and consultants assured the community that there is no risk of River Nanyuki drying up because the project is only enhancing water delivery efficiency but not increasing the abstraction rates. Water rationing will educe due to increase in water flow and the water tariffs will be as guided by Water Services Regulatory Board (WASREB).

MIN 5 ROLE OF THE GOVERNMENT

The role of the government in the project as discussed by the community, client and consultants include:

a. Ensuring well maintained access of roads
b. Enhancing drainage in the area
c. Demarcate road reserves
d. Establishment of police post
e. Revising admistrative boundaries since there are sectiond of Temu that are in Nyeri and not Laikipia
f. Provide a polling station for political accountability

MIN 6: ROLE OF COMMUNITY

The role of the commmunity as proposed by the community included:

a. Identification of the current water pipes
b. identify water distribution challenges
c. Providing security for pipes
d. Reporting water pipe bursts.

MIN 6 QUESTIONS AND RESPONSES

NAWASCO will put one metre then the landlords will do their own connections

.

Question	Response
1. Will the water pipes be closed during project implementation	No , the water supplies continues and pipes will be replaced gradually
2. Will the water benefit the TEMU community	The community was assured that water will be supply is meant to serve them
3. Why does the project concentrate on pipes and not the storage ?	Am illustration was given based on blood flow, important to widen the water ways to reduce the undue pressure
4. Who addresses the water bills	The staff from the water department asked the community to attend a planned meeting and air their concerns
what happens about pipes that are within residential plots	The main water meters will be along a main roads and its upon the owners of the buildings or homesteads to have their own connecttions.

MIN 7: ADJOURNMENT

There being no other business, the meeting ended at 4pm with a word of prayer from Chief Mwiti from Temu community.

Minutes signed by:

Minutes signed by:

Client ---------- Joseph Muthugan D/m ----------

Signature ----------

Date ---------- 13/6/2024 ----------

Minutes signed by:

Consultant Rebecca HN Karanja

Signature - ----------

Date 18/06/2024

11.1.4. Bill of Quantities

NANYUKI WATER AND SEWERAGE COMPANY LTD

EMMANUEL 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	3,376	250	844,031
	SUBTOTAL				**844,031**
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	110mm HDPE PIPE PN 12.5	m	1,666	1,021	1,700,986
1.2.1	90mm HDPE PIPE PN 12.5	m	522	690	360,180
1.2.2	63mm HDPE PIPE PN 12.5	m	1,608	340	546,720
1.2.3	50mm HDPE PIPE PN 12.5	m	733	215	157,595

1.2.4	40 mm HDPE PIPE PN 12.5	m	4,472	142	635,024
1.2.5	20 mm PPR PIPE PN 16	m	5,544	63	349,272
	SUBTOTAL				**1,699,519**
1.3	**PIPEWORK- FITTINGS**				
1.3.1	Saddle clamp HDPE PN 12.5 200mm x 110mm	no	1	6,500	6,500
1.3.2	Saddle clamp HDPE PN 12.5 110mm x 90mm	no	1	2,000	2,000
1.3.3	Saddle clamp HDPE PN 12.5 110mm x 40mm	no	11	2,000	22,000
1.3.4	Saddle clamp HDPE PN 12.5 90mm x 63mm	no	3	1,500	4,500
1.3.5	Saddle clamp HDPE PN 12.5 90mm x 50mm	no	0	1,500	0
1.3.6	Saddle clamp HDPE PN 12.5 90mm x 40mm	no	0	600	0
1.3.7	Saddle clamp HDPE PN 12.5 63mm x 50mm	no	4	600	2,400
1.3.8	Saddle clamp HDPE PN 12.5 63mm x 40mm	no	7	600	4,200
1.3.9	Saddle clamp HDPE PN 12.5 50mm x 40mm	no	0	550	0

