

African Medical and Research Foundation in Ethiopia

Access to Water, Sanitation and Hygiene Promotion Project,
Gullele Sub City, District 05, Addis Ababa



BASELINE SURVEY REPORT

Client: AMREF-Ethiopia

Consultant: Nucleus Research P.L.C

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Table of Contents

1. INTRODUCTION	8
2. Literature Review	14
3. Methodology	17
3.1. Quantitative Method	17
3.1.1. Coverage	17
3.1.2. Target Population	18
3.1.3. Domain of Estimation (Reporting Level)	18
3.1.4. Sample Design	18
3.1.4.1. Sampling Frame	18
3.1.4.2. Selection Scheme.....	19
3.1.4.3. Sample Size Determination and Allocation	19
3.1.4.4. Quