FERROVIAL SUSTAIBLE WATER FOR THE MAA PROJECT

Baseline Evaluation Report

Submitted to

Ferrovial through Amref Salud África

October 2020

Contents

List of figures 5

LIST OF ACRONYMS AND ABBREVIATIONS 6

EXECUTIVE SUMMARY 7

CHAPTER ONE: INTRODUCTION AND BACKGROUND 9

1.1 Kajiado County Profile 9

1.2 Overview of Ferrovial Project 10

1.5 Review of Literature 12

1.5 Research Objectives 13

1.5.1 General objective 13

1.5.2 Specific objectives: 13

1.5.3 Research questions: 14

CHAPTER TWO: METHODOLOGY 15

2.1 Study Design 15

2.2 Study area 15

2.3 Study Population 15

2.4 Sample size determination 15

2.5 Sampling strategy 16

2.6 Data Collection 17

2.7 Training of research assistants 17

2.8 Pre-testing of study tools 17

2.9 Ethical considerations 17

2.10 Data Processing and Analysis 18

CHAPTER THREE: FINDINGS AND DISCUSSIONS 20

3.1 Sociodemographic characteristics 20

3.2 Access to water 22

3.2.1 Types of primary water sources 22

3.2.2 Time Taken to Fetch Water 24

3.2.3 Water Quality 27

3.2.4 Treatment of Drinking Water 30

3.2.5 Payment for water services 32

3.2.6 Water Point Reliability and Functionality 34

3.3 Sanitation 39
3.4 Handwashing Practices 44
3.5 Prevalence of diarrhea 46
CHAPTER 4: CONCLUSION AND RECOMMENDATIONS 49
Conclusion 49
Recommendations 49
References 51
Appendices 52
Appendix I: Water Quality Report - Eseki 1 52
Appendix II: Water Quality Report - Eseki 2 54
Appendix III: Water Quality Report – Home Hope Borehole 56
Appendix IV: Water Quality Report – Ilmarba Kilalash Scoop Hole 58

LIST OF TABLES

Table 1: Summary of Key Findings 7
Table 2: Data Collection Techniques 17
Table 3: Household Sizes 20
Table 4: Households with Children Under 5 21
Table 5: Loaction of Water Source 24
Table 6: Time taken to primary water source 25
Table 7:Analysis of Variance for time taken to primary water source 26
Table 8: Water points sampled for water quality analysis 28
Table 9: Households paying for water services 32
Table 11: Cost of water 33
Table 12: Households with difficulties paying for water 33
Table 13: Frequency of water point breakdowns 38
Table 14: Where children 6-17 years defecate 41
Table 15: Feces disposal for childfren under 5 41
Table 16: Household access to latrines 42
Table 17: Instances when hands are washed 44
Table 18: Use of handwashing aids 45
Table 19: Trend in clinical diarrhoea cases 47

LIST OF FIGURES

Figure 1: Mean Household Size 21
Figure 2: Sources of Drinking Water 22
Figure 3: Access to improved water sources by community 23
Figure 4: Types of Primary Water Source 24
Figure 5: Time taken to fetch water 25
Figure 6: Perceived Taste of Drinking Water 27
Figure 7: Reasons why drinking water doesn't taste good 28
Figure 8: Water treatment by type of source 31
Figure 9: Methods of water treatment 31
Figure 10: Frequency of payment for water services 33
Figure 11: Number of months households are served by primary water sources 34
Figure 12: Months during which water is not available 35
Figure 13: Secondary water sources 36
Figure 14: Frequency of using other water sources 37
Figure 15: Water point breakdowns 37
Figure 16: Time taken to fix breakdowns 38
Figure 17: Reasons for not accessing water in the past 2 weeks 39
Figure 18: Where adult household members defecate 40
Figure 19: Where adults defecate by community 40
Figure 20: Where children 6-17 years defecate 41
Figure 21: Disposal of feces for children under 5 42
Figure 22: Types of sanitation facilities 43
Figure 23: Instances when hands are washed 45
Figure 24: Diarrheain children under 5 47
Figure 25: Proportion of patients with diarrhoea 48

LIST OF ACRONYMS AND ABBREVIATIONS

BCC	Behaviour Change Communication
CHEW	Community Health Extension Worker
CHV	Community Health Volunteers
CLTS	Community Led Total Sanitation
EIA	Environmental Impact Assessment
EMMP	Environmental Monitoring and Management Plan
FIETS	Financial, Institutional, Environmental and Technical and Social
HWTSS	Household Water Treatment and Safe Storage
IEC	Information Education and Communication
IGAs	Income Generating Activities
MHM	Menstrual Hygiene Management
NEMA	National Environmental Management Authority
ODF	Open Defecation Free
ODSS	Organizational Development and Systems Strengthening
PHASE	Personal Hygiene and Sanitation Education
PIT	Project Implementing Team
RWH	Rain Water Harvesting
RWHS	Rain Water Harvesting Systems
VIP	Ventilated Improved Toilets
WASH	Water Sanitation and Hygiene
WMCs	Water Management Committees

EXECUTIVE SUMMARY

This report presents the findings of Ferrovial Project Baseline Evaluation. The evaluation was conducted in Matapato North Ward of Kajiado County in collaboration with the County Department of Water and Ministry of Health. The purpose of the study was to collect baseline data that would provide benchmarks for measuring and monitoring WASH outcomes of Ferrovial Project interventions. Findings from the baseline evaluation will be used by the Amref Health Africa in Kenya to inform project implementation and in Spain to strengthen learning, and inform future programming.

Methodology This was a cross-sectional mixed methods study. Quantitative assessment focused on structured surveys with household water managers (mainly spouses to male household heads). Qualitative data were collected through focus discussions with Water Management Committees, men and women; and key informant interviews with Public Health Officers, Borehole operators and Owners of private water facilities.

Key findings: The key findings from the evaluation are summarized in table 1 below:

Table 1: Summary of Key Findings

THEME	INDICATORS	BASELINE
Water Access 	Proportion of households using an improved water source	51%
	Average time taken to reach a primary water source	33.9 minutes
	Average waiting time before fetching water	15.5 minutes
	Proportion of households treating water	7.4%
	Proportion of households paying for water services	45.9%
Sanitation 	Proportion of households with access to a latrine	37.2%
	Proportion of shared sanitation facilities	80%
	Proportion of households whose adult men and women practice open defecation	62%
	Proportion of households whose children 6-17 years practice open defecation	66.2%
	Proportion of households where feces of children under five is disposed in the Open	64.7
Handwashing	Proportion of households with handwashing facilities/modalities	41.9%
	Proportion of households with a dedicated location for handwashing	27.7%
	Proportion of households with water for washing hands	39.2%
	Proportion of households with soap or other cleansers for washing hands	35.2%

	Average Number of instances (critical times) when household members wash hands	3.4
Diarrhea 	Proportion of household's whose children under 5 years had diarrhea within 14 days before the study	11.7%
	% of under five patients diagnosed with diarrhea at Ilmarba dispensary (6 months before the study)	8%
	% of under five patients diagnosed with diarrhea at Emurua Dikirr dispensary (6 months before the study)	19%

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 Kajiado County Profile

Kajiado is a county in the former Rift Valley Province of Kenya. The county borders Nairobi and extends to the Tanzania border further south. It is situated between Longitudes 360 5‘and 370 5‘East and between Latitudes 10 0‘30 0‘South. The county covers an approximated area of 21,292.7 square kilometers. Kajiado County is divided into five administrative sub counties i.e. Kajiado Central, Kajiado North, Kajiado East, Kajiado West and Kajiado South. According to the most recent census (2019), Kajiado County had a total population of 1,117,840 (Male=557,098 Female= 560,704 and Intersex=38) with an annual population growth rate of about 2.9%. The rural population stands at 41.2% and urban population is 58.8%. It has a Human Development Index (HDI) of 59.35% and a poverty index of 27.87%. Illiteracy rates especially in rural areas are high at 60% while the County average stands at 35% compared to the national rate of 28.6%. Further, 76% of the population have no access to proper health care. The county is endowed with natural resources such as wildlife, open grasslands, wooded bush lands, open bushes, woodlands and forests. The main economic activities include pastoralism, tourism, agriculture and urban-life activities like cattle trading.

Access to water in Kajiado County remains low with only 66% of her residents having access to improved water sources while the rest rely on unimproved sources. Inadequate access to water is informed by dry climatic conditions experienced in the county characterized by low rainfall averaging 500mm per annum. This coupled with inadequate infrastructural investments has left communities in both rural and urban areas with low access to water. In the rural areas, long distances to water sources is the main barrier to water access, with women and children walking more than 5Km to the nearest improved water sources. In major urban and peri-urban areas, water services are provided by Water Companies and other private water vendors. However, water shortage is a common phenomenon characterized by water rationing and complete outages,

especially during the dry seasons. This forces urban communities to buy water from vendors who supply it using hand carts, donkeys, motorcycles or water trucks. These sources are unreliable and expensive, limiting access to water which has a spiral effect on the level of sanitation both at household and community levels.

Sanitation coverage in the county is at 56% with 32% defecating in the open, and 12% using unimproved facilities. This like access to water has huge disparities between the urban and rural coverage where in some wards like Kajiado central at 30% improved sanitation and 62% defecating in the open. Poor sanitation in rural areas is informed by a number of factors including low standards of education, cultural beliefs and poverty. Urban areas also have low access to sanitation, with major centers such as Bissil and Kajiado town having few or no public toilet facilities. This is exacerbated by absence of crucial infrastructure such as public sewer lines, and poor or no structures for toilet exhaustion, garbage collection and liquid waste management.

1.2 Overview of Ferrovial Project

Ferrovial Sustainable Water Sources for the Maasai Communities Project (In short Ferrovial Project) is a one-year WASH project funded by Ferrovial-Spain to the tune of 149,462 euros. The project is geared towards improving access to sustainable WASH services among underserved rural communities in Kajiado County. The targets to Increase access to safe and sustainable water, basic sanitation and improve hygiene practices at the domestic and institutional levels in North and South Matapato of Kajiado County. To achieve these, the project utilizes the following strategies

1) **Recharge, Retention and Reuse (3R) for sustainable ground and rain water management and efficient use:** The project utilizes the **3R Approach** (Recharge, Retention and Reuse) in making buffer of groundwater, surface water and storage systems. Sand dams will be constructed to collect and retain surface run-off in sandy riverbeds. The retained water then percolates into the ground and recharges the shallow underground aquifers. The sand trapped in the dam acts as filter for the water. Clean water will be accessed through infiltration wells constructed on the edge of the dam where water will be drawn using hand pumps or pumped using submersible solar pumps to elevated tanks and

gravitated to the community for domestic, livestock and agricultural uses. Sand dams will be fenced off to allow vegetation and normal flora to re-generate. This way, the project will offers people with sufficient access to drinking water and provides water for livestock, agricultural and other productive purposes. Access to water also benefits the environment and the wider ecosystem. Storage of water through retention in this case allows for secure levels of reserves that can be used in times of need. 3R can substantially contribute to increasing the quantity and quality of water resources. The use and reuse of buffered water allows for the increased availability of water, as it circumvents water allocation conflicts through simply using and re-circulating the water. By infiltrating water into the soil, 3R contributes to green water management in a way that leaves a positive footprint on both ecosystems and agricultural production. Other benefits of 3R initiative include it's a relatively low cost approach hence highly feasible for small water supply schemes at a local or village level, recharged ground water and raising water table which can be harnessed all the year round.

2) **Use of green energy to supply water closer to the communities:** In an effort to embrace green technology and cut operation costs, the project will use solar energy to pump water to community centers, heath facilities and schools. In so doing, water will be moved closer to communities and thus reducing walking distance for women and children. The use of the solar pumping system together with the 3R approach is beneficial to the ecosystem through sustainable access to water and conservation of the environment. To further reduce water scarcity, we will procure and install rain water harvesting (RWH) tanks in schools and health facilities that will go a long way in storage of the water at the institutions.

3) **Sanitation demand creation through community led total sanitation (CLTS):** Leveraging and building on the capacity of existing structures, the project will work with the Ministry of Public Health and Sanitation to undertake CLTS activities in the villages served by the project. The project will address all the three components of Water, Sanitation and Hygiene around the developed water points. This will ensure a comprehensive approach to WASH issues and maximize on impact. Wherever we will develop a water point, we will ensure the other component of sanitation and hygiene is also promoted to have a full circle of WASH 360^0. This way, water safety will be guaranteed

by ensuring that there is no open defecation which may eventually be swept by rains into the water points.

4) **Household Water Treatment and Safe Storage (HWTSS):** Water contamination may occur during transportation and or even at the point of consumption in the household. In an effort to ensure water for drinking is safe, we will procure and distribute household water filters to the most vulnerable households in the project area and sensitize women on water safety and hygienic maintenance of the water filters.

1.5 Review of Literature

An estimated 663 million people worldwide do not have access to improved drinking-water source(World Health Organization & United Nations International Children's Emergency Fund, 2017). An estimated 2.4 billion people, or one third of the world's population, lack access to an improved sanitation facility, and 13% practice open defecation. Among the world's regions, sub-Saharan Africa and South Asia continue to have the lowest sanitation coverage(World Health Organization & United Nations International Children's Emergency Fund, 2017). Globally, in 2014, an estimated 159 million children under 5 years of age were stunted, and 50 million were wasted (Fig. 2). The highest rates of under nutrition are reported in Africa, Asia and Oceania. Under nutrition in all its forms is estimated to contribute to 3.1 million child deaths each year, accounting for 45% of all deaths of children under 5 years of age (Black et al., 2013). Global Food Insecurity has global ramifications such that economic and political development in poor countries will continually be frustrated if populations are unable to feed themselves.

The United Nations classifies Kenya as a chronically water scarce country on the basis of having one of the lowest natural water replenishment rates, at 647 meters cubed per capita per annum which is far below the 1,000 meters cubed per capita per annum(UNICEF, 2019). Estimates of water supply in the country indicate that only about 56 per cent of the population has access to safe water. Approximately 80 percent of hospital attendance in Kenya is due to preventable diseases and about 50 percent of these illnesses are water, sanitation and hygiene related. Coverage of adequate sanitation has dropped from 49 percent to 43 percent in recent years. 16 million Kenyans do not have adequate sanitation; more than 90 per cent of the water and sanitation related

disease outbreaks occur in the rural areas; 50 per cent of rural households have no toilet facilities at all, and where they exist they are generally unhygienic; up to 50 per cent of the urban populations reside in slum environments where sanitation conditions are appalling; on average, schools have only one latrine per 100 pupils compared with the recommended maximum of 40 pupils per latrine; more than three-quarters of Kenya is still vulnerable to disasters, especially floods, droughts and cholera(UNICEF, 2019).

Kajiado County is categorized as a water scarce county. Still livelihoods depend strongly on water for drinking purposes, livestock watering, industry, as well as irrigated agriculture with water mostly coming from wetlands (swamps), hills (springs), boreholes, riverbeds (sand dams and scoop holes) and open water reservoirs (earth pans). Kajiado County has an Open Defecation Status of 25.7%3 with water access at 66% which makes it unlikely for Kenya achieving the target of 100% coverage of safe water supply by 2030 and 100% access to basic sanitation services by 2030 (Kenya National Bureau of Statistics, 2013; Water and Sanitation Program, 2014). Sustainable Development Goal (SDG) 6 makes the strongest case for the integration of Water, Sanitation and Hygiene (WASH) and Water Resources Management (WRM). It focuses on water with the overarching goal to "Ensure availability and sustainable management of water and sanitation for all"(United Nations Water, 2016).

1.5 Research Objectives

1.5.1 General objective

The goal of the study was to identify benchmark information for measuring and monitoring WASH outcomes of Ferrovial Project intervention in the selected locations.

1.5.2 Specific objectives:

The specific objective were as follows:

1. To determine the level of access to clean and safe drinking water among households in Ilmarba and Eseki locations
2. To determine the level of access to sanitation facilities including types and condition of latrines used by households in Ilmarba and Eseki locations
3. To determine hygiene knowledge levels and practices including handwashing, and availability of handwashing aids among households in Ilmarba and Eseki locations.

4. To make recommendations to inform project implementation and future WASH programming

1.5.3 Research questions:

1. What is the level of access to clean and safe drinking water among households in Ilmarba and Eseki locations?
2. What is the level of access to sanitation facilities including types and condition of latrines used by households in Ilmarba and Eseki locations
3. What are the hygiene knowledge levels and practices among households in Ilmarba and Eseki locations?
4. What should the project do to efficiently and effectively address the WASH challenges experienced in Ilmarba and Eseki locations?

CHAPTER TWO: METHODOLOGY

2.1 Study Design

This evaluation adopted a cross-sectional design using mixed methods of data collection to assess the WASH situation in Ilmarba and Eseki locations, Kajiado County where the Ferrovial water project will be implemented.

2.2 Study area

The study was carried out in Ilmarba and Eseki locations of North Matapato ward, Kajiado County. The two locations were purposely selected because this is the region where Amref Health Africa is implementing the Ferrovial project.

2.3 Study Population

The study population comprised of all the households in Ilmarba and Eseki locations. The primary study participants were the spouses to male household heads (or household heads for female headed households). This is because women are traditionally charged with the responsibility of fetching water and are the main household water managers in the target Maasai community. In the absence of the primary participant, an adult female household member from the same household was be interviewed. For this role, household members were asked to suggest the person who was most knowledgeable about water practices in the household. Male participants were only included in instances where the role of household water management was done by man. The target population for qualitative data included members of Water Management Committees (WMCS); Water point operators; Public health officers; and owners of private water facilities.

2.4 Sample size determination

The sample size was determined using Cochran's formula. The assumption is that the sample is representative, the sampling error is small and that the results are generalizable.

$$n=\frac{z^2pq}{e^2}$$

Where: n = sample size

z= value for the selected alpha level (1.96) which corresponds to 95% confidence interval

p= proportion of population with access to improved water (66% for Kajiado County)

q=1-p

p=0.66

q=0.34

e=0.05

$$n = \frac{1.96^2 \times 0.66 \times 0.34}{0.05^2}$$

n= 345

Since the households of interest to the study were less than 10,000 the sample size was corrected using finite correction formula.

$$ns = \frac{n}{1 + \frac{n}{N}}$$

Where,

ns- is the new sample size

n - is the sample size based on the calculations above (345)

N- is population size (670 households).

Calculating the new sample size using the Finite Population Correction (FPC) Factor we find:

$$ns = \frac{345}{1 + \frac{345}{805}} = 242$$

A minimum sample of 242 households was targeted in the study.

2.5 Sampling strategy

Probability proportional to size (PPS) was used to determine the number of households to be interviewed in each of the 2 locations. Listing of the households was done by the CHVs with supervision from CHAs. The entire process was coordinated by the County and Sub-county Community Health Strategy Focal Persons and the study team. After the full list of households in each location had been determined the individual households to be interviewed were then selected using systematic random sampling. For qualitative data, study participants were purposively selected.

2.6 Data Collection

Quantitative data were collected using a structured household questionnaire. The data were collected electronically using Open Data Kit (ODK) platform installed on android phones. Qualitative data were collected using semi-structured interview guides with one person moderating the interviews while another took notes. All interviews were audio recorded and permission sought from study participants to record the interviews. The table below outlines the data collection method and target groups:

Table 2: Data Collection Techniques

Data Collection Technique	Target population
Structured interviews	Household water managers (mainly women)
Key Informant Interviews	Bore hole operators
	Owners of private water facilities
	Public Health Officers
Focused group discussions *(One in each Sub County)*	Water management committees
	Men
	Women

2.7 Training of research assistants

The research team developed a training programme and manual for the research assistants who underwent a 2 days intensive training and one day piloting of tools. The objective of the training was to impart the research assistants with the knowledge and skills to effectively collect data for this study. Specifically, the training sought to provide an overview of the purpose of the study, procedures involved in data collection, equip research assistants with basic interviewing skills, emphasize the importance of ethics in research, and outline the roles and responsibilities of each team member.

2.8 Pre-testing of study tools

All the tools were pre-tested prior data collection. Pre-testing was done a day after the training of research assistants and thereafter the study tools were revised accordingly.

2.9 Ethical considerations

All study participants were provided with details about the purpose of the study, the objectives of the study, methodology to be used in selection of participants and conducting the interviews, benefits and risk involved in participating in the study and assured of confidentiality and privacy

during the course of the study. Written informed consent was obtained from all participants prior to interviewing them.

To ensure confidentiality of participants, all participants were given a unique identifier and their names or personal identifying information did not appear in the questionnaires or transcripts. In case any personal identifying information was given during FGDs and KIIs, it was not transcribed. All FGDs and KIIs were audio recorded to enable the researchers to capture all the relevant information and permission was sought from the participants prior to recording the interviews. All the raw data collected either in paper form or audio records will be destroyed three years after the end of the study.

There were minimal risks associated with participation in this study and these mainly included breach of confidentiality and or loss of privacy. To minimize these risks, data collected was for the sole purpose of the study; all study tools were filed and locked in a cabinet. All soft copies of the study documents were saved on password protected computers and only the project team will have access to the study materials. Additionally, all research assistants signed a confidentiality agreement form to ensure that participants' information was safeguarded. Privacy of the participants was upheld by ensuring interviews are conducted in a quiet and private place within the community.

2.10 Data Processing and Analysis

Data processing

Quantitative data were collected electronically using ODK platform. The questionnaires were programmed using ODK build and installed in all mobile devices. Each RA was assigned an android mobile phone which they used to administer the questionnaire. Once they completed filling each questionnaire, they saved the particular form on the device and submitted the filled questionnaire on real time to the Amref server. Checks that were put in place while programming the questionnaire (relevance and constraint) to ensure completeness of data. The statistician then downloaded the cleaned forms and exported them to SPSS for analysis.

For qualitative interviews, data were audio-recorded and then transcribed verbatim and translated into English where appropriate. Every evening the moderators, note takers and investigators met to discuss the emerging themes and any challenges encountered during data collection process and how these challenges can be addressed moving forward.

Data Analysis

Quantitative data analysis was done using SPSS version 20. Several procedures were performed on the data including means, medians, frequency counts, proportions, range and inter-quintile range were performed on the data. Inferential analyses were done using Chi-square and Analysis of Variance (ANOVA) tests.

Thematic analysis was used to analyze qualitative data. A code book was developed to guide qualitative analysis and coding was done thematically whereby events or occurrences that share the same characteristics were assigned the same code. Pre-set codes were identified from the interview guides and research questions and emerging codes were derived from the transcripts. Finally, both quantitative and qualitative data were jointly interpreted.

CHAPTER THREE: FINDINGS AND DISCUSSIONS

3.1 Sociodemographic characteristics

A total of 296 respondents were included in the study. Almost two thirds (64.2% of the respondents were from Ilmarba Community while 31.8% were from Eseki Community. Majority of the respondents were female, accounting for 98.6%, while men accounted for only 1.4%. The age of the respondents ranged from 19 years to 75 years with a mean of 37.0 years. Eseki community recorded the highest mean age of 38.1 years while Ilmarba recorded a mean age of 36.4 years. The difference in age between the two communities was however not statistically significantly different (ANOVA F (1,292) =0.754, p=0.389).

Table 3: Household Sizes

Community	Number of Households	Mean	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Ilmarba	190	36.4316	34.2142	38.6490	20.00	68.00
Eseki	106	38.1321	34.6830	41.5811	19.00	75.00
Total	296	37.0405	35.1754	38.9056	19.00	75.00

Household sizes ranged from a minimum of 2 people per household to a maximum of 12, with a mean of 6.2 persons per households. As illustrated in figure 1 below, Ilmarba Community had the highest mean household size of 6.4 while Eseki had mean of 5.9. The difference in household sizes was however not significant (ANOVA F (1,292) =2.129, p=0.147).

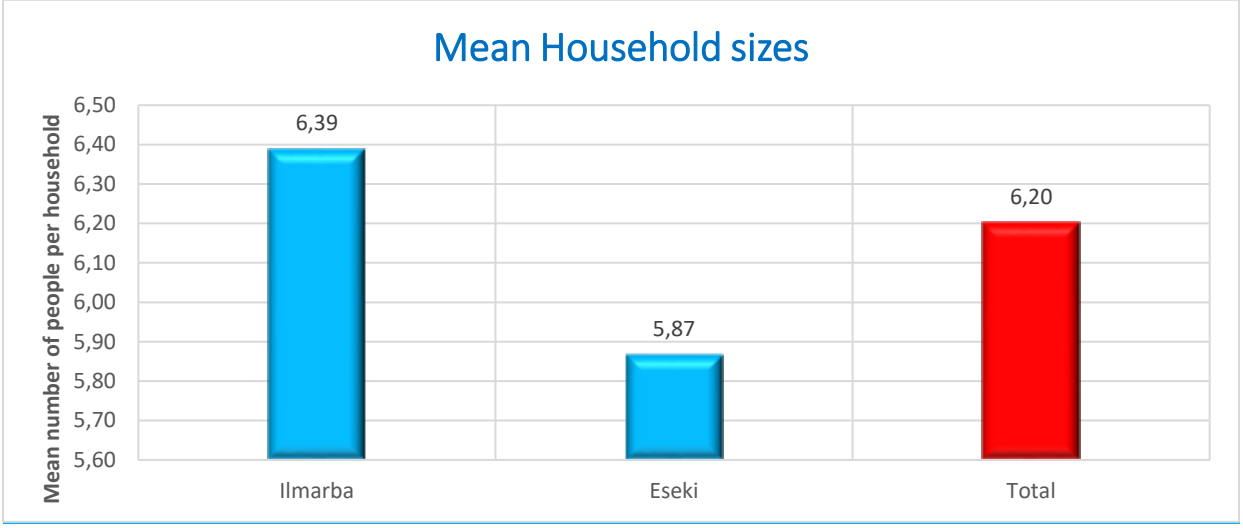

Figure 1: Mean Household Size

Slightly more than two thirds (69.6%) of the households reported to have children under the age of five years. The presence of children under five years was evenly distributed in the population, with Ilmarba and Eseki having almost similar proportions of households with children under five years at 69.5% and 69.8% respectively. Table 4 below shows a summary of the proportions of households with children under five years for Ilmarba and Eseki Communities.

Table 4: Households with Children Under 5

Community	Children under five years present	Number of households	Percent
Ilmarba	Yes	132	69.5
	No	58	30.5
	Total	190	100.0
Eseki	Yes	74	69.8
	No	32	30.2
	Total	106	100.0
Total	Yes	206	69.6
	No	90	30.4
	Total	296	100.0

3.2 Access to water

3.2.1 Types of primary water sources

Figure 2 below shows proportion of households with access to improved water sources. Slightly more than half (51%) of the households reported to be obtaining water from an improved water source while 49% were obtaining water from unimproved sources.

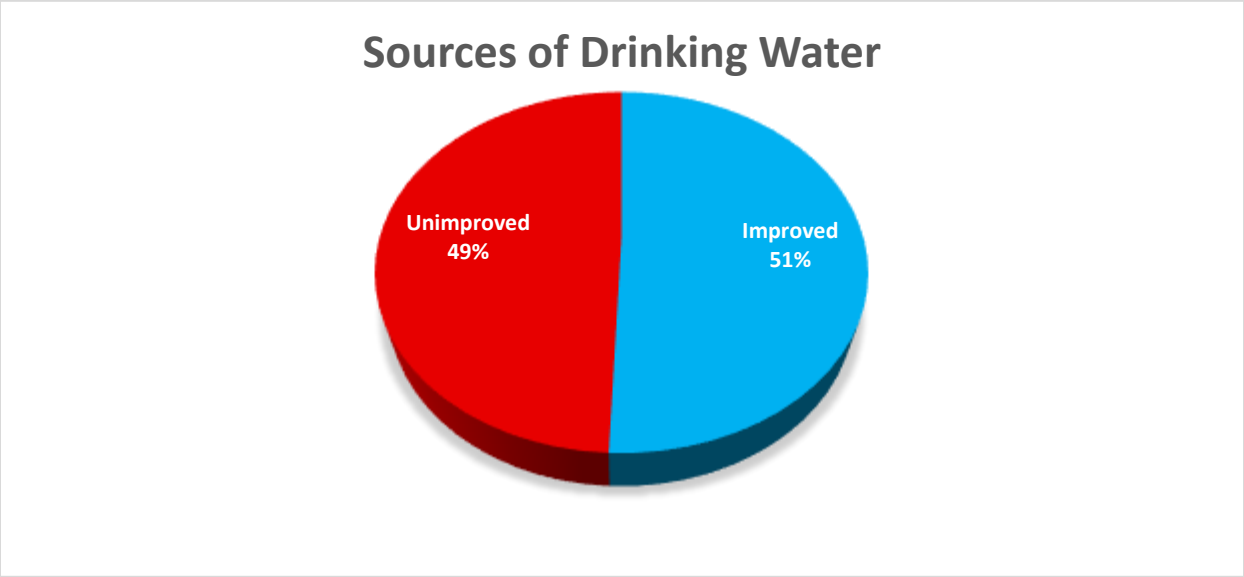

Figure 2: Sources of Drinking Water

As illustrated in Figure 3 below, a majority of the households in Ilmarba community (76.8%) fetch water from improved sources while 23.2% fetch water from unimproved sources. In contrast, almost all households in Eseki community (96.2%) obtain water from unimproved sources while only 3.8% have access to improved water sources. The proportion of households with access to improved water in Ilmarba (76.8%) was statistically significantly higher than Eseki (3.8%) (X^2 (*1*, *N* = 296) 72.667, p ≤0.05).

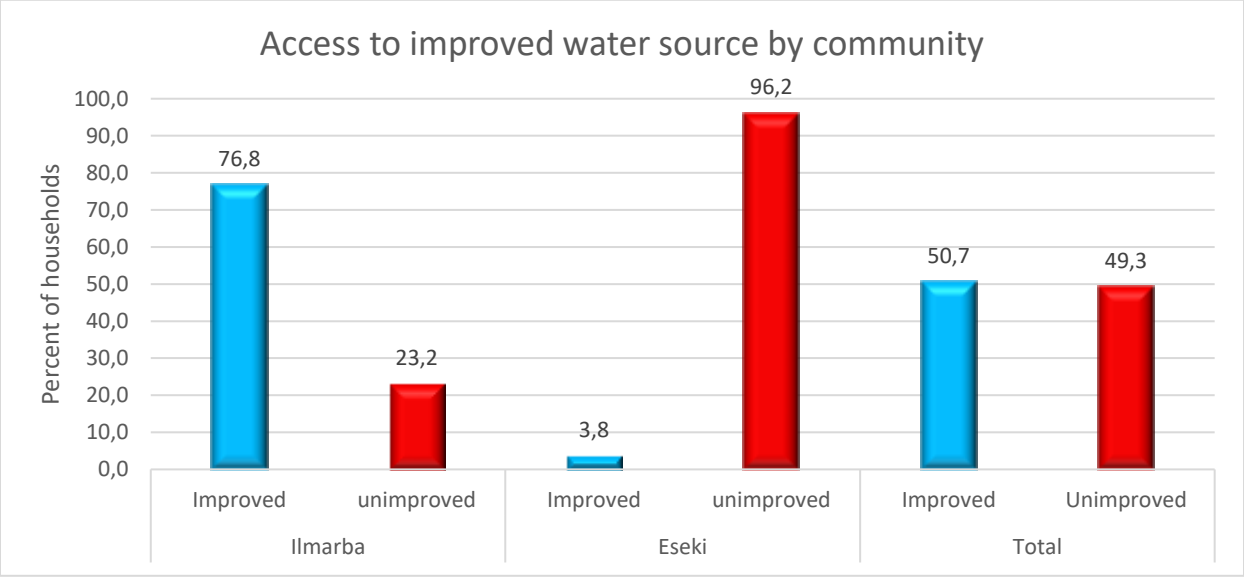

Figure 3: Access to improved water sources by community

Figure 4 below shows a summary of the types of water source by community. For Ilmarba community, mechanized boreholes are the main sources, providing water to 65.3% of the households. This is followed respectively by unprotected dug wells (23.2%), protected dug wells with hand pump (7.4%) and protected dug wells (4.2%). For Eseki community, unprotected dug wells are the main sources of water, being used by almost all households (96.2%). Protected dug wells are used by only 3.8% of the households.

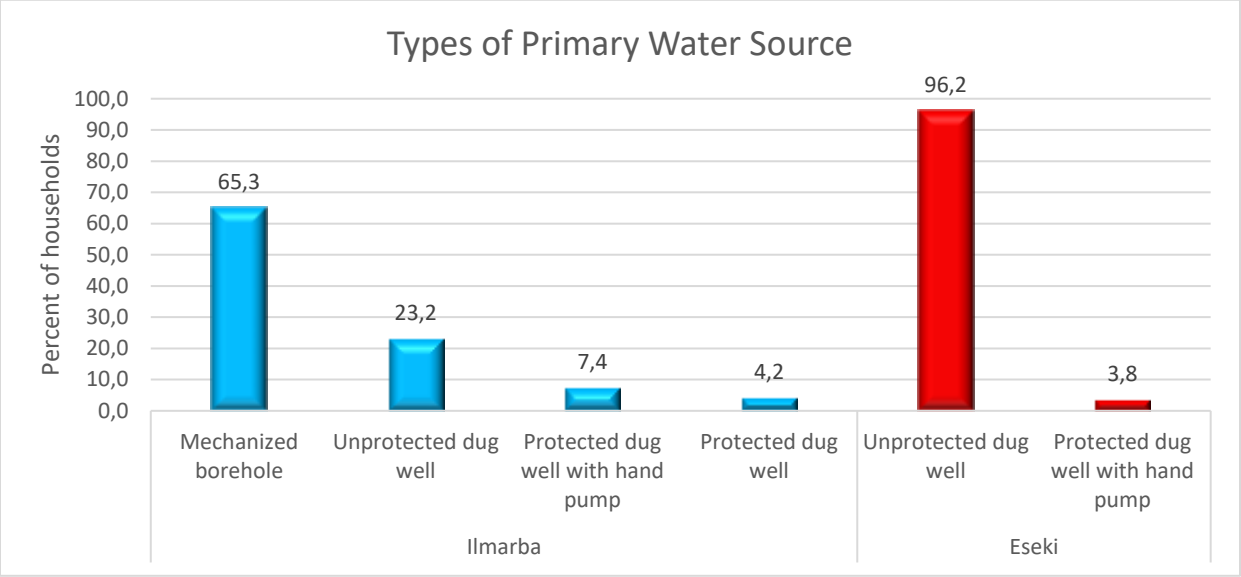

Figure 4: Types of Primary Water Source

3.2.2 Time Taken to Fetch Water

According to the survey, 98% of the households have their primary water sources located off plot (away from their homes) while only 2% have primary water sources located in own yard or plot. For Ilmarba community, all (100%) of the households reported that their water points are located off plot. This was slightly different from Eseki Community where 94.3% of the households obtain water from off plot sources while 5.7% have primary water sources located within their plot as shown in table 5 below:

Table 5: Loaction of Water Source

Community	Water Source Location	Number of Households	Percent
Ilmarba	Away from home/plot	190	100
Eseki	In own yard or plot	6	5.7
	Away from home/plot	100	94.3
	Total	106	100

The average time taken to reach a primary water source was found to be slightly more than half an hour (33.9 minutes). The minimum time was 5 minutes while the maximum time taken to reach a primary water source was 2.7 hours (160 minutes). Similarly, waiting time before fetching water

ranged from 0 minutes to 1 hour with an average waiting time of approximately quarter an hour (15.5 minutes) as shown in table 6 below:

Table 6: Time taken to primary water source

	Community	N	Mean	Minimum	Maximum
Time taken to primary water source	Ilmarba	190	37.9684	2	160
	Eseki	106	26.6038	5	120
	Total	296	33.8986	2	160
Waiting time before fetching water	Ilmarba	190	14.7895	0	60
	Eseki	106	16.8679	0	60
	Total	296	15.5338	0	60

Ilmarba community had a higher mean time taken to reach primary water source (38 minutes as compared to Eseki community, 26.6 minutes). However, upon reaching the water source, Eseki community had a longer waiting time (16.9 minutes) than Ilmarba (14.8 minutes). This may be explained by the fact that Eseki community draws water from unimproved sources e.g. unprotected dug wells which require more time to draw water as compared to improved sources such as mechanized borehole used by Ilmarba community. Figure 5 below shows a summary of the mean time taken to access water for the two communities:

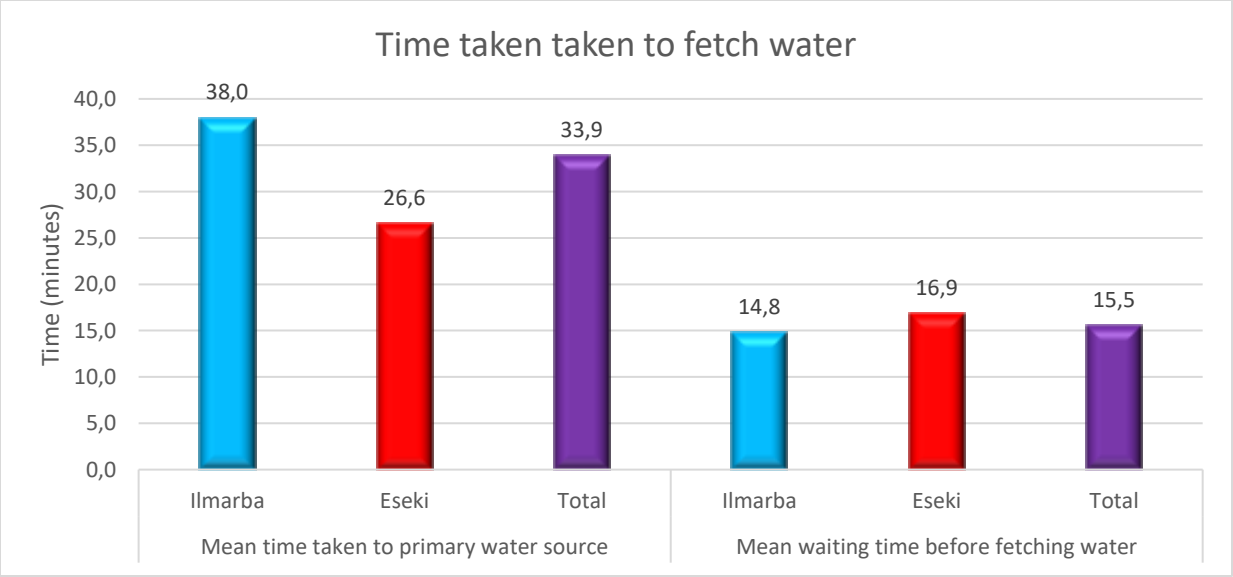

Figure 5: Time taken to fetch water

Analysis of variance test showed that the mean time taken to reach primary water source for Ilmarba (38 minutes) was statistically significantly higher than the mean for Eseki community (26.6 minutes) (ANOVA F (1,292) =6.901, p=0.010). The difference in means of waiting time between Eseki (16.9 minutes) and Ilmarba (14.8) was however not statistically significant as shown in table 7 below;

Table 7:Analysis of Variance for time taken to primary water source

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Time taken to primary water source	Between Groups	4393.895	1	4393.895	6.901	.010
	Within Groups	92961.585	292	636.723		
	Total	97355.480	294			
Waiting time before fetching time	Between Groups	146.966	1	146.966	.438	.509
	Within Groups	49017.865	292	335.739		
	Total	49164.831	294			

"The water points are very far. We have to walk all the way every time we want to fetch water. And some of us have small children whom you can't leave alone at home. You have to bring them along...." **FGD with women, Eseki Community**

According to focus group discussions held with the community members, the time taken to fetch water for the two communities is influenced by a number of factors. Walking long distances to water sources is the primary reason, as most households are located far from water points. Women have to walk for up to 6Km to access water. The women are further slowed down when walking with children or donkeys since the children cannot keep up with their pace. The women explained that donkeys are used to fetch water to relieve them of the burden of carrying water. Donkeys also have a higher (60L per donkey) which allows them to fetch more water to meet their domestic water needs. The nature of the water source also increases the time spent. Since most of the community members use a shared water source, they have to take turns to fetch water. The situation is worse where the same water point is used for watering livestock because livestock is given first priority and the livestock are watered in hundreds. In such cases, women may have to wait for up to 1 hour. Also given that a household has several donkeys, one woman will require a considerable period of time to fill all the containers

as one donkey carries an average of 6 ten-liter jerry cans. Some water sources such as scoop holes and shallow wells also have a low discharge especially during the dry seasons, forcing women to wait for a longer time before the water is adequate enough to fill their containers. Besides these, women also have to do other activities such as laundry, cleaning their children, and bathing hence increasing the time spent for any trip to a water facility.

3.2.3 Water Quality

When asked about the taste of water from their primary water source, 89.2% of the respondents felt the water had good taste while 10.8% reported that the water did not taste good. The proportions that felt the water had a bad taste were 10.5% and 11.3% for Ilmarba Community and Eseki Community respectively as shown in figure 6 below:

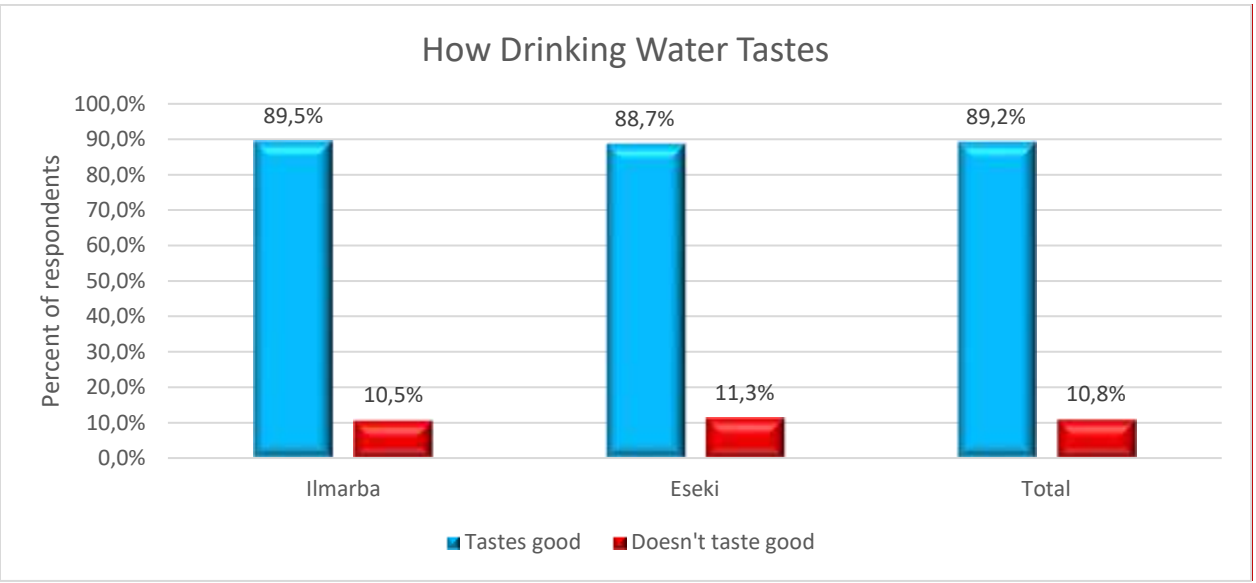

Figure 6: Perceived Taste of Drinking Water

Figure 7 below shows the reasons why respondents felt their water did not taste good. Majority (80%) of the respondents in Ilmarba ascribed the bad taste to saltiness, 10% reported it tastes like iron, while 10% said it has a "nondescript bad taste". The reasons given by respondents from Eseki Community included "nondescript bad taste (33.3%), a soil-like taste (16.7%), a urine-like taste (33.3%) and a characteristic bad smell (16.7%).

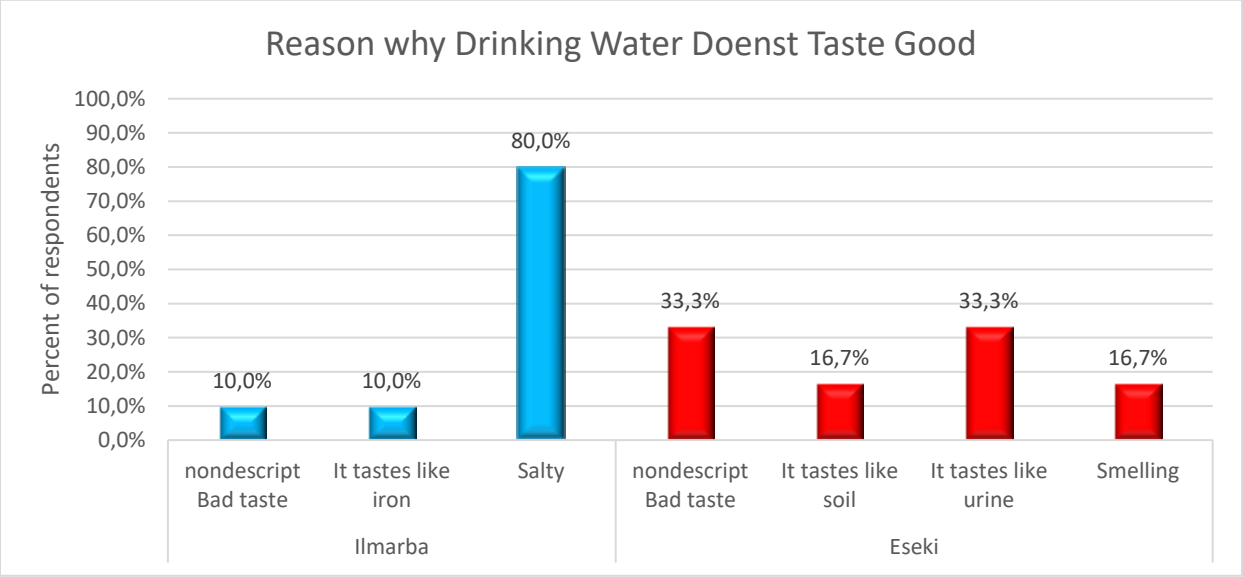

Figure 7: Reasons why drinking water doesn't taste good

Water samples from 4 main communal water points in the 2 communities were collected and taken for water quality analysis in a licensed Laboratory. The water points were as summarized in table 8 below:

Table 8: Water points sampled for water quality analysis

Name of Water Point	GPS Coordinates	Community Served	Nature of Water point
Home Hope Borehole	-2.23377, 36.66543	Ilmarba	Ground water; an improved water source; separates human and animal draw points
Ilmarba kilalash	-2.25024,36.67723	Ilmarba	Scoop hole located inside river bed; unimproved source; shared by humans and livestock
Eseki 1	-2.21360,36.71447	Eseki	Scoop hole located inside river bed; unimproved source; shared by humans and livestock
Eseki 2	-2.21416,36.71491	Eseki	Giant well located inside river bed; unimproved source; shared by humans and livestock

Both chemical and bacteriological tests were conducted on the 4 samples and the respective detailed reports are listed in appendices I-IV below. The laboratory findings were in line with what was reported by the community. For instance Home Hope Borehole was found to have high levels

of total hardness (656.6 mg/L against recommended 600 mg/L) and chloride (336.9mg/L against recommended 250 mg/L). This could explain the "Salty taste" reported by a majority (80%) of the respondents in Ilmarba Community. Similarly, samples from Ilmarba Kilalash had higher levels of iron (1.255 mg/L) than recommended standards of 0.300 mg/L. This could explain why some of the respondents (10%) reported that the water tastes like iron. This also applies for Eseki Community where water samples from Eseki 2 had higher levels of total suspended solids (48.6 mg/L) than the recommended standerd of 0 mg/L; and very high turbidity of 80.65 NTU (against recommended standards of 25 NTU). Similarly, Eseki 1 also recorded higher than recommended levels of total suspended solids (57.8 mg/L against recommended 0mg/L). The high levels of turbidity and total suspended solids could explain the 'soil-like taste' and 'bad smell' reported by respondents from Eseki Community.

For bacteriological analysis, the analytic parameters included *Salmonella sp., Shigella sp., and Escherichia coli (E.coli).* Two water sources i.e. Home Hope Borehole and Eseki 1 were free from any form of bacteriological contamination. Samples from Eseki 2 and Ilmarba Kilalash however tested positive for *E.coli* (Eseki2 1.7 x 10^2 cfu/100mg; Ilmarba Kilalash - 1.3 x 10^2 cfu/100mg). Several reasons could explain the presence of E.coli in water sources. Firstly, due to the long distance to water sources, women who are primarily responsible for fetching water prefer carrying clothes to do laundry at the source. For this reason, water sources get thronged with women from different households doing laundry at any particular time of the day. They also change and wash their children near the water points. The wastewater from laundry, some of which containing children fecal matter, is poured in the vicinity of the water source and finds its way back into the sources either through infiltration or by surface run off. The other reason relates with the high levels of open defecation practiced by the community (62%) with only 38% of the respondents reporting to have access to a toilet facility. During the rainy seasons, the water points get contaminated by surface runoff containing fecal matter. In addition since the water source is shared with livestock, fecal matter can be carried mechanically on the hooves of animals like goats and cows and brought to the source as they come to drink water. Other animals such as dogs also feed on human excreta and directly contaminate water through their mouths.

Women at Ilmarba doing laundry along the river bed

3.2.4 Treatment of Drinking Water

When asked about the drinking water available on the day of the interview 49.7% had obtained their drinking water from an improved source while 50.3 had obtained from unimproved sources. Figure 8 below shows the proportion of households treating water by type of water source. Despite the risks associated with water from unimproved water sources, only 4.3% and 9.8% of households using unimproved water sources in Ilmarba and Eseki treat their drinking water respectively.

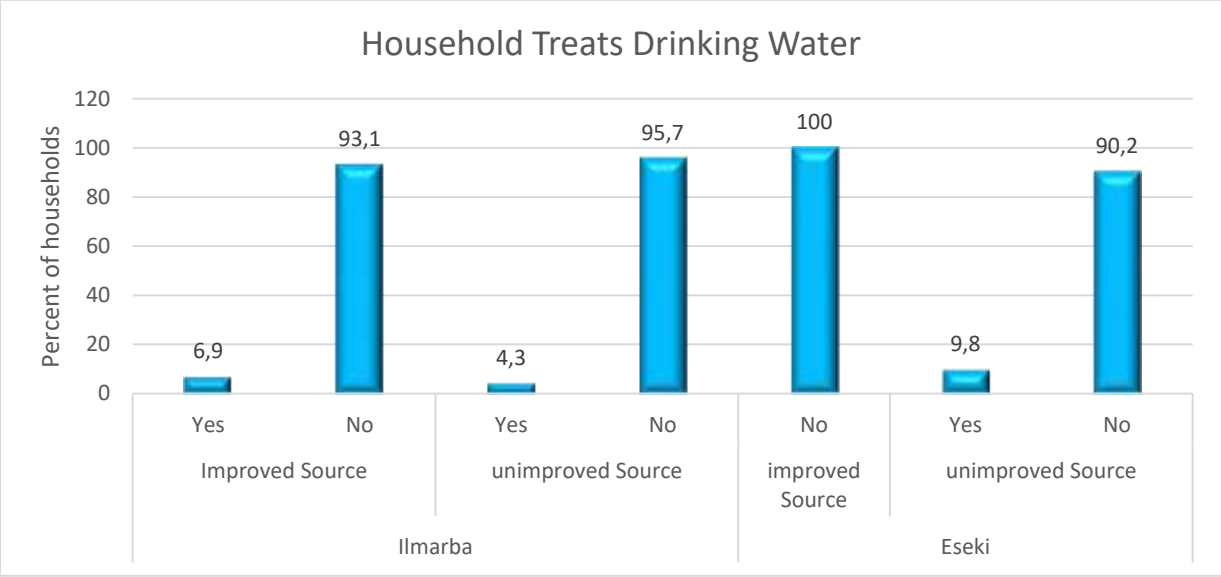

Figure 8: Water treatment by type of source

The survey revealed that chlorination and boiling are the main methods of water treatment used by the two communities. Of the households that treat their drinking water in Ilmarba community, 77.8% use chlorination while 22.2% treat their water by boiling. Similarly, 80% of the households in Eseki use chlorination while 20% boil their drinking water as shown in figure 9 below.

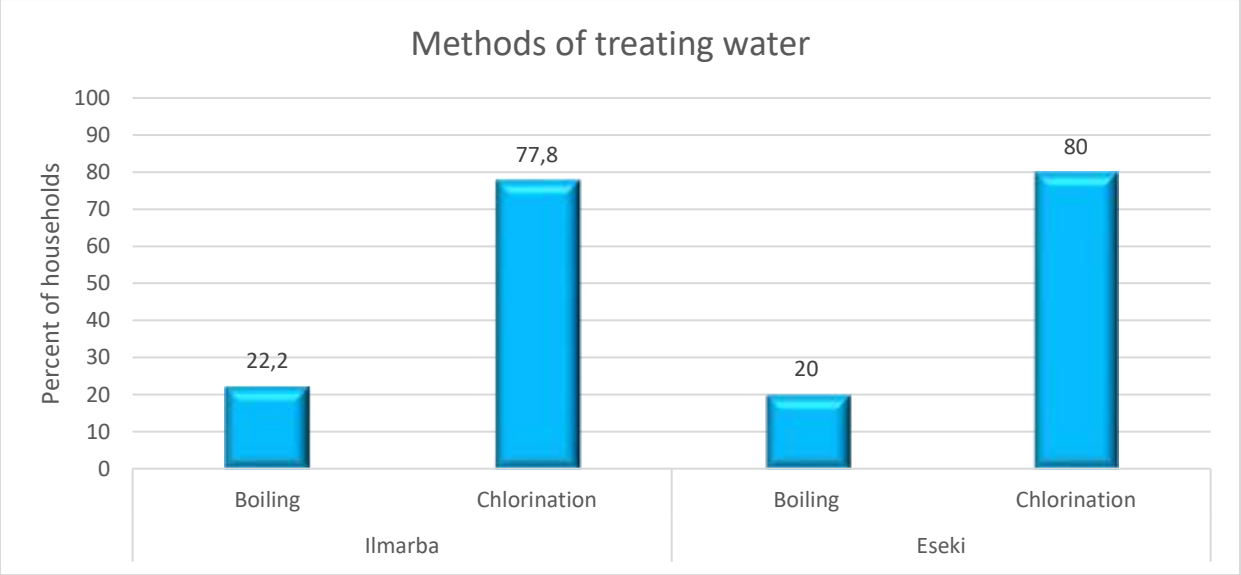

Figure 9: Methods of water treatment

According to key informant interviews conducted with the PHO in charge and CHVs, the main reason why community members do not treat water is lack of knowledge on the importance of water treatment. Chlorine products are readily available at an affordable cost (from ksh 5-50) in most of the market areas. However due to low demand, most shops in the villages do not stock the products. Further, some WASH partners such as Feed the Children and World Vision have been involved in supporting acquisition of chlorine tablets for communities. The tablets are centrally placed at health facilities for distribution to the households by CHVs. However, some households do not treat water despite having access to chlorine. There's need to sensitize communities on water safety and the health rsiks associated with using untreated water especially from unimproved water sources.

3.2.5 Payment for water services

As summarized in table 9 below, all (100%) of the households interviewed in Eseki do not pay for water services. In contrast, 71.6% of households in Ilmarba reported to be paying for water services while only 27% do not. This is attributable to the fact that most households (76.8%) in Ilmarba obtain water from improved sources, which require funds for operation and maintenance, while most households (96.2%) in Eseki rely on unimproved sources which have no O&M costs. For instance, one of the main water sources in Ilmarba is a diesel powered borehole, and the users are required to pay for water in order to get money to buy fuel. In contrast, Eseki uses scoop holes and giant wells which do not have significant operational costs.

Table 9: Households paying for water services

Community	Payment for water services	Frequency	Percent
Ilmarba	Yes	136	71.6%
	No	54	28.4%
Eseki	No	106	100%

Of those who reported to be paying for water, 1.5% pay per container, 11.8% per trip, 2.9% on a daily basis, 2.9% pay on a weekly basis while the majority (80.9%) pay for water services on monthly basis as illustrated in figure 10 below.

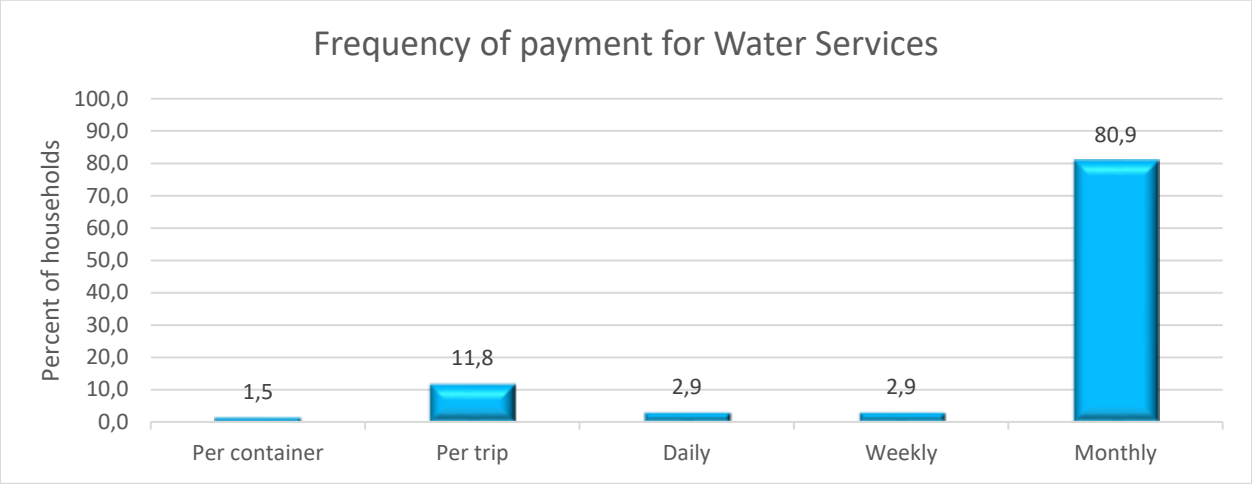

Figure 10: Frequency of payment for water services

For majority of the households, water services are paid for on a monthly basis and the cost ranges from ksh. 50 to 1000 per household per month. On average, each household spends approximately ksh. 215 per month. Table 11 below shows a summary of the cost of water for each of the payment options.

Table 10: Cost of water

	Per trip	Per container	Daily	Weekly	Monthly
Mean	295.00	5.00	77.50	505.00	215.4545
Minimum	10.00	5.00	5.00	10.00	50.00
Maximum	1000.00	5.00	150.00	1000.00	1000.00

The survey further revealed that approximately two thirds 66.2% of the households had some difficulties paying for water and that there are some times they did not pay (7.4%) or made late payments (58.8%) as shown in table 12 below:

Table 11: Households with difficulties paying for water

Difficulties in paying for Water	Frequency	Percent	Cumulative Percent
Yes, there were times we did not pay	10	7.4	7.4
Yes, there were times we paid late	80	58.8	66.2
No, we always paid the fee on time	46	33.8	100
Total	136	100	

3.2.6 Water Point Reliability and Functionality

The survey showed that most of the households (88.5%) obtain water from their main water point all year round. The other households use their primary water sources for 9-11 month (2%), 6-8 months (8.1%) and 3-5 months (1.4%). As shown in figure 11 below, 98.1% of households in Eseki obtain water from the primary source throughout the year compared to only 83.2% in Ilmarba.

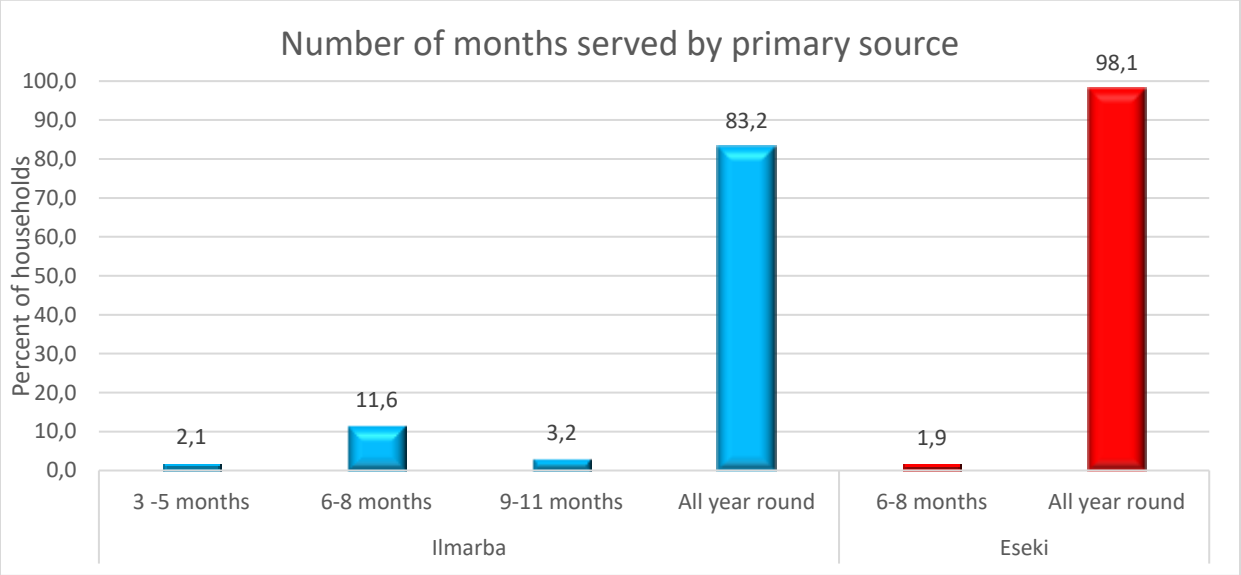

Figure 11: Number of months households are served by primary water sources

Most of the households mentioned July (65%) August (50%) and September (45%) as the months during which water is not available as shown in figure 12 below. Kajiado County has a bimodal rainfall pattern with short rains from October to December, and long rains from March to May. The three months (July, August and September) therefore coincide with the dry season of the year. During the dry season, shallow and surface water sources such as dug wells, earth pans and scoop holes dry up. Community members opt for other sources such as deep wells and mechanized boreholes. The increased demand strains the functional water sources which in turn contributes to reduced water levels, and to occasional breakdowns which further exacerbates water shortage.

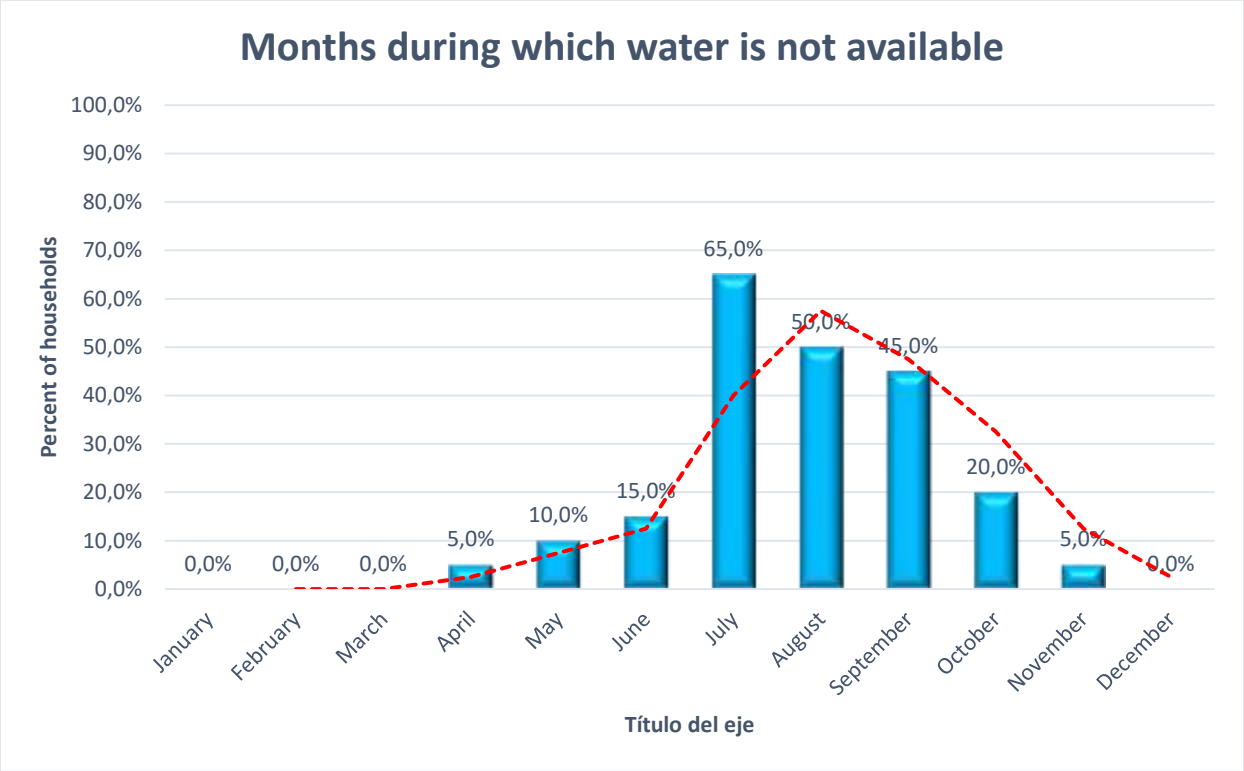

Figure 12: Months during which water is not available

When asked if they had ever fetched water from another source in the preceding one year, 45.3% of respondents in Ilmarba reported having used another source compared to only 3.8% in Eseki who reported using another source in the same time period. The secondary water sources used by the two communities were as illustrated in figure 13 below:

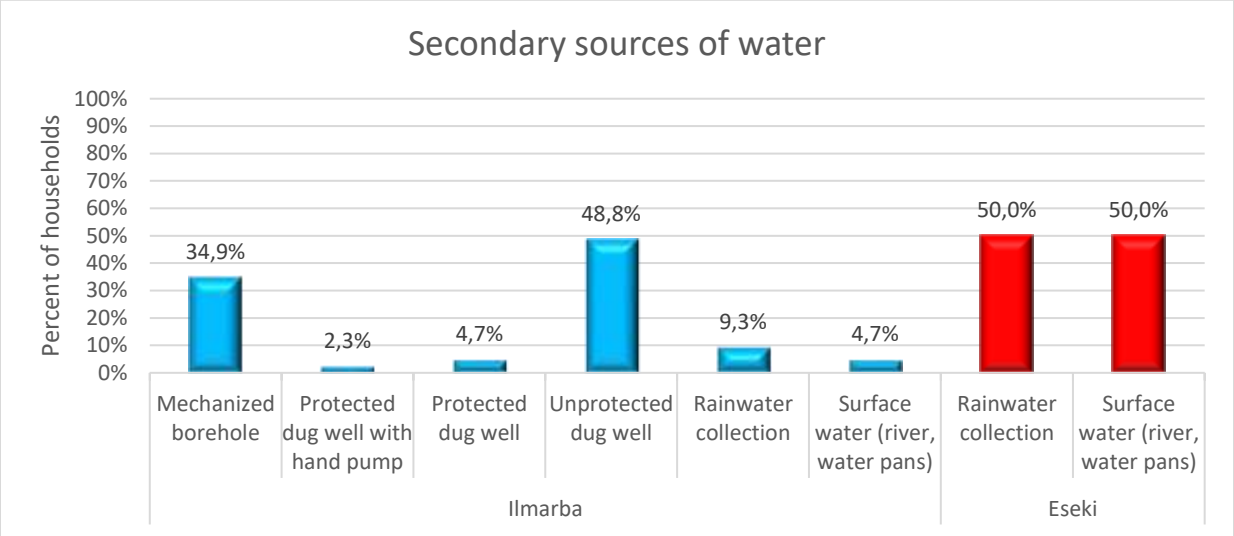

Figure 13: Secondary water sources

Of those who reported using other sources during the year in Ilmarba, a majority (72.1%) rarely used them. This was only in cases where the main water point had broken down or dried up. A very small proportion (4.7%) use alternative water sources during rainy seasons. For Eseki, 50% of respondents reported to be using other water sources occasionally (a few days in a month while the other 50% use other sources during rainy season. Figure 14 below shows a summary of the frequency of using other water sources for the two communities.

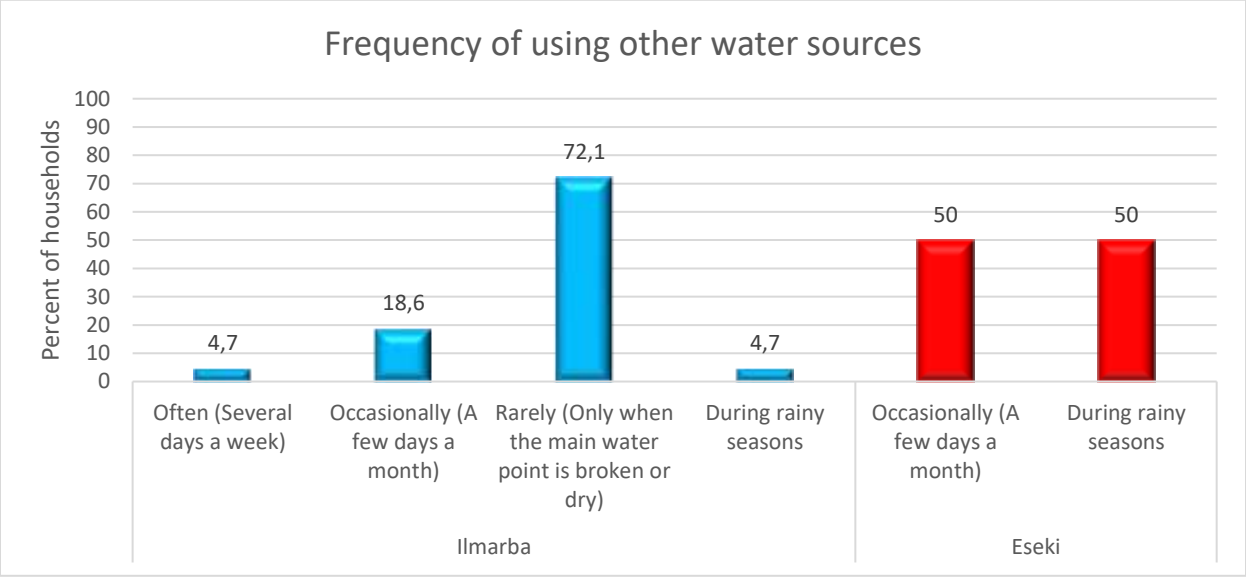

Figure 14: Frequency of using other water sources

With regards to functionality of the water points, the respondents were asked whether their water points had broken down in the past 1 year. Almost one quarter (24%) of all the respondents reported that their water points had broken down while 27% reported that their water points had never broken down. The rest of the respondents (49%) were using water systems that cannot experience mechanical problems as shown in figure 15 below:

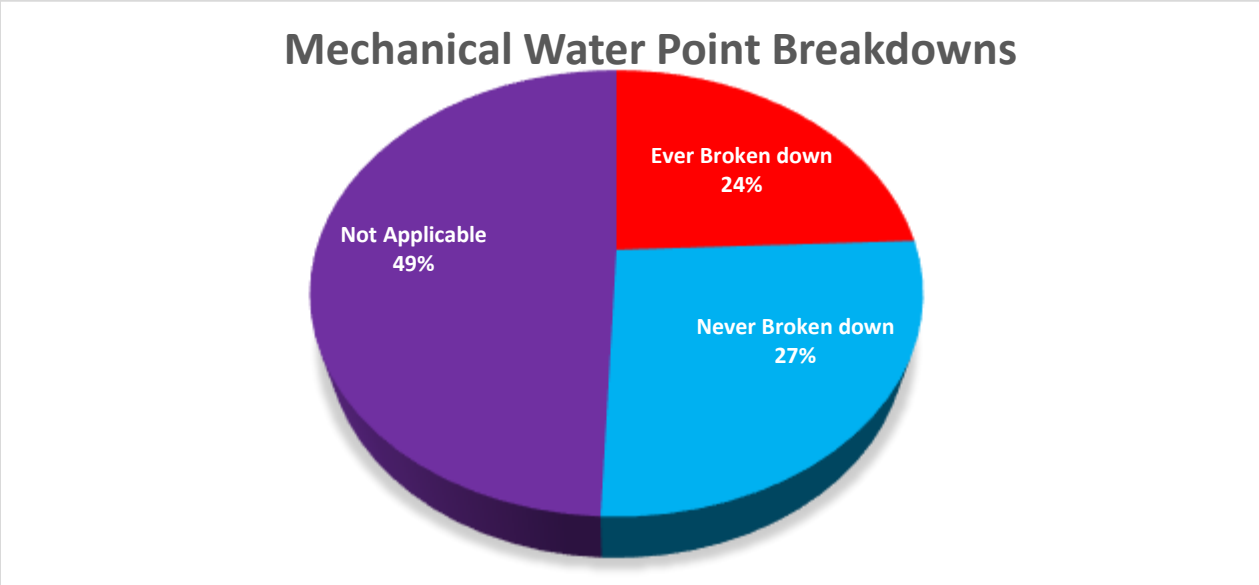

Figure 15: Water point breakdowns

Of those whose water points had breakdowns occasioned by mechanical problems, more than half (52%) reported the water points broke down only once. Another 30.6% reported two breakdowns in a year, while 13.9% and 2.8% reported three and four breakdowns respectively as shown in table 13 below.

Table 12: Frequency of water point breakdowns

Breakdowns	Frequency	Percent
Once	38	52.8
Twice	22	30.6
Thrice	10	13.9
Four times	2	2.8
Total	72	100

During the last breakdown experienced, the down time for the water points ranged from a few days to more than a month. As illustrated in figure 16 below, half (50%) of the respondents had their water points fixed with 1-2 days while another 22.2% of the households had their water points repaired within one week. Only 11.1% of the households had to wait for more than 1 month to have their water points fixed.

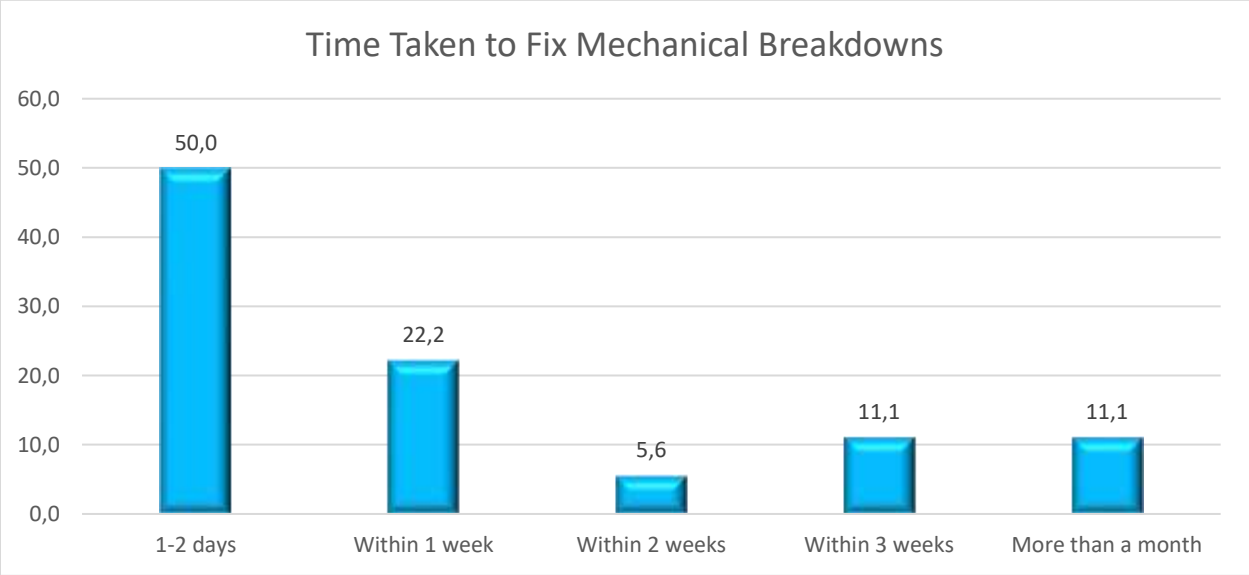

Figure 16: Time taken to fix breakdowns

When asked whether there are times they could not access water in past two weeks, 100% of the households in Eseki reported that they could always access water while 10.5% of respondents from Ilmarba reported there are times they could not access water. The reasons given fore not accessing water were as shown in figure 17 below:

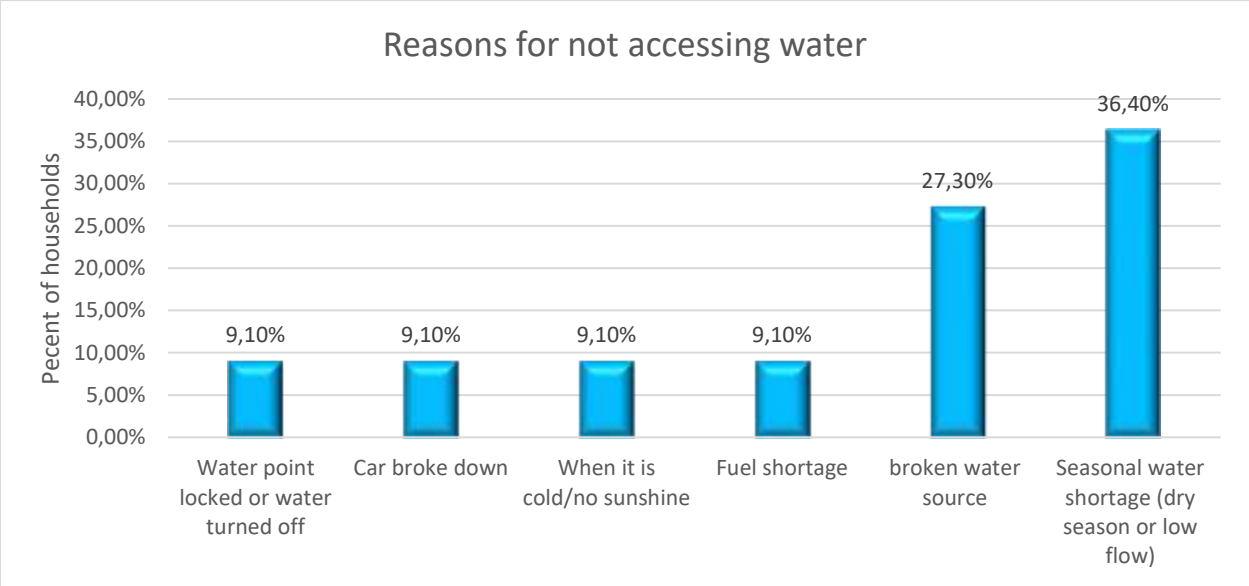

Figure 17: Reasons for not accessing water in the past 2 weeks

The main reasons were lack of water due to drought (36.4%) and breakdown of water points (27.3%). Other reasons included lack of fuel to power the pump, no adequate sunshine to generate enough solar power, breakdown of means of transport to the water point, and restricted access to the water point by locking.

3.3 Sanitation

Access to sanitation was low with only 38% of the households using a latrine as shown in figure 18 below:

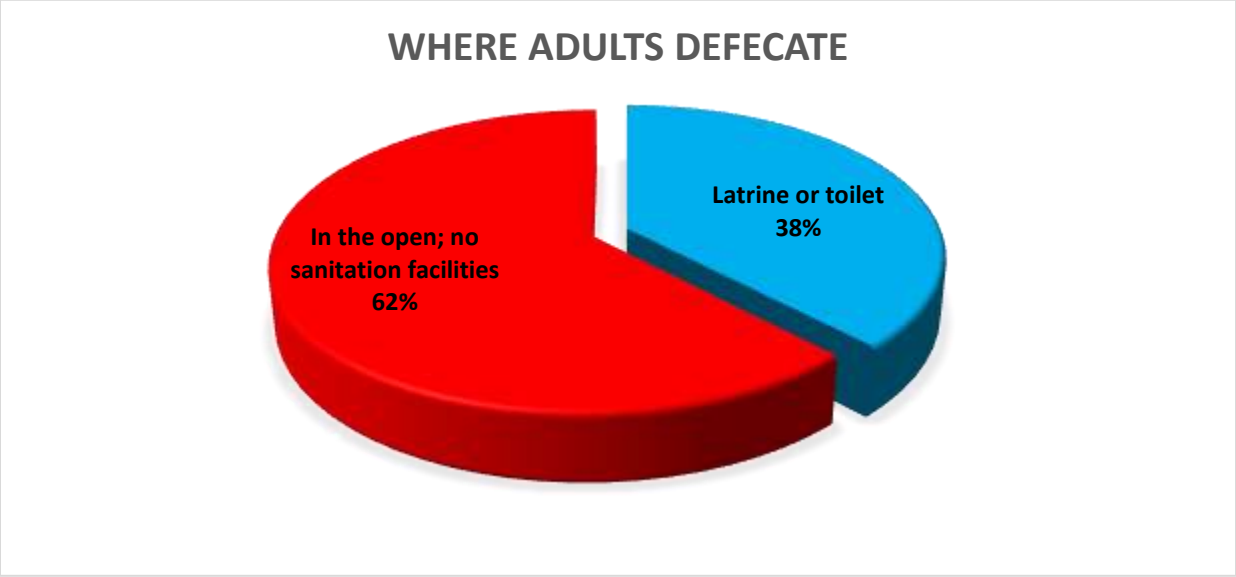

Figure 18: Where adult household members defecate

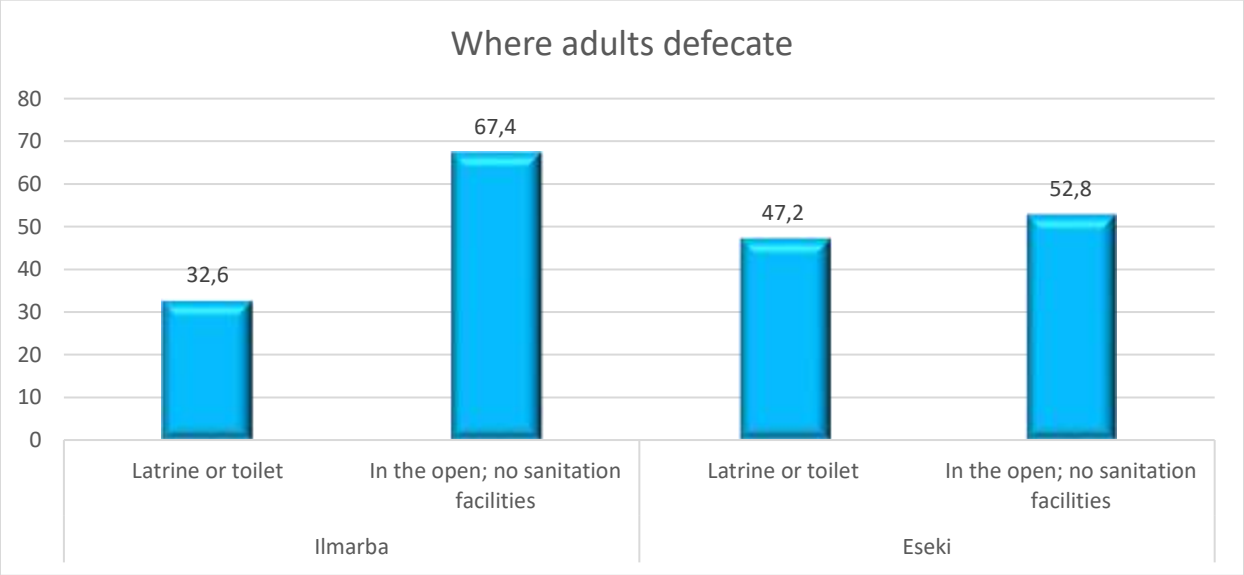

Figure 19: Where adults defecate by community

Proportion of households practicing open defecation was higher in Imarba (67.4%) than Eseki (52.8).

When asked about the places where children between 6-17 years go to defecate, a majority reported they defecate in the open (66.2%). Another 35.1% use latrines while few (2.7%) use potties.

Table 13: Where children 6-17 years defecate

Where children 6-17 years defecate	Percent of Households
Latrine or toilet	35.10%
Pot or potty	2.70%
In the open; no sanitation facilities	66.20%

As shown in the figure below, Ilmarba had a higher proportion of households whose children (6-17 years) defecate in the open (71.6%) as compared to Eseki (56.6%).

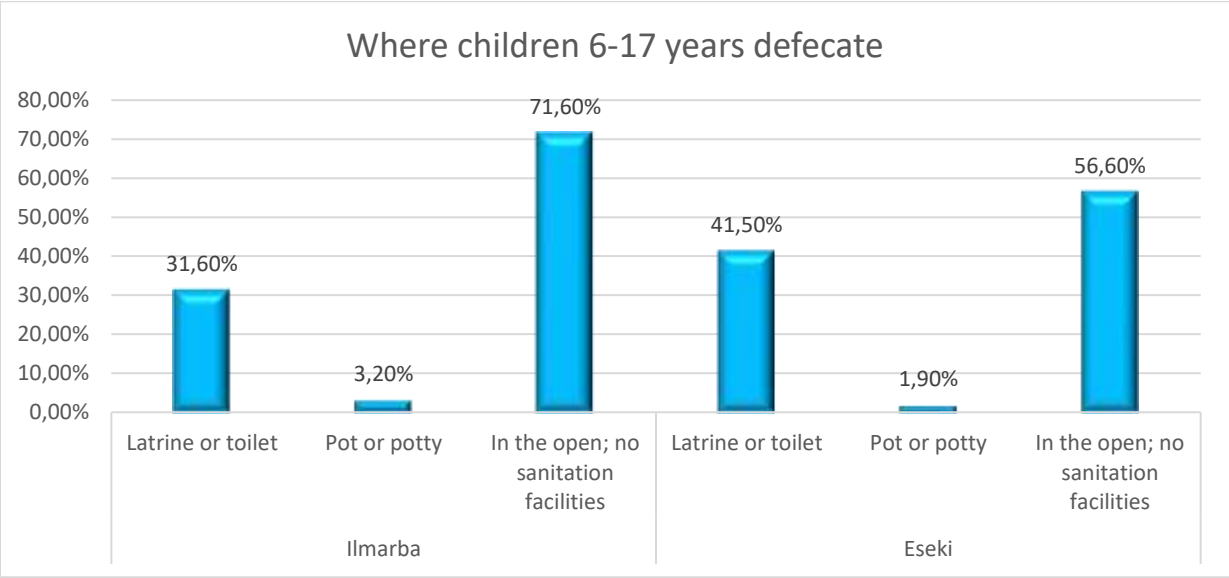

Figure 20: Where children 6-17 years defecate

On disposal of feces of children under the age of 5 years, almost half (47.1%) of the households rinse or put it on the ground or in the open. Another 17.6% of the households dispose it in the garbage while only 35.3% safely dispose children's faces in the latrine whereby the child directly uses a latrine or their feces are rinsed and taken to a latrine.

Table 14: Feces disposal for childfren under 5

Feces Disposal for children under 5	Percent	Cumulative Percent
Child uses latrine	21.6	21.6
It is put or rinsed into latrine	13.7	35.3

It is put or rinsed into garbage bin	17.6	52.9
It is put or rinsed on the ground or in the open	47.1	100

Comparatively, Ilmarba had a higher proportion of households that dispose children's' feces in the open than Eseki as illustrated in figure 20 below;

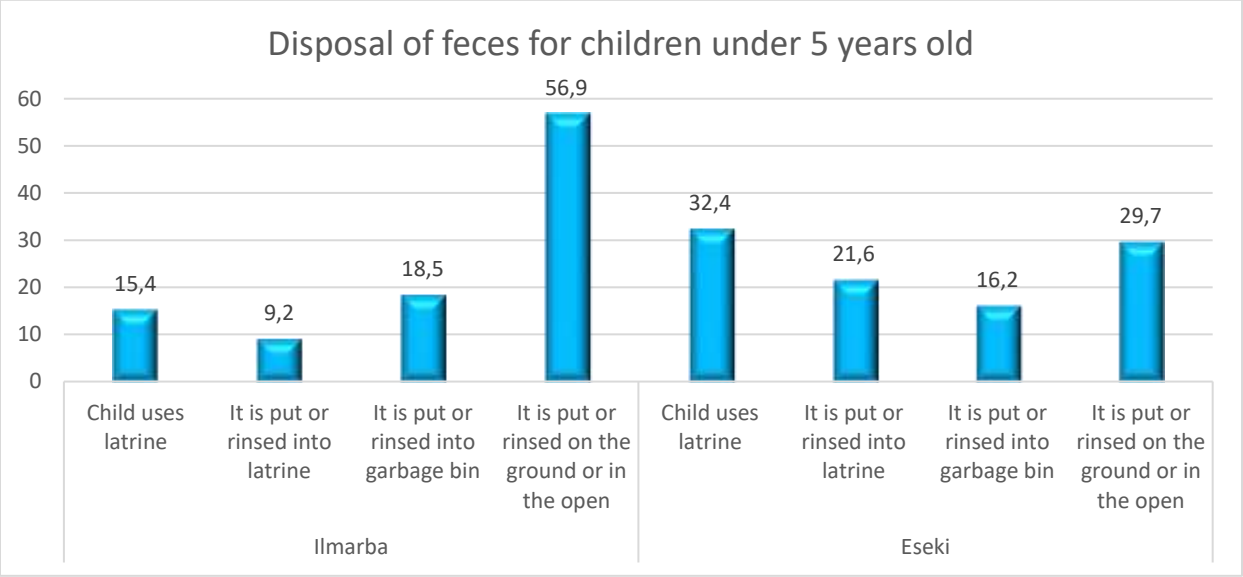

Figure 21: Disposal of feces for children under 5

As observed during the survey, 37.2% of the households had latrines while a majority (62.8%) did not have access to a sanitation facility. Ilmarba had a lower proportion (31.5%) households with a latrine as compared to Eseki community (47.2%).

Table 15: Household access to latrines

Community	Does Household Have a Latrine	Valid Percent	Cumulative Percent
Ilmarba	Yes, shows facility	31.6	31.6
	Does not have facility	68.4	100.0
	Total	100.0	
Eseki	Yes, shows facility	47.2	47.2
	Does not have facility	52.8	100.0
	Total	100.0	

Eight in every ten households (80%) that have access to a latrine use a shared facility while only 20% have their own private latrines. This could be explained by the communal culture of the Maasai people. They live in clustered homesteads of between 2 and 15 households depending on the number of wives and sons that the man has. These homesteads form one big "family" and in stead of constructing latrines for each household, a few latrines are constructed to be shared by all the households in the homestead.

Pit latrines were the most commonly used sanitation facilities for both Ilmarba (90%) and Esekei (88%). VIP latrines accounted for only 10% and 12% in Ilmarba and Eseki respectively as shown in figure 21 below:

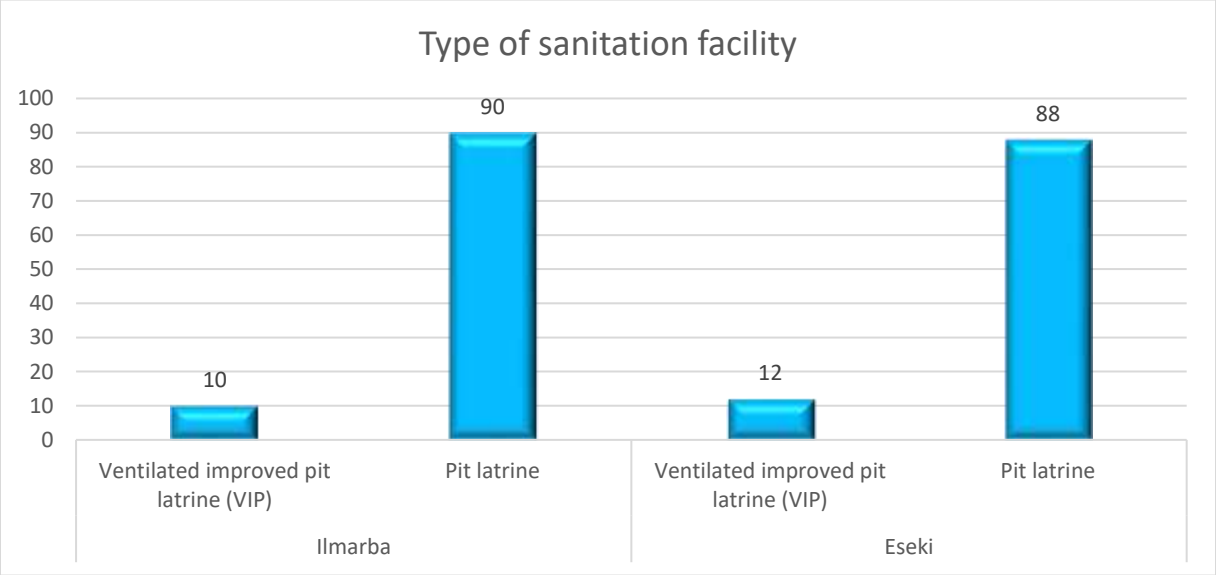

Figure 22: Types of sanitation facilities

Most (90.9%) of the latrines were located within the homestead while the rest (9.1) were located within the plot. In both instances the sanitation facilities were easily accessible and the distance from the household could not limit their usage. Concrete was the most commonly used material for constructing the latrine floor, accounting for 98.2% of all the latrines. The rest (1.8%) were constructed using wood boards or planks. More than three quarters (76.4%) of the floors were in good condition (with no cracks or gaps), while the remaining 23.6% were slightly damaged but safe to stand on. None of the facilities had a floor in bad (unsafe) condition. With regards to the

latrine superstructure, almost all the facilities (98.2%) had walls and doors in good condition hence providing privacy. Only 1.8% of the latrines provided little or no privacy. The pits for 14.5% of the latrines showed signs of being full while the rest (85.5%) of the latrines had no evidence of being full.

All (100%) of the latrines showed signs of recent use. This was evidence that the households that had latrines had appreciated the importance of using latrines. However when asked if they were aware of any people who practice open defecation, 96.6% reported that they knew of community members who practice open defecation. This implies that open defecation is still widely practiced in the two communities.

3.4 Handwashing Practices

The respondents were asked to mention different instances when they wash their hands. Respondents who wash their hands the least number of times mentioned only one instance, while those who wash hands the most number of times mentioned 6 different instances. On average, the respondents reported to be washing their hands 3.4 different instances. Ilmarba community reported an average of 3.3 instances when they wash their hands while Eseki recorded a slightly higher average of 3.5. As shown in table 17 below, 13.5% of all respondents reported only one instance when they wash their hands. Majority of the respondents (68.9%) however reported 3 to 5 instances when they wash their hands.

Table 16: Instances when hands are washed

Number of Instances when hands are washed	Percent of respondents	Cumulative Percent
1.00	13.5	13.5
2.00	13.5	27.0
3.00	23.0	50.0
4.00	25.0	75.0
5.00	20.9	95.9
6.00	4.1	100.0
Total	100.0	

For Ilmarba community, the most frequently reported instance when hands are washed was 'before food preparation' (75%). This was followed respectively by 'after defecating' (65%) and 'before eating' (60%). Similarly for Eseki community, the most frequently reported instances when the community members was their hands included 'before food preparing (85%), after defecating (83%), and before eating (72%). Figure 23 below shows the various instances when hands are washed by the 2 communities.

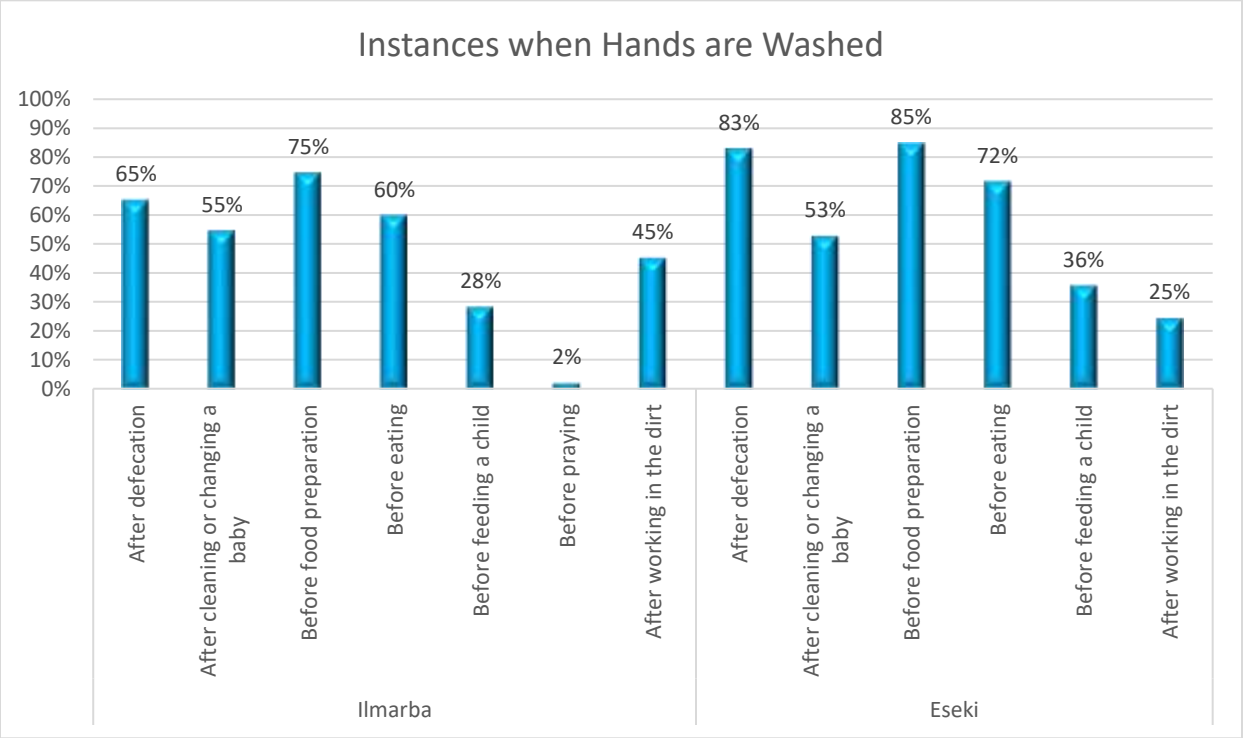

Figure 23: Instances when hands are washed

The survey revealed that only 41.9% of the households had handwashing facilities (or modalities for washing hands). The other 58.1% were not in a position to show somewhere they usually wash their hands from and/or what they use to wash hand. Of those who had hand washing facilities, a total of 83.9% had soap, ash, or other cleaning agents. This constitutes only 35.2% of the total number of households.

Table 17: Use of handwashing aids

	Percent of all households	Percent of households with handwashing facilities	Cumulative Percent

Soap	33.1	79	79
Ash	0.7	1.6	80.6
Other cleanser of detergent	1.4	3.2	83.9
No cleansing agent	6.8	16.1	100
Total	41.9	100	
Does not have handwashing facility	58.1		
Total	**100**		

Of those who had handwashing facilities, 66.1% had a dedicated location for handwashing. This constitutes only 27.7% of all households. Water for washing hands was observed in most (93.5%) of the households with handwashing facilities.

3.5 Prevalence of diarrhea

Diarrhea was defined as having three or more loose or liquid stools within 24 hours. Of all households interviewed, 69% had children under the age of 5 years. The respondents were asked whether one or more of these children under the age of 5 had had diarrhea in the past two weeks. In total, 11.7% of the households reported that their children had experienced diarrhea in the said period. As shown in figure 24 below, Eseki community had a higher prevalence of diarrhea reported by 24.3% of households as compared to Ilmarba Community where diarrhea among children under 5 years was reported by only 4.5% of the households.

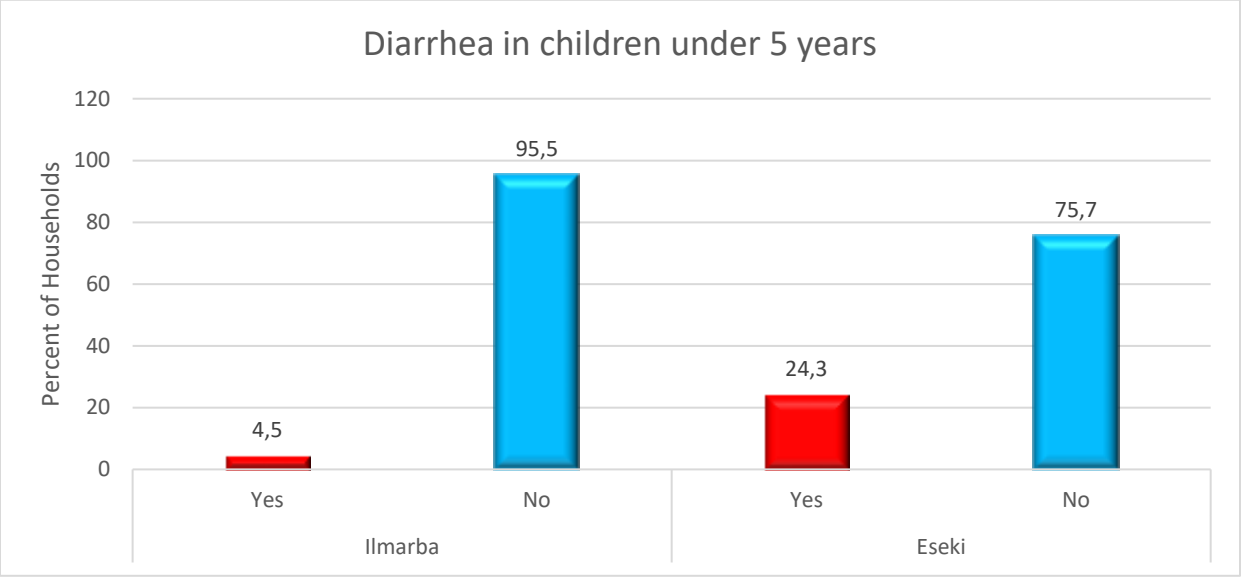

Figure 24: Diarrheain children under 5

Ilmarba and Eseki communities are served by two health facilities i.e. Ilmarba dispensary and Emurua Dikirr Dispensary. Data on clinical cases of diarrhea diagnosed at the two facilities was obtained for 6 months preceding the study. The table below shows the trend in Diarhoea cases for the two facilities from April to September 2020. The data is segregated by age into cases among children under five years and diarrhea cases among patients over 5 years old.

Table 18: Trend in clinical diarrhoea cases

	Age		20-Apr	20-May	20-Jun	20-Jul	20-Aug	20-Sep
Ilmarba Dispensary	Under 5 years	Diarrhoea Cases	8	4	6	10	11	5
		Total number of Patients	106	119	131	73	89	95
		Percent	8%	3%	5%	14%	12%	5%
	Over 5 years	Diarrhoea Cases	9	8	9	9	14	9
		Total number of Patients	140	131	267	107	116	112
		Percent	6%	6%	3%	8%	12%	8%
Emurua Dikirr	Under 5 years	Diarrhoea Cases	11	7	9	9	17	14
		Total number of Patients	71	48	51	55	70	60
		Percent	15%	15%	18%	16%	24%	23%
	Ov	Diarrhoea Cases	8	5	6	6	8	9

		Total number of Patients	194	158	195	155	112	161
		Percent	4%	3%	3%	4%	7%	6%

The lowest incidence of diarrhea recorded at Ilmarba dispensary was in the month of May where out of 119 children under five who visited the facility only 4 (3%) were diagnosed with diarrhea. The highest incidence for the facility was in the month of July where 14% of children under five years who visited the facility had diarrhea. For Emurua Dikir dispensary, the highest number of diarrhea cases among children under five were recorded in August (24%) while the lowest cases were recorded in April (15%) and May (15%). The highest incidence of diarrhea among patients over 5 years was recorded in the month of August for both Ilmarba Dispensary (12%) and Emurua Dikirr (7%).

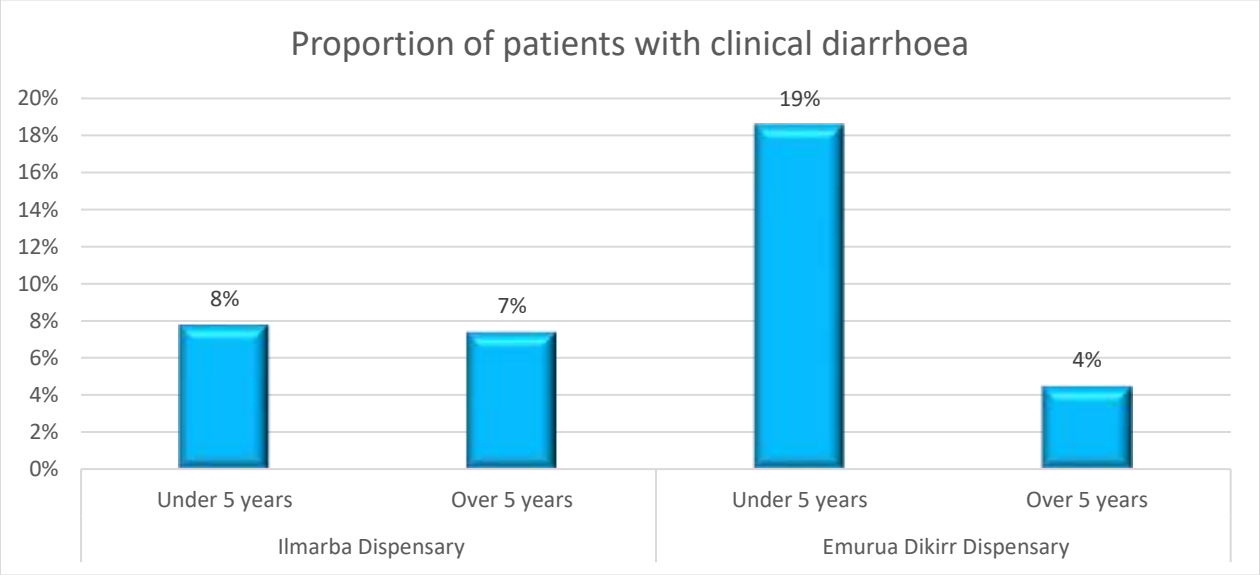

Figure 25: Proportion of patients with diarrhoea

Cumulatively for the 6 month period, 8% of all under 5 patients who visited Ilmarba dispensary and 19% of all under 5 patients who visited Emurua Dikirr were diagnosed with diarrhea. For patients over five years old, the incidence rate was 7% and 4% for Ilmarba and Emurua Dikirr as shown in figure 25 above.

CHAPTER 4: CONCLUSION AND RECOMMENDATIONS

Conclusion

- **Water access:** There is low access to safe water in the Ilmarba and Eseki with only 51% of households having access to improved water sources. The average time taken to fetch water is also higher than the 30 minute return trip recommended by the World health organization. There are significant disparities in access to water with some households taking as long as 2.7 hours to reach a water point. Water from unimproved sources does not meet quality standards for drinking water. This coupled with low practice of water treatment poses risk to the health of beneficiary communities.
- **Sanitation coverage:** There is low sanitation coverage with 62% of the households practicing open defecation. Open defecation in the area pauses a high risk for contamination of water sources, especially surface water sources such as scoop holes and shallow wells used by the community. However, there is evidence that the few households who have latrines frequently use them which implies a positive change in sanitation behavior.
- **Handwashing practices:** Whereas Ilmarba and Eseki communities practice handwashing, there is a gap in knowledge of the critical times of handwashing and the proper way of handwashing using running water and Soap (or handwashing aids). In addition, only 41.9% had handwashing facilities which limits proper hand handwashing practices. Inadequate access to water occasioned by long distances to primary water also contributes to low uptake of handwashing practices. Frequent washing of hands using the little water available is considered wastage of water.

Recommendations

- ***Intensity community sensitization and follow ups to accelerate access to basic sanitation and increase adoption of handwashing practices.*** By use of trained sanitation champions, the project should intensify follow ups through continuous household-to-household sensitization. The champions should visit every homestead and reach the residents with key sanitation and hygiene messages. Small Immediate Doable Actions (SIDAs) should be employed to accelerate provision of handwashing and garbage

management facilities at the homesteads. Through SIDAs approach, the champions can ensure that every plot they visit has a leaky tin/ tippy tap, water and handwashing aids before moving to the next household.

- ***Reducing distance to water source through pipeline extensions*** **–** Women walk long distances to access primary water sources. This especially affects Eseki community where most of the water sources are located along the river. The project should explore options for taking water closer to the community through pipeline extensions. The water sources should be designed with future extension in mind. This may include construction of large infiltration chambers which can be equipped with high capacity submersible pumps in the future. The water can then be pumped to an elevated reservoir and reticulated to serve various parts of the community when more funding is available.
- ***Construction of washing areas around water points*** **–** As observed during the evaluation, community members do laundry around water points and within river beds which poses high risk of contaminating water sources. To mitigate this, the project should explore options to provide for spaces for doing laundry and cleaning. This will allow for mechanisms of controlling and directing wastewater away from the watercourse hence minimizing chances of flowing /infiltrating back to cause contamination.

REFERENCES

Kenya National Bureau of Statistics. (2013). *Exploring Kenya ' s Inequality: Pulling apart or pooling together?- Kakiado County: Vol. II*.

UNICEF. (2019). *Kenya: Water and Sanitation Hygiene*. Water and Environmental Sanitation. https://www.unicef.org/kenya/wes.html

United Nations Water. (2016). *Integrated Monitoring Guide for SDG 6: Targets and global indicators*. *April*, 1–26.

Water and Sanitation Program. (2014). *County Sanitation Profiles: State of Sanitation in Kajiado County*. https://doi.org/10.3%

World Health Organization, & United Nations International Children's Emergency Fund. (2017). *Progress on Drinking Water, Sanitation and Hygiene: 2017 update and SDG Baselines*. https://doi.org/10.1111 / tmi.12329

APPENDICES

Appendix I: Water Quality Report - Eseki 1

Spectralab

Research Testing Training

CERTIFICATE OF ANALYSIS

CoA No:SAS/CA/PWG- 202765

Client: **AMREF Kenya**	
Contact Person: **Mr. Kenneth Ochieng**	
Date Received: October 13, 2020	
Client's Code:SAS - KC - 634	

Sample Name :	**Ground Water**
Customer's Sample ID	**Eseki 1 Water point at the Road**
Laboratory ID:	SAS-PWG-202765
Date	19-Oct-2020

Test Parameter	Test Method	Result	Units	Limit -Treated Water	Limit - Natural Water	Status
Total suspended Solids	ISO 11923	57.8000	mg/L	ND	ND	Does Not Comply
pH @25°C	ISO 10523	7.9130	pH units	6.5-8.5	6.5-8.5	Complies
Colour	ISO 7887	30.0000	TCU	15.000	50.000	Complies
Turbidity	ISO 7027	15.1500	NTU	5.000	25.000	Complies
Permanganate Index	SAS-APHA-$KMnO_4$	0.9600	mg/L	NS	NS	NS
Conductivity (EC)	ISO 7888	2,859.0000	µS/cm	1500.000	2500.000	Does Not Comply
Iron	ISO 6332	1.1700	mg/L	0.300	0.300	Does Not Comply
Manganese	ISO 6333	<0.02	mg/L	0.100	0.100	Complies
Calcium	ISO 7980	86.2400	mg/L	150.000	150.000	Complies
Magnesium	ISO7980	52.4183	mg/L	100.000	100.000	Complies
Sodium	ISO 9964	158.8000	mg/L	200.000	200.000	Complies
Potassium	ISO 9964	69.5500	mg/L	50.000	50.000	Does Not Comply
Total Hardness	ISO 6059	431.2000	mg/L	300.000	600.000	Complies
Total Alkalinity	SAS-APHA-2320	585.2000	mg/L	NS	NS	NS
Chloride	ISO 9297	219.9318	mg/L	250.000	250.000	Complies
Fluoride	ISO10359	0.5800	mg/L	1.500	1.500	Complies
Nitrogen as Nitrates	ISO 14911	2.3500	mg/L	45.000	45.000	Complies
Nitrogen as Nitrites	ISO 6777	<0.001	mg/L	0.900	0.900	Complies
Ammoniacal Nitrogen	ISO 11732	0.0660	mg/L	0.500	0.500	Complies
Aluminium	ISO 12020	<0.01	mg/L	0.200	0.200	Complies
Sulphates	ISO 22743	56.1870	mg/L	400.000	400.000	Complies
Orthophosphates	ISO 15681	0.0520	mg/L	2.200	2.200	Complies
Free Carbon Dioxide	SAS-APHA-4500-CO_2	3.5200	mg/L	NS	NS	NS
Total Dissolved Solids	ASTM D 5907-13	1,572.0000	mg/L	1000.000	1500.000	Does Not Comply
Dissolved Oxygen	SAS-APHA-4500-O	5.6150	mg/L	NS	NS	NS
Bicarbonates	SAS-APHA-2320	585.2000	mg/L	NS	NS	NS
Carbonates	SAS-APHA-2320	ND	mg/L	NS	NS	NS

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

amref health africa ferrovial amref salud africa flying doctors

Spectralab

■ *Research* ■ *Testing* ■ *Training*

Analytical Parameters	Method	Result	Units	Desirable Limits	Status
Salmonella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Shigella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Escherichia coli (E.coli)	KS 05-220	Absent	cfu/100ml	Not Detected	Complies

Remarks: Limits are based on KS EAS 12:2018

**CFU- Colony forming units (for microbiology)

* * mg/L - milligrams per liter, µg/L - micrograms per Liter

** TCU - True colour Units, NTU - Nephalometric Turbidity Units

* ND - Not Detected, NS - No standard issued by any authority

** Permissible Limit means that the water complies with limits for Natural potable water but is off limits for treated water.

Observations

*** Some parameters tested for did NOT meet the requirements of EAS 12, standard for potable Natural Water

Conclusion

*** Based on the sample submitted to the laboratory, and the parameters tested for, this water requires treatment.

SPECTRALAB ANALYTICAL SERVICES LIMITED P. O. Box 50208 - 00200, NAIROBI Tel: 020 6551177, 0775 502222 Email: info@spectralab.co.ke

19/10/2020

ANALYST (Date: dd/mm/yyyy)

19/10/2020

LABORATORY MANAGER (Date: dd/mm/yyyy)

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

Appendix II: Water Quality Report - Eseki 2

Spectralab

Research Testing Training

CERTIFICATE OF ANALYSIS

CoA No:SAS/CA/PWG- 202766

Client: **AMREF Kenya**	
Contact Person: **Mr. Kenneth Ochieng**	
Date Received: October 13, 2020	
Client's Code:SAS - KC - 634	

Sample Name :	**Ground Water**
Customer's Sample ID	**Eseki 2- Sand Dam Site**
Laboratory ID:	SAS-PWG-202766
Date	19-Oct-2020

Test Parameter	Test Method	Result	Units	Limit -Treated Water	Limit - Natural Water	Status
Total suspended Solids	ISO 11923	48.6000	mg/L	ND	ND	Does Not Comply
pH @25°C	ISO 10523	7.8350	pH units	6.5-8.5	6.5-8.5	Complies
Colour	ISO 7887	30.0000	TCU	15.000	50.000	Complies
Turbidity	ISO 7027	80.6500	NTU	5.000	25.000	Does Not Comply
Permanganate Index	SAS-APHA-$KMnO_4$	0.6400	mg/L	NS	NS	NS
Conductivity (EC)	ISO 7888	2,752.0000	µS/cm	1500.000	2500.000	Does Not Comply
Iron	ISO 6332	1.2200	mg/L	0.300	0.300	Does Not Comply
Manganese	ISO 6333	<0.02	mg/L	0.100	0.100	Complies
Calcium	ISO 7980	109.7600	mg/L	150.000	150.000	Complies
Magnesium	ISO7980	14.3587	mg/L	100.000	100.000	Complies
Sodium	ISO 9964	170.8000	mg/L	200.000	200.000	Complies
Potassium	ISO 9964	64.5500	mg/L	50.000	50.000	Does Not Comply
Total Hardness	ISO 6059	333.2000	mg/L	300.000	600.000	Complies
Total Alkalinity	SAS-APHA-2320	550.0000	mg/L	NS	NS	NS
Chloride	ISO 9297	224.6112	mg/L	250.000	250.000	Complies
Fluoride	ISO10359	1.2400	mg/L	1.500	1.500	Complies
Nitrogen as Nitrates	ISO 14911	0.4900	mg/L	45.000	45.000	Complies
Nitrogen as Nitrites	ISO 6777	0.1300	mg/L	0.900	0.900	Complies
Ammoniacal Nitrogen	ISO 11732	0.1300	mg/L	0.500	0.500	Complies
Aluminium	ISO 12020	<0.01	mg/L	0.200	0.200	Complies
Sulphates	ISO 22743	34.2720	mg/L	400.000	400.000	Complies
Orthophosphates	ISO 15681	1.1050	mg/L	2.200	2.200	Complies
Free Carbon Dioxide	SAS-APHA-4500-CO_2	0.7040	mg/L	NS	NS	NS
Total Dissolved Solids	ASTM D 5907-13	1,512.0000	mg/L	1000.000	1500.000	Does Not Comply
Dissolved Oxygen	SAS-APHA-4500-O	6.6300	mg/L	NS	NS	NS
Bicarbonates	SAS-APHA-2320	550.0000	mg/L	NS	NS	NS
Carbonates	SAS-APHA-2320	ND	mg/L	NS	NS	NS

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

amref health africa ferrovial amref salud africa flying doctors

Spectralab

Research Testing Training

Analytical Parameters	Method	Result	Units	Desirable Limits	Status
Salmonella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Shigella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Escherichia coli (E.coli)	KS 05-220	1.7×10^2	cfu/100ml	Not Detected	Does Not Comply

Remarks: Limits are based on KS EAS 12:2018

**CFU- Colony forming units (for microbiology)

* * mg/L - milligrams per liter, µg/L - micrograms per Liter

** TCU - True colour Units, NTU - Nephalometric Turbidity Units

* ND - Not Detected, NS - No standard issued by any authority

** Permissible Limit means that the water complies with limits for Natural potable water but is off limits for treated water.

Observations

*** Some parameters tested for did NOT meet the requirements of EAS 12, standard for potable Natural Water

Conclusion

*** Based on the sample submitted to the laboratory, and the parameters tested for, this water requires treatment.

SPECTRALAB ANALYTICAL SERVICES LIMITED
P. O. Box 50208 - 00200, NAIROBI
Tel: 020 6551177, 0775 502222
Email: info@spectralab.co.ke

19/10/2021

ANALYST (Date: dd/mm/yyyy)

19/10/2020

LABORATORY MANAGER (Date: dd/mm/yyyy)

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

Appendix III: Water Quality Report – Home Hope Borehole

Spectralab

Research Testing Training

CERTIFICATE OF ANALYSIS

CoA No:SAS/CA/PWG- 202767

Client: **AMREF Kenya**	
Contact Person: **Mr. Kenneth Ochieng**	
Date Received: October 13, 2020	
Client's Code:SAS - KC - 634	

Sample Name :	**Ground Water**
Customer's Sample ID	**Home Hope Borehole**
Laboratory ID:	SAS-PWG-202767
Date	19-Oct-2020

Test Parameter	Test Method	Result	Units	Limit -Treated Water	Limit - Natural Water	Status
Total suspended Solids	ISO 11923	Nil	mg/L	ND	ND	Complies
pH @25°C	ISO 10523	7.6965	pH units	6.5-8.5	6.5-8.5	Complies
Colour	ISO 7887	<5	TCU	15.000	50.000	Complies
Turbidity	ISO 7027	0.5850	NTU	5.000	25.000	Complies
Permanganate Index	SAS-APHA-$KMnO_4$	0.6400	mg/L	NS	NS	NS
Conductivity (EC)	ISO 7888	4,295.0000	µS/cm	1500.000	2500.000	Does Not Comply
Iron	ISO 6332	<0.01	mg/L	0.300	0.300	Complies
Manganese	ISO 6333	<0.02	mg/L	0.100	0.100	Complies
Calcium	ISO 7980	101.9200	mg/L	150.000	150.000	Complies
Magnesium	ISO7980	97.6459	mg/L	100.000	100.000	Complies
Sodium	ISO 9964	187.6000	mg/L	200.000	200.000	Complies
Potassium	ISO 9964	49.4000	mg/L	50.000	50.000	Complies
Total Hardness	ISO 6059	656.6000	mg/L	300.000	600.000	Does Not Comply
Total Alkalinity	SAS-APHA-2320	642.4000	mg/L	NS	NS	NS
Chloride	ISO 9297	336.9168	mg/L	250.000	250.000	Does Not Comply
Fluoride	ISO10359	0.6450	mg/L	1.500	1.500	Complies
Nitrogen as Nitrates	ISO 14911	3.3000	mg/L	45.000	45.000	Complies
Nitrogen as Nitrites	ISO 6777	<0.001	mg/L	0.900	0.900	Complies
Ammoniacal Nitrogen	ISO 11732	<0.05	mg/L	0.500	0.500	Complies
Aluminium	ISO 12020	<0.01	mg/L	0.200	0.200	Complies
Sulphates	ISO 22743	63.7920	mg/L	400.000	400.000	Complies
Orthophosphates	ISO 15681	0.9900	mg/L	2.200	2.200	Complies
Free Carbon Dioxide	SAS-APHA-4500-CO_2	3.5200	mg/L	NS	NS	NS
Total Dissolved Solids	ASTM D 5907-13	2,350.0000	mg/L	1000.000	1500.000	Does Not Comply
Dissolved Oxygen	SAS-APHA-4500-O	4.4100	mg/L	NS	NS	NS
Bicarbonates	SAS-APHA-2320	642.4000	mg/L	NS	NS	NS
Carbonates	SAS-APHA-2320	ND	mg/L	NS	NS	NS

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

amref health africa ferrovial amref salud africa flying doctors

Spectralab

■ *Research* ■ *Testing* ■ *Training*

Analytical Parameters	Method	Result	Units	Desirable Limits	Status
Salmonella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Shigella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Escherichia coli (E.coli)	KS 05-220	Absent	cfu/100ml	Not Detected	Complies

Remarks: Limits are based on KS EAS 12:2018

**CFU- Colony forming units (for microbiology)

* * mg/L - milligrams per liter, µg/L - micrograms per Liter

** TCU - True colour Units, NTU - Nephalometric Turbidity Units

* ND - Not Detected, NS - No standard issued by any authority

** Permissible Limit means that the water complies with limits for Natural potable water but is off limits for treated water.