1.3.10	PN12.5 HDPE Equal TEE 63mm	no	0	2,500	0
1.3.11	PN12.5 HDPE Equal TEE 50mm	no	0	1,336	0
1.3.12	PN12.5 HDPE Equal TEE 40mm	no	2	1,072	2,144
1.3.13	Hexagonal Nipple Male GI 110mm	no	2	1,100	2,200
1.3.14	Hexagonal Nipple Male GI 90mm	no	2	668	1,336
1.3.15	Hexagonal Nipple Male GI 63mm	no	4	185	740
1.3.16	Hexagonal Nipple Male GI 50mm	no	4	140	560
1.3.17	Hexagonal Nipple Male GI 40mm	no	20	125	2,500
1.3.18	Hexagonal Nipple Male GI 20mm	no	693	38	26,334
	Peglar Gatevalve GI 110mm	no	2	28,500	57,000
1.3.19	Peglar Gatevalve GI 90mm	no	1	18,500	18,500
1.3.20	Peglar Gatevalve GI 63mm	no	4	7,000	28,000
1.3.21	Peglar Gatevalve GI 50mm	no	4	3,800	15,200

1.3.22	Peglar Gatevalve GI 40mm	no	20	2,500	50,000
1.3.23	Peglar Gatevalve GI 20mm	no	693	1,000	693,000
1.3.24	PN 12.5 HDPE Male Adaptor 110mm	no	2	4,156	8,312
1.3.25	PN 12.5 HDPE Male Adaptor 90mm	no	1	2,125	2,125
1.3.26	PN 12.5 HDPE Male Adaptor 63mm	no	4	893	3,572
1.3.27	PN 12.5 HDPE Male Adaptor 50mm	no	4	581	2,324
1.3.28	PN 12.5 HDPE Male Adaptor 40mm	no	20	447	8,940
1.3.29	PN 16 PPR Male Adaptor 20mm	no	693	40	27,720
1.3.30	PN 12.5 HDPE Straight Connectors 110mm	no	16	6,252	100,032
1.3.31	PN 12.5 HDPE Straight Connectors 90mm	no	5	3,000	15,000
1.3.32	PN 12.5 HDPE Straight Connectors 63mm	no	17	1,300	22,100

1.3.33	PN 12.5 HDPE Straight Connectors 50mm	no	7	900	6,300
1.3.34	PN 12.5 HDPE Straight Connectors 40mm	no	45	670	30,150
1.3.35	PN12.5 HDPE End Cap 110mm	no	2	5,100	10,200
1.3.36	PN12.5 HDPE End Cap 90mm	no	1	4,732	4,732
1.3.37	PN12.5 HDPE End Cap 63mm	no	2	2,935	5,870
1.3.38	PN12.5 HDPE End Cap 50mm	no	5	1,100	5,500
1.3.39	PN12.5 HDPE End Cap 40mm	no	19	940	17,860
1.4	**WATER METERS AND AIR VALVES**				
	MultiJet bulk cold water meters(Brass Material). Meters to meet WASPA Technical guidelines. Minimum R 200				
1.4.1	DN110mm	no	1	35,000	35,000

1.4.2	DN90mm	no	1	20,000	20,000
1.4.3	DN63mm	no	4	10,250	41,000
1.4.4	DN15mm; minimum start flow of 4l/hr	no	742	4,500	3,339,000
1.4.5	Double orifice with 50 mm opening on OD 110 mm pipeline	no	2	6,900	13,800
	SUBTOTAL				**4,628,151**
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		10	16,500	165,000
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"	no	178	1,200	213,600

	"SV","GV","WO") respectively.				
	SUBTOTAL				**378,600**
	TOTAL				**7,550,301**

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 Maina	T.S.M	0721967137	
James Kirumba	Giso	0708223507	
Martha Wambui	M & E	0726906916	

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	0722601849	rebeccakaranja3@gmail.com	
2	DR. PURITY MUTHONI	"	0725 896329	Punitymuthoni2023@gmail.com	
3.	Dr. Florence Ngari	Biodiversity C.U.K	0700406016	ngarifla@gmail.com	
4.	EUNICE Kwaria	Water sector	0725894389	Kwariaeunice@gmail.com	
5.	LYDIAH KAIRU	NAWASCO C.RO	0728106965	lydiamichael12@gmail.	
6.	Joseph Muthigani	NAWASCO D/M	0722978691	Mamamuthigani@gmail.com	
7.	Martha Wambui	NAWASCO - M&E	0726906916	wambui@gmail.com	
8.					
9.					
10.					
12.					

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 KYMTHA, MBS	Organization : INTERIOR Designation: COUNTY COMMISSIONER
Project Awareness	Award
Anticipated Positive Impacts	- Sewerage Coverage - Most + Middle grade - Time saving - Pasture - Economy - Education - Economic empowerment.
Anticipated Negative Impacts	- Table water levels -
Proposed Mitigation Measures	- Friendly - Cheap. to learn. - water harvesting. - Construction of dams - Tree planting.

SIGNATURE ..... DATE 14/6/2020

COUNTY COMMISSIONER
LAIKIPIA

STAMP

NAWASCO Officer's 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

WaterFund
Financing the Water Sector

TEMU

NAIVASHA WATER AND SANITATION COMPANY NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN EMMANUEL & TEMU AREAS

DATE: 13TH JUNE, 2024
TIME: 2.00 P.M. – 4.00 P.M.

VENUE: TEMU

ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	James W. Muthee	Private Developer	0723973034	0978198	
2	Mwiti Kenneth	St. Christophers	0728859110	25710039	
3.	Anderson Kingori	Land Lord	0725825876	7121039	
4.	JAMES THEURI	LANDLORD	0726796871	9857337	
5.	Musyoka Oresmus Mbila	Landlord	0722958024 oresmus@accesspac.co.ke	21644958	
6.	LINUS WANGOMBE	LANDLORD	0723049099	24427625	
7.	Moses Gitau	N/A	0722691959	3369184	
8.	Kariuki Thari	L/Lord	0722552338	0276286	
9.	TIMOTHY BUNSI	L/LORD	0711250470	16050013	
10.	PETER NDERITU	Caretaker	0725128005	13779229	
11.	VERONICA SAIRUWA	Land lady.	0722220757	29827215	
12.	SALOME NDIRANGU	LANDLADY	0723093548	16000286	Ndirangu

WaterFund
Financing the Water Sector

TEMU

NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN EMMANUEL & TEMU AREAS

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ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.					
2	JOSEPH THIGA	Cottage	0727601714	23345276 06	
3.	Fridah Muringo	NGO	0708818694	23318136	
4.	Charles Mwangi Ndirangu		0711663 506	26670583	
5.	Grishon Kichinji John		0712376 580	23507853	
6.	James Thuo		0708790132	33447140	
7.	Peter Muriithi	Cottage	0723873086	27389627	
8.	LAWRENCE OMBATI	cottage	0748693223	39524673	
9.	Harrison Okumu	Sporty	0768144666	37252703	
10.	Gideon Omoori	Cottage	0790439937	29761980	
11.					
12.					

TEMU

NANYUKI WATER SERVICE & SEWERAGE COMPANY

ESIA

13/06/2024

	NAME	~~Email~~ phone number	Location	Signature
	JAMES THEURI	0726796871	TEMU	
	Charles Mwangi	0711663506	TEMU	
	ANDERSON KINGORI	0725825876	TEMU	
	Harrison Okumu (Charles)	0768144666	Sporty	
	Mwiti Kennett fw St christopher's	0728859110	Temu	13/6/24
	PETER MBIRIRI	0720389935	TEMU	

WaterFund
Financing the Water Sector

NAIROBI WATER AND SANITATION COMPANY NAWASCO

NAWASCO PUBLIC PARTICIPATION BARAZA ON UPGRADING WATER PIPELINE IN EMMANUEL & TEMU AREAS

DATE: 13TH JUNE, 2024
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VENUE: TEMU

ATTENDANCE LIST

No.	Name	Organization	Phone No. / Email	I.D No.	Signature
1.	ESTHER WAMBUI	CARE TAKER	0721-470926	32191555	Wambui
2	CHARLES M. RUKUNGA	NGAO	0723561354	13358143	
3.	FRIDAH NGATHA M.	NGAO	0708818694	30318136	
4.	Dr. Florence Ngaki	T.U.K (Biodiversity)	0700406016	5180429	
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

11.2

ESIA EXPERT CERTIFICATE



EAE 23061620

FORM 7 (r.15(2))