Observations

*** Some parameters tested for did NOT meet the requirements of EAS 12, standard for potable Natural Water

Conclusion

*** Based on the sample submitted to the laboratory, and the parameters tested for, this water requires treatment.

SPECTRALAB ANALYTICAL SERVICES LIMITED P.O. Box 50208 - 00200, NAIROBI Tel: 020 6551177, 0775 502222 Email: info@spectralab.co.ke

19/10/2020 — ANALYST (Date: dd/mm/yyyy)

19/10/2020 — LABORATORY MANAGER (Date: dd/mm/yyyy)

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

Appendix IV: Water Quality Report – Ilmarba Kilalash Scoop Hole

Spectralab

Research Testing Training

CERTIFICATE OF ANALYSIS

CoA No:SAS/CA/PWG- 202768

Client: **AMREF Kenya**	
Contact Person: **Mr. Kenneth Ochieng**	
Date Received: October 13, 2020	
Client's Code:SAS - KC - 634	

Sample Name :	**Ground Water**
Customer's Sample ID	**Ilmarba Kilalash Scoop Hole**
Laboratory ID:	SAS-PWG-202768
Date	19-Oct-2020

Test Parameter	Test Method	Result	Units	Limit -Treated Water	Limit - Natural Water	Status
Total suspended Solids	ISO 11923	96.3000	mg/L	ND	ND	Does Not Comply
pH @25°C	ISO 10523	7.4770	pH units	6.5-8.5	6.5-8.5	Complies
Colour	ISO 7887	40.0000	TCU	15.000	50.000	Complies
Turbidity	ISO 7027	141.5000	NTU	5.000	25.000	Does Not Comply
Permanganate Index	SAS-APHA-$KMnO_4$	0.3200	mg/L	NS	NS	NS
Conductivity (EC)	ISO 7888	2,108.0000	µS/cm	1500.000	2500.000	Does Not Comply
Iron	ISO 6332	1.2550	mg/L	0.300	0.300	Does Not Comply
Manganese	ISO 6333	0.0855	mg/L	0.100	0.100	Complies
Calcium	ISO 7980	105.4400	mg/L	150.000	150.000	Complies
Magnesium	ISO7980	36.0166	mg/L	100.000	100.000	Complies
Sodium	ISO 9964	104.9000	mg/L	200.000	200.000	Complies
Potassium	ISO 9964	30.0000	mg/L	50.000	50.000	Complies
Total Hardness	ISO 6059	411.6000	mg/L	300.000	600.000	Complies
Total Alkalinity	SAS-APHA-2320	690.8000	mg/L	NS	NS	NS
Chloride	ISO 9297	65.5116	mg/L	250.000	250.000	Complies
Fluoride	ISO10359	1.2600	mg/L	1.500	1.500	Complies
Nitrogen as Nitrates	ISO 14911	0.7700	mg/L	45.000	45.000	Complies
Nitrogen as Nitrites	ISO 6777	0.3700	mg/L	0.900	0.900	Complies
Ammoniacal Nitrogen	ISO 11732	<0.05	mg/L	0.500	0.500	Complies
Aluminium	ISO 12020	<0.01	mg/L	0.200	0.200	Complies
Sulphates	ISO 22743	44.6310	mg/L	400.000	400.000	Complies
Orthophosphates	ISO 15681	1.9450	mg/L	2.200	2.200	Complies
Free Carbon Dioxide	SAS-APHA-4500-CO_2	3.5200	mg/L	NS	NS	NS
Total Dissolved Solids	ASTM D 5907-13	1,156.0000	mg/L	1000.000	1500.000	Complies
Dissolved Oxygen	SAS-APHA-4500-O	3.4100	mg/L	NS	NS	NS
Bicarbonates	SAS-APHA-2320	690.8000	mg/L	NS	NS	NS
Carbonates	SAS-APHA-2320	ND	mg/L	NS	NS	NS

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

Spectralab

Research Testing Training

Analytical Parameters	Method	Result	Units	Desirable Limits	Status
Salmonella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Shigella sp.	KS 05-220	Absent	cfu/100ml	Not Detected	Complies
Escherichia coli (E.coli)	KS 05-220	1.3×10^2	cfu/100ml	Not Detected	Does Not Comply

Remarks: Limits are based on KS EAS 12:2018

**CFU- Colony forming units (for microbiology)

* * mg/L - milligrams per liter, µg/L - micrograms per Liter

** TCU - True colour Units, NTU - Nephalometric Turbidity Units

* ND - Not Detected, NS - No standard issued by any authority

** Permissible Limit means that the water complies with limits for Natural potable water but is off limits for treated water.

Observations

*** Some parameters tested for did NOT meet the requirements of EAS 12, standard for potable Natural Water

Conclusion

*** Based on the sample submitted to the laboratory, and the parameters tested for, this water requires treatment.

SPECTRALAB ANALYTICAL SERVICES LIMITED
P.O. Box 50208 - 00200, NAIROBI
Tel: 020 6551177, 0775 502222
Email: info@spectralab.co.ke

19/10/2020

ANALYST (Date: dd/mm/yyyy)

19/10/2020

LABORATORY MANAGER (Date: dd/mm/yyyy)

Credit Bank Building, Mezzanine Floor. 53 Butere Road, off Dar Es Salaam Road. Industrial Area, Nairobi
P.O BOX 50208 00200 Nairobi, Kenya
Tel: +254-20-7858761/2/3, 020-6551177, 0775-052222, Mobile: 0774-088111, 0774-214161
lab@spectralab.co.ke; lab.spectralab@gmail.com; www.spectralab.co.ke

Appendix V: Translated Household Survey Questionnaire

Audience: Female Head of Household (if unavailable, a household member over 18 years old)

Informed Consent (ENGLISH)

"Good day, I am *[INSERT NAME]*. I am representing *Amref Health Africa.* I am part of a team interviewing people about water, sanitation, and handwashing in *[INSERT NAME OF DISTRICT OR AREA]*. This will help us learn about practices and improve water, sanitation, and health in the future.
You have been randomly selected to participate in this survey. If you agree, I will ask you questions about your family, and about your drinking water, handwashing, and sanitation practices. These questions usually take about 20 minutes.
You have the choice to participate in this survey. If you do not want to participate, that is okay. You can stop at any time, or skip any questions you do not want to answer. The information you give will be confidential. That means no one except me will know it was you who gave these answers.
Are you interested in participating in this survey today?

☐Yes – Continue the survey

☐No – Thank the respondent and move to another household

Emplai eyielounoto(MAASAI LANGUAGE]

"Supa enedama" Kaaji nanu enkarna [TIPIKA ENKARNA INO] . Agira aitashiki olturorr Amref Health Africa Kara nanu obo lelelo oosita ejurore aikilikuanishore iltunganak naipirta ibaa enkare, onebiotisho, tenebo wekisujata oonkaik tiatua[TIPIKA ENKARNA OLKERENKET AASHU ENEMURA]. Kelo ena aretoo iyiok matayiolo inaasitae onailepunyie esiaai enkare, obiotisho olmanyara telulungata toonkolongi naaponu. nikitegeluaki pee iyaku obo lelelo oikilikuanishoreki tena jurore . Teninyoraa naa kaikiluanishore toonaipirta olmarei lino, onaipirta enkare niokitoto, wenkisujata oonkaik, tenebo biotisho olmanyara enaa eniasitata. Ore kuna kikilikuanat naa keya erishata ooldakikani 20.
Idim atengelu piaku tenebo wena jurore aashu miaku tenebo, naa tenimiyieu naakaaai ake. Idim sii atapala ata teninteru neitu iidip ekata pooki, aashu igiroo nena kikilikuanat nimiyieu nilimu, ore ilomon lilo alimu naa keeku elesiri, Neeku imetii likai tungani oyiolo nanu ake oyiolo inchere iyie natolimuo kuna kulo omon.

Ira tayari peyie iyaku tenebo wena jurorore

☐Ee – Kalo dukuya inkilikuanishoreki

☐imara – ashe oleng shomo dukuya teyiai enkai aji.

I. Metadata

1. Today's date _____

2. Enumerator name _____

3. Scan the GPS coordinates _____

Make sure GPS coordinates are accurate within 10 meters. If you cannot automatically register GPS within 3 attempts, you can use a handheld device and manually enter the coordinates. If a handheld device is not available, please enter 888.

4. Community name _____

5. Select Baseline or Endline.

☐Baseline

☐Endline

II. Household Characteristics

6. [Direct Observation] is the respondent male or female?
6. [Tisipu ingura] kamaa olinkilikuanishore kolee enaa enkitok?

☐Male (Olee)
☐Female (Enkitok)

7. How old are you? _____
7. Elarin aja iata?_____

8. How many people live in your household? Household means the number of people living under this roof, including you. _____
8. *kaja iltunganak otii enkaji ino? Ore enkaji naa esiana ooltunganak otii enkaji nabo itii sii oyie.*_____

9. Do any children under the age of 5 live in your household?
9. ketii inkerai natii tiabori ilarin 5 natii enkaji ino?

☐Yes (*Ee)*
☐No *(Imetii*)→ SKIP TO 10

☐Don't know (Imayiolo) → SKIP TO 10
☐Declined to state (Etanya elimu) → SKIP TO 10

9.1. Diarrhea means having three or more loose or liquid stools within 24 hours. Has one or more of these children under the age of 5 had diarrhea in the past two weeks?
9.1 Ore elolototo enkoshoke naa tenintayu inkik naaruko tiatua inkolongi uni tiatua isaai 24. Ketii enkerai nabo aashu inkera natii tiabori ilarin 5 nashomo enkoshuake te wiki natulusoyie?

☐Yes (*Ee)*
☐No *(Imetii*)
☐Don't know (Imayiolo)
☐Declined to state (Etanya elimu)

III. Household Water Collection
10. Did anyone in your household collect drinking water yesterday?
10. *Ketii oltungani lenkaji ino otookuo enkare naoki ngole?*

☐Yes (*Ee)*
☐No *(Imetii*)→ SKIP TO 11
☐Don't know (Imayiolo) → SKIP TO 11
☐Declined to state (Etanya elimu) → SKIP TO 11

10.1. How many people in your household collected water yesterday? _____
10.1. *Translation: Kaja iltunganak ootookutuo enkare tenkajino ngole?*

10.2. How many total trips to collect water were made by all people in your household? [Probe and add up all the trips for all the people]
10.2. *Kenkatitin aja telulungata etookutuo iltunganak pooki enkare tenkaji ino? [Tujurru naleng niponiki pooki lototo ooltunganak pooki]*_____

10.3. Which containers did household members fill and bring home yesterday? [Mark all that apply]
10.3. Kakua tooiy lelo oiputaki enkare iltunganak lenkaji ino neyauni ang ngole? [tisira pooki naalimuni]

☐25 liter (litaai 25) → SKIP TO 10.3a.
☐20 liter (litaai 20) → SKIP TO 10.3b.
☐15 liter (litaai 15) → SKIP TO 10.3c.
☐10 liter (litaa 10) → SKIP TO 10.3d
☐5 liter (litaai 5) → SKIP TO 10.3e.
☐Other [please specify] (okulie ake, nilimu ajo kaa nabo) → SKIP TO 10.3f.

10.3a. Yesterday, how many total containers of this [25 liter] size did household members fill and bring home? ----------
10.3a. *Kamaa ngole kaja iltooi (loolitai 25) ootookutuo iltunganak lenkaji ino ooiput neyauni ang?* ------ → SKIP TO 11

10.3b. Yesterday, how many total containers of this [20 liter] size did household members fill and bring home?
10.3b. Kamaa ngole kaja iltooi (loolitai 20) ootookutuo iltunganak lenkaji ino ooiput neyauni ang?____ → SKIP TO 11

10.3c. Yesterday, how many total containers of this [15 liter] size did household members fill and bring home?
10.3c. Kamaa ngole kaja iltooi (loolitai 15) ootookutuo iltunganak lenkaji ino ooiput neyauni ang? → SKIP TO 11

10.3d. Yesterday, how many total containers of this [10 liter] size did household members fill and bring home? _____
10.3d. Kamaa ngole kaja iltooi (loolitai 10) ootookutuo iltunganak lenkaji ino ooiput neyauni ang?_____ → SKIP TO 11

10.3e. Yesterday, how many total containers of this [5 liter] size did household members fill and bring home?
10.3e. Kamaa ngole kaja iltooi (loolitai 5) ootookutuo iltunganak lenkaji ino ooiput neyauni ang?_____ → SKIP TO 11

10.3f. Yesterday, how many total containers of this other size did household members fill and bring home?
10.3f. Kamaa ngole kaja iltooi lelo kulie ake ootookutuo iltunganak lenkaji ino ooiput neyauni ang? _____ → SKIP TO 11

IV. Water Sources

11. What is the main source that you get drinking water from?
11. kaji oshi ine sapuk nitumiemie enkare naooki toonkutukie?

- ☐Piped water into dwelling (enkare olpaip tiatua aji)
- ☐Piped water to yard or plot (enkare olpaip tiatua ang arashu eploot)
- ☐Public tap or standpipe (olmsereji lepookingae aashu olpaip otashe)
- ☐Mechanized borehole(oltinka loompukunot pooki)
- ☐Borehole with hand pump(Oltinka ooshi te mashini oo nkaik)
- ☐Protected dug well with hand pump(Olchoro oitobira netii emashini oonkaik)
- ☐Protected dug well (Olchoro oturo neitobiraki esidai)
- ☐Unprotected dug well(Olchoro ake oturo)
- ☐Protected spring (Enkongu enkare nashetuno)

☐Unprotected spring(Enkongu enkare naruko nemesheta)
☐Rainwater collection (Enkare enchan nikiwou)
☐Pay another person to collect (Kilaaki likai tungani meyau)
☐Bottled water, sachet water, or pure water (Enkare oltupa, enkare oompuyai, aashu enkare kewon)
☐Cart with small tank or drum (Emukokoteni narikitto oltanki aashu oldiramu)
☐Tanker truck(Erori enkare)
☐Surface water (river, dam, lake, pond, stream, canal, irrigation channels) {Enkare nairrag (olkeju, esilanke, enaiposha, enkiti silanke, erukoto, olmutaro, enetookieki edaa enkare}
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

12. For how many months each year do you use this main water point?
12. *Toolapaitin aja tolari iwooku enkare teneweji oshi nitumie oleng?*_____

13. Throughout the year, do you ever collect drinking water from another source?
13. kamaa tiatua olari kelo oshi niwooku enkare nawoki toonkutukie tedikai ?

☐Yes (*Ee)*
☐No *(Imetii*)→ SKIP TO 14
☐Don't know (Imayiolo) → SKIP TO 14
☐Declined to state (Etanya elimu) → SKIP TO 14

13.1. What other water sources do you sometimes collect drinking water from?
13.1. Kaji oshi dikai nelo niwokunyienyie enkare nawoki toonkutukie? [Mark all that apply]

☐Piped water into dwelling (enkare olpaip tiatua aji)
☐Piped water to yard or plot (enkare olpaip tiatua ang arashu eploot)
☐Public tap or standpipe (olmsereji lepookingae aashu olpaip otashe)
☐Mechanized borehole(oltinka loompukunot pooki)
☐Borehole with hand pump(Oltinka ooshi te mashini oo nkaik)
☐Protected dug well with hand pump(Olchoro oitobira netii emashini oonkaik)
☐Protected dug well (Olchoro oturo neitobiraki esidai)
☐Unprotected dug well(Olchoro ake oturo)
☐Protected spring (Enkongu enkare nashetuno)
☐Unprotected spring(Enkongu enkare naruko nemesheta)
☐Rainwater collection (Enkare enchan nikiwou)
☐Pay another person to collect (Kilaaki likai tungani meyau)
☐Bottled water, sachet water, or pure water (Enkare oltupa, enkare oompuyai, aashu enkare kewon)
☐Cart with small tank or drum (Emukokoteni narikitto oltanki aashu oldiramu)
☐Tanker truck(Erori enkare)

☐Surface water (river, dam, lake, pond, stream, canal, irrigation channels) {Enkare nairrag (olkeju, esilanke, enaiposha, enkiti silanke, erukoto, olmutaro, enetookieki edaa enkare}
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

13.2. Do you collect water from these other sources often, occasionally, or rarely?
13.2. Kelo oshi niwoku enkare tekulie wejitin toonkatitin kumok, toorishat, aashu tenkiti kata? [Read answers to the respondent]

☐Often (Several days a week) {Toonkatitin kumok (toonkolongi kumok te wiki) }
☐Occasionally (A few days a month) {Toorishat (inkuti olongi tolapa)}
☐Rarely (Only when the main water point is broken or dry) {Tenkiti kata (Tenkata ake natarruoyie eweji oshi nekitumie ennkare aashu etoyio pii) }
☐Don't know (Mayiolo)
☐Decline to state (Etanya elimu)
☐Other (please specify) { Okulie ake (Intirishu)}

14. I am now going to ask you several questions about your household's primary drinking water source. Please confirm which source you consider to be your primary drinking water source.
14. Kaalo aikilikuan inkumok naipirta enkare nawoki toltiren tiatua enkaji ino wenitumieki inaare. Kayieu nikiliki injere etumieki inaare nijo iyie ninye ewoki toltiren lino?

☐Piped water into dwelling (enkare olpaip tiatua aji)
☐Piped water to yard or plot (enkare olpaip tiatua ang arashu eploot)
☐Public tap or standpipe (olmsereji lepookingae aashu olpaip otashe)
☐Mechanized borehole (oltinka loompukunot pooki)
☐Borehole with hand pump(Oltinka ooshi te mashini oo nkaik)
☐Protected dug well with hand pump(Olchoro oitobira netii emashini oonkaik)
☐Protected dug well (Olchoro oturo neitobiraki esidai)
☐Unprotected dug well (Olchoro ake oturo)
☐Protected spring (Enkongu enkare nashetuno)
☐Unprotected spring(Enkongu enkare naruko nemesheta)
☐Rainwater collection (Enkare enchan nikiwou)
☐Pay another person to collect (Kilaaki likai tungani meyau)
☐Bottled water, sachet water, or pure water (Enkare oltupa, enkare oompuyai, aashu enkare kewon)
☐Cart with small tank or drum (Emukokoteni narikitto oltanki aashu oldiramu)
☐Tanker truck(Erori enkare)

☐Surface water (river, dam, lake, pond, stream, canal, irrigation channels) {Enkare nairrag (olkeju, esilanke, enaiposha, enkiti silanke, erukoto, olmutaro, enetookieki edaa enkare}
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

15. Where is this main drinking water point located?
15. Kaji toi etii ine oshi nitumie enkare nawoki toonkutukie oleng?

☐Inside the home (Atua ang etii)
☐In own yard or plot (Atua emanyisho aashu atua emploot)
☐Off-plot (Boo emploot)
☐Don't know (Mayiolo)
☐Decline to state (Etanya elimu)

16. Do you like the taste of the water from this water point?
16. Inyor oshi olchamei leina are naingua ine niwokuku?

☐Yes (*Ee)*
☐No *(Imetii*)
☐Don't know (Imayiolo)
☐Declined to state (Etanya elimu)

V. Water Accessibility

18. How long do you walk to get to the water point? Please estimate the time that is required to walk to the water point, not the time that is required for a round trip. [In minutes]
18. Kebaa elakuani pee ibaiki enetii enkare? Toinyua tejo alimu isaai niya tenilo enetii enkare, ime taa isaai niya tenilo nishukunyie[tooldakikani]_____

19. Once you get there, how long do you have to wait to collect water from the water point? [in minutes]
19. kamaa tenibaiki ine, kebaa erishata niya yanyita pee iwoku enkare teine netumieki enkare[tooldakikani]_____

VI. Payment

20. Do you have to pay to collect water from this water point?
20. Kempaka nilak iropiyiani pee itum atooku enkare teine netumieki enkare?

☐Yes (*Ee)*
☐No *(Imetii*)→ SKIP TO 21
☐Don't know (Imayiolo) → SKIP TO 21

☐Declined to state (Etanya elimu) → SKIP TO 21

20.1. How often do you pay for water? (Probe: Are there any other times you pay?)
20.1. Ketiakua katitin oshi ilak iropiyiani enkare oleng? (Tujurru teguton: ketii oshi kulie rishat irropiyiani?
[Mark all that apply]

☐Per trip (kila eookunoto nalo) → SKIP TO 20.1a.
☐Per container (Enaa oltoo/ olkonko)→ SKIP TO 20.1b.
☐Daily (Enaake)→ SKIP TO 20.1c.
☐Weekly(kila te wiki) → SKIP TO 20.1d.
☐Monthly(Kila olapa) → SKIP TO 20.1e.
☐Yearly(Kila olapa) → SKIP TO 20.1f.
☐When the system breaks (Tenelo neinyiala emashini) → SKIP TO 20.1f.
☐No fixed schedule (when they have money) {Imeeta duo enkata nauno (metaa akeyie iyata iropiyiani)} → SKIP TO 20.1f.
☐Don't know (Imayiolo) → SKIP TO 21
☐Decline to state (Etanya elimu)→ SKIP TO 21

20.1a. How much do you pay each trip? [in Kenya shillings]
20.1a. Kebaa iropiyiani nilak telototo nabo?[Ksh]_____ → SKIP TO 20.2

20.1b. How much do you pay each time to fill a container [in ksh] ___
20.1b. Kebaa iropiyiani nilak tenkata nabo pee iimput oltoo/olkonko obo[Ksh]____ → SKIP TO 20.2

20.1c. How much do you pay each day? [in Ksh.]
20.1c. Kebaa iropiyiani nilak tenkolong ? [Ksh.] _____→ SKIP TO 20.2

20.1d. How much do you pay each week? [in Ksh.]
20.1d. Kebaa iropiyiani nilak te wiki ?[Ksh.] _____→ SKIP TO 20.2

20.1e. How much do you pay each month? [in Ksh.]
20.1e. Kebaa iropiyiani nilak to lapa ? [Ksh.]_____ → SKIP TO 20.2

20.1f. Approximately how much do you pay each year? [in Ksh.]
20.1f. Kamaa teeyie keidimayu naa keropiyiani oshi nabaa ilak tolari ?[Ksh.]_____

20.2. In the past year, did your household ever have difficulty paying the fee?
20.2. Kamaa tolari otulusoyie, kenoto aikata enkaji ino engoloto elaata ooropiyiani enkare?

☐Yes, there were times we did not pay (Ee, etii apa enkata nimikilata)
☐Yes, there were times we paid late(Ee, etii enkata nikimutie eitu kilak)
☐No, we always paid the fee on time (Imetii, ekilak oshiake tenkata naishiakino)
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

VII. Water Point Reliability and Functionality

21.Are there months during the year when water is not regularly available from this water point because it is dry?
21. Ketii ilapaitin tiatua olari lemetumoyu enkare enaa enatiu teine neokuni tenkaraki kelo netoyu ?

☐Yes (Ee)
☐No (Imetii) → SKIP TO 22
☐Not applicable (Meeta enaidimayu) → SKIP TO 22
☐Don't know (Imayiolo) → SKIP TO 22
☐Decline to state (Etanya elimu) → SKIP TO 22

21.1. In the past year, during which months of the year was water not available from this water point?
21.1. Kamaa tolari otulusoyie, kaloapa apa ilo teilo ari lemetii enkare ine nitumimie ?
[Mark all that apply]

☐ January (olapa liobo)
☐February (olapa liare)
☐March (olapa liokuni)
☐April (olapa lionguan)
☐May (olapa lemiet)
☐June (olapa leile)
☐July (olapa liopishana)
☐August (olapa leisiet)
☐September (olapa lioudo)
☐October (olapa letomon)
☐November (olapa letomono obo)
☐December (olapa letomon aare)
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

22.[*If answered Piped water into dwelling, Piped water to yard or plot, Public tap or standpipe, Mechanized borehole, Borehole with hand pump, protected dug well with hand pump, protected dug well, protected spring for Question 14*] In the past year, were there times that management decided to lock or turn off the water point?

22. [Kamaa tenijio kelotu olpaip mpaka atuaji, kelotu olpaip lenkare mpaka atuaang aashu emploot, olmsereji lepookingae aashu oloitashe ake, oltinka loompukunot pooki, entika oonkaik,olchoro osheta neeta emashini oonkaik,olchoro asheta ake,enkongu nasheta aitobiraki Tenkikilikuanata 14] Kamaa tolari otulusoyie, ketii enkata naetuo ilaitashikinok lenkare aamit aashu aiken enkare pee meokuni?

☐Yes (Ee)
☐No (Imetii) → SKIP TO 24
☐Don't know (Imayiolo) → SKIP TO 24
☐Decline to state (Etanya elimu) → SKIP TO 24
☐Not applicable (Meeta enaidimayu) → SKIP TO 24

22.1. When this happened, was it communicated so your household knew when water would be available?
22.1. Ore pee eesi ena, ketolikioki intae pee eyiolou ankaji ino teneeku ketumoyu enkare?

☐Yes (*Ee)*
☐No *(Imetii*)
☐Don't know (Imayiolo)
☐Declined to state (Etanya elimu)

23.[*If Piped water into dwelling, Piped water to yard or plot, Public tap or standpipe, Mechanized borehole, Borehole with hand pump, Protected dug well with hand pump, Protected dug well, Protected spring, Rainwater collection to Question 14*] In the past year, has the water point broken down because of a mechanical problem?
23 [Kamaa tenijio kelotu olpaip mpaka atuaji, kelotu olpaip lenkare mpaka atuaang aashu emploot, olmsereji lepookingae aashu oloitashe ake, oltinka loompukunot pooki, entika oonkaik,olchoro osheta neeta emashini oonkaik,olchoro asheta ake,enkongu nasheta aitobiraki Tenkikilikuanata 14] Kamaa tolari otulusoyie, ketingile aikata ine nitumimie enkare aashu kenyiale atum enyamali emashini?

☐Yes (*Ee)*
☐No *(Imetii*) → Skip to 24
☐Declined to state (Etanya elimu) → Skip to 24

23.1 In the past year, how many times has the water point broken down because of a mechanical problem?

23.1 kamaa tolari otulusoyie, ke katitin aja einyiale ine niokuku tenkaraki enyamalitin emashini?

_____

23.2a.The last time the water point broke down, how long did it take to repair it? [If it has never broken, enter 777. If the system is still broken, record time since the system broke]

23.2a Kanu ebayie ine niokuku anyiale ,naa kerishata nabaa eewa pee eitobiri?[Teneitu aika einyiala tisira 777.naa tenaa keinyiale otene tisira enkata apa nainyiale ina mashini]_____

23.2b. Days, weeks, months, or years?

23.2b Inkolongi,iwikii, ilapaitin, aashu ilarin?

☐Days (Inkolongi)
☐Weeks (Iwikii)
☐Months (Ilapaitin)
☐Years (Ilarin)
☐Not applicable (Imeeta enaidimayu)

24. In the past two weeks, has there been any time that you could not get water from the water source for a full day or more?
24. Ore too wikii are naatulusotie, ketii enkata nitala enkare teine netumieki enkolong nalulunga aashu alus ?

☐Yes (*Ee)*
☐No *(Imetii*) → Skip to 25
☐Don't know (Imayiolo) → Skip to 25
☐Declined to state (Etanya elimu) → Skip to 25

24.1. In the past two weeks, why were you not able to get water from this water source?
24.1 Kamaa too wikii are natulusotie, kainyio pee eitu itum enkare teine weji?

☐ Seasonal water shortage (dry season or low flow) {Enoonkatitin dorropu enkare (enkata oolameitin aashu erukunoto enkiti)}
☐It was broken (Keinyiale apa)
☐Respondent unable to pay (Imeidim oloikilikuanishoreki atalaa ropiyiani)
☐Respondent physically unable to collect (Imeidim oloikilikuanishoreki ashomo atooku)
☐Water point locked or water turned off (Keikeno eneokunyieki enkare aashu imetii enkare)
☐Don't know (Imayiolo)
☐Other (please specify) { Okulie (toinyua intirishu) }
☐Decline to state(Etanya elimu)

VIII. Household Water

25.May I see the water you have to drink today?
25. Inchooki matodua enkare niokito taata?

☐Yes (Ee)
☐No (Imidol) → SKIP TO 26
☐Does not have water (Emeeta enkare) → SKIP TO 26

25.1What water point did this water come from? [Mark all that apply]
25.1. Keniapukunoto eweji intungua enaare ?[Tisira pooki naalimu]

☐Piped water into dwelling (enkare olpaip tiatua aji)
☐Piped water to yard or plot (enkare olpaip tiatua ang arashu eploot)
☐Public tap or standpipe (olmsereji lepookingae aashu olpaip otashe)
☐Mechanized borehole (oltinka loompukunot pooki)
☐Borehole with hand pump(Oltinka ooshi te mashini oo nkaik)
☐Protected dug well with hand pump(Olchoro oitobira netii emashini oonkaik)
☐Protected dug well (Olchoro oturo neitobiraki esidai)
☐Unprotected dug well (Olchoro ake oturo)
☐Protected spring (Enkongu enkare nashetuno)
☐Unprotected spring(Enkongu enkare naruko nemesheta)
☐Rainwater collection (Enkare enchan nikiwou)
☐Pay another person to collect (Kilaaki likai tungani meyau)
☐Bottled water, sachet water, or pure water (Enkare oltupa, enkare oompuyai, aashu enkare kewon)
☐Cart with small tank or drum (Emukokoteni narikitto oltanki aashu oldiramu)
☐Tanker truck(Erori enkare)
☐Surface water (river, dam, lake, pond, stream, canal, irrigation channels) {Enkare nairrag (olkeju, esilanke, enaiposha, enkiti silanke, erukoto, olmutaro, enetookieki edaa enkare}
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

25.2. Did someone in your household treat this water?
25.2. Ketii oltungani otabaa enaare tenkaji ino

☐Yes (*Ee)*
☐No *(Imetii*) → Skip to 25.3a
☐Don't know (Imayiolo) → Skip to 25.3a
☐Declined to state (Etanya elimu) → Skip to 25.3a

25.2a. How was it treated?
25.2a. Kaji eikunaka ebaata?

☐Boiled (Keitokitokie
☐Chlorine (Alchani etipika (Chlorine)
☐Strained through a cloth (Atijia tolkarasha
☐Biosand filter (Atijia temashini enkare(Biosand filter)
☐Ceramic filter (Atijia tenyoongo)
☐Solar disinfection (Aishoo minosa enkolog)
☐Let it stand and settle (Aishoo ake eton omeirraga osordo)
☐Don't know (Imayiolo)

☐Decline to state (Etanya elimu)
☐Other (please specify){ Ookulie (tonyua intirishu)}

IX. Sanitation Facility

26. Some people prefer to defecate in the open, some prefer to defecate in a latrine, and some prefer other places. What are the places that adult men and women in this household defecate? [Probe to ask "Is there any other place?" until they finish, and mark all that apply.]
26. Enguar kulie tunganak pee epik inkik osero, nenguar kulie pee epik inkik inchooi,nengua kulie dikai ake, kaji oshi epuo ilewa onkituak botorok enaaji aapik inkik? [tujurru tenguton "ninkilikuan tenaa keetai dikae weji ?" impaka nelimu pooki, tisira nena pooki naalimu]

Latrine or toilet (Inchooi)
In the open; no sanitation facilities (Osero; emeetai eweji ebiotisho)
In water body (river or lake) {Atua inkariak sapuki (olkeju aashu enaiposha)}
Don't know (Imayiolo)
Decline to state (Etanya elimu)

27.Where are the places that children over 3 in this household go to defecate? [Mark all that apply and probe to ask "Is there any other place?" until they finish]
27. kaji oshi ine wejitin nepuo inkera aapik inkik oolarin 3 neilep?

Latrine or toilet (Inchooi)
Pot or potty (Pooti aashu olbakuli loonkik oonkera)
In the open; no sanitation facilities (Osero; meetai eweji ebiotisho)
In water body (river or lake) {Atua inkariak sapuki (olkeju aashu enaiposha)}
Not applicable, no one between the ages of 3-17 lives in this household (Imeeta enaidimayu, emeetae oltungani lesirit oolarin 3-17 otii enaaji)
Don't know (Imayiolo)
Decline to state (Etanya elimu)

28.[Only if Yes answer to Question 9] How is feces from children under 3 in this household disposed of?
28. [Aashu ake tenaa Ee enkikilikuannunoto 9] Kaji oshi epiki inkik oonkera naatii tiabori ilarin 3 tenaaji?

Child uses latrine (Eitumia inkera inchooi)
It is put or rinsed into latrine (Ebukokini aashu eisujakini atua choo)
It is put or rinsed into garbage bin (Ebukokini aashu esujakini egumoto oltaka)
It is put or rinsed on the ground or in the open (Ebukokini aashu eisujakini enkop aashu boo ake)
It is buried (Kenukari)
Other (please specify) (Ookulie ake (tonyua intirishu))
Not applicable, no one under 3 lives in this household (Imeeta enaidimayu, imeetai olotii tiabori ilarin 3 otii enaaji)
Don't know (Imayiolo)

Decline to state (Etanya elimu)

29.Can I see the toilet facility that you use?
29. Kayieu nadol ina chooo oshi nintumia?

☐Yes, shows facility (Ee, eitodolua)
☐Has a facility, but does not show (Keeta , kake imeyieu nedoli)→ SKIP TO 29.11
☐Does not have facility (imeeta eweji ebiotisho) → SKIP TO 30

29.1. [Direct Observation] Where is the sanitation facility?

☐Inside the home
☐In own yard or plot
☐Off-plot
☐Not observed

29.2. [Direct Observation] What type of sanitation facility is it?

☐Flush or pour flush → SKIP TO 29.2a
☐Ventilated improved pit latrine (VIP) → SKIP TO 29.2b
☐Pit latrine → SKIP TO 29.2b
☐Composting toilet → SKIP TO 29.2b
☐Bucket → SKIP TO 29.2b
☐Hanging toilet or hanging latrine→ SKIP TO 29.2b
☐Don't know → SKIP TO 29.2b

29.2a. (If flush or pour flush) Where does it flush to?
29.2a. *(Kamaa tenaa kebolori aashu kebolokini) kaji oshi elo abukokino?*

☐Piped sewer system (Olpaip losordo loonkik)
☐Septic tank (Oltanki oturoro loonkik)
☐Pit latrine (Atua engumoto echoo)
☐To the ground or water body (Tenkop or oneetii inkariak)
☐Don't Know (Imayiolo)
☐Decline to state (Etanya elimu)

29.2b. Does the latrine have a seat, bowl, or squat platform that is made out of any of the following: concrete, plastic, ceramic?
29.2b Keeta ena chooo olorika, esimiti,olbakuli, aashu eneitobira sida neitoriori naitobiraki te kuna pukunot naijo kuna: olkokote, olpirai, isoito

☐Yes (*Ee)*
☐No *(Imetii*)
☐Don't know (Imayiolo)

29.3. [Direct Observation] What type of floor or slab does this latrine have?

☐Concrete
☐Wood boards or planks
☐Plastic
☐Mud or dirt
☐Other (please specify)
☐No floor or slab (open pit) → SKIP TO 29.4

29.3a. [Direct Observation] What is the condition of the floor?
☐Good condition (no cracks or gaps)
☐Medium (some damage, but safe to stand on)
☐Bad (dangerous to stand on)
☐Don't know
☐Not applicable

29.4. [Direct Observation] How well does the latrine superstructure (walls, door) provide privacy?
☐Offers full privacy (has walls and a door)
☐Offers some privacy (has walls but no door)
☐Offers little to no privacy (very poor quality)
☐No superstructure at all

29.5. [If Flush or pour flush, Ventilated improved pit latrine (VIP) Pit latrine , Composting toilet to Question 29.2][Direct Observation] Is there evidence that the pit is full?
☐Yes
☐No
☐Don't know
☐Not applicable

29.6. [If flush or pour flush to Question 29.2][Direct Observation] Is there enough water present to flush the toilet?
☐Yes
☐No
☐Don't know

29.7. [Direct Observation] Is the user able to access the latrine right now (it is not locked, or they can open it)
☐Yes
☐No
☐Don't know

29.8. [Direct Observation] Does the facility show signs of recent use?
☐Yes
☐No
☐Don't know

29.9. [Photo] Take a photo of the inside of the sanitation facility.

29.10. [Photo] Take a photo of the outside of the sanitation facility. → SKIP TO 29.12

29.11. What type of toilet facility do you use?
29.11 Kaabila ina choo nigira aitumia?

☐Flush or pour flush (Enabolori meibukori aashu inaibukori) → SKIP TO 29.11a
☐Ventilated improved pit latrine (VIP) (Choo naata olpaip)→ SKIP TO 29.12
☐Pit latrine with slab (Choo nasheta abori tesimiti) → SKIP TO 29.12
☐Open pit latrine (Choo ake engumoto) → SKIP TO 29.12
☐Composting toilet (Choo nanukari) → SKIP TO 29.12
☐Bucket (Olbaket)→ SKIP TO 29.12
☐Hanging toilet or hanging latrine (Ichooi naaika) → SKIP TO 29.12
☐No facility (emeeta enepuoi) → SKIP TO 30
☐Decline to state (Etanya elimu)→ SKIP TO 30
☐Don't know (Imayiolo) → SKIP TO 29.12

29.11a. (If flush or pour flush) Where does it flush to?
29.11a (Tenaa Enabolori meibukori aashu inaibukori) Naa kaji epuo aajing?

☐Piped sewer system (Olpaip losordo loonkik)
☐Septic tank (Oltanki oturoro loonkik)
☐Pit latrine (Engumoto e choo)
☐To the ground or water body (Enkop ake aashu atua inkariak)
☐Don't Know (Imayilo)
☐Decline to state (Etanya elimu)

29.12. In what year was this toilet facility constructed? (Please use Gregorian Calendar)
*Ketialo ari apa eteshetaki ena choo?(tonyua taasishore kalenda)*_____

29.13. Do you share this facility with other households?
29.13 Ingaritata oshi ena choo onkulie ajijik?

☐Yes (*Ee)*
☐No *(*Imikingar)
☐Don't know (Imayiolo)
☐Declined to state (Etanya elimu)

30. Have you seen a person openly defecate in this community in the past two weeks?
30. Aitadua aikata opikita inkik osero tena murrua tiatua iwikii aare naatulusoitie?

☐Yes (*Ee)*
☐No *(*Eitu)
☐Don't know (Imayiolo)
☐Declined to state (Etanya elimu)

X. Hygiene

31. When do you personally wash your hands? [Probe to ask "Are there any other times that you wash your hands?" until they finish [Mark all that apply] [Do not read options to respondent]
31. kamaa iyie makewon ketiarishata oshi intuku inkaik inonok? [Tujuru teguton inkilikuana" ketii kulie rishat oshi nintukuyie inkaik ?" mpaka neidip atolimu[Tisira pooki naalimu] [Nemisumaki ake olikilikuanishore kuna majibu]

☐After defecation (Tenaidip aitau inkik)
☐After cleaning or changing a baby (Tenaidip aisuja aashu tenaibelekenyaki enkerai Ingilani)
☐Before food preparation (Enakata etaa kaiteru aitobir edaa)
☐Before eating (Eton eitu anya edaa)
☐Before feeding a child (Eton eitu aitoti enkerai)
☐Before praying (Eton eitu aiteru aomon)
☐After working in the dirt (Tenaidip ataasa esiai tenetii oloiterio)
☐Don't know (Imayiolo)
☐Decline to state (Etanya elimu)

32. Can you please show me where you usually wash your hands and what you use to wash your hands?
32 Kayieu naaji nikitodol ineweji oshi nisujiejie inkaik oina toki oshi nintumia aisujie inkaik inonok ?

☐Yes (Ee)
☐No (Imetii)→ SKIP TO 33

32.1. [Direct Observation] Does respondent show soap, ash, or another cleanser?

☐Soap
☐Ash
☐Other cleanser or detergent
☐None shown

32.2. [Direct Observation] Does respondent show water used to wash their hands?

☐Yes
☐No

32.3. [Direct Observation] Is there a dedicated location for handwashing (a place they always use)?

☐Yes

☐No
☐Don't know

XI. Conclusion of survey

33. Thank the respondent for their time [Record your notes here] _____

Appendix VI: Focus Group Discussion Guides

Women, Men

1. How easy or hard is it for you to access water in this community? *Probe for who fetches water, sources, distance, water quality*
2. Has there been any health education and sensitization on sanitation and hygiene in the community*? If yes, when, by who? What was it about?*
3. In this community, how do you perceive use of toilets? *Probe for coverage, barriers for use, and barriers for construction*
4. How is faeces for children under 5 years managed?
5. How is the latrine coverage? *Probe for reasons*
6. How are the handwashing practices in this community? *(probe for instances when they wash hands, frequency of handwashing, presence of handwashing facilities, what kind of water is used, use of soap/ash etc)*

Water management committees/ Private operators

1. What kind of water source do you operate?
2. How is the quality of water from this sources?
3. For How long does this point provide water during the year
4. How many households fetch water from this source?
5. How long does it take to fetch water?
6. How do you meet the costs of operation and maintenance? (probe for revenue collection methods, revenue management)
7. How often does the water point break down?
8. How long does it take to repair the breakdowns?

Appendix VII: KII guide for County officials

1. What is the status of sanitation in this community? (probe for latrine coverage)
2. What factors hinder this community from constructing and using toilets?
3. What is being done to increase access to improved sanitation in this community?
4. In your opinion, what can be done to accelerate ODF attainment by this community?
5. How would you describe the water access situation of this community?
6. What is being done to improve water access for this community?
7. How prevalent is WASH-related diseases in this community?