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**

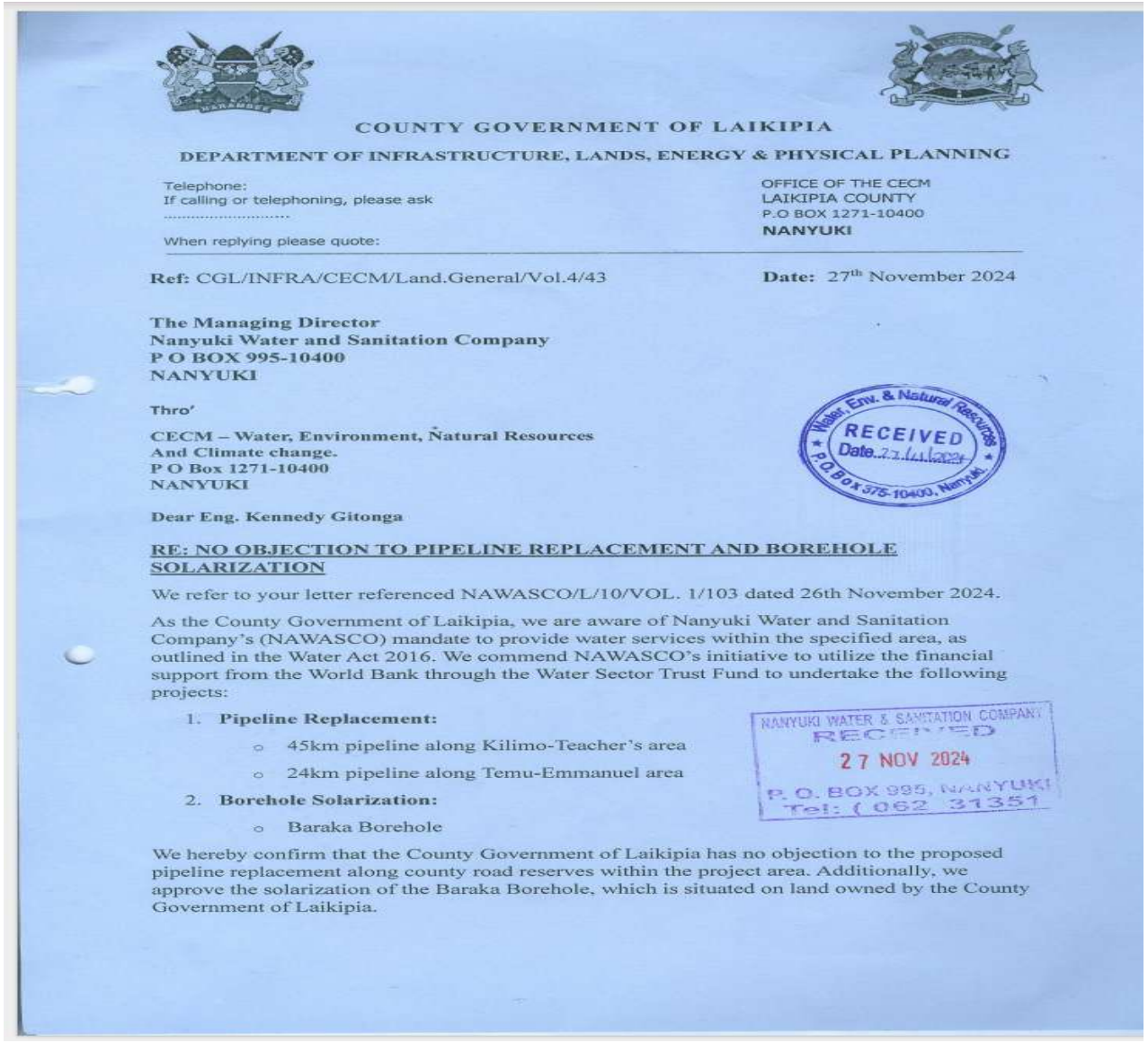
Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001 : 2015 Certified

11.3. 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.

COUNTY GOVERNMENT OF LAIKIPIA

DEPARTMENT OF INFRASTRUCTURE, LANDS, ENERGY & PHYSICAL PLANNING

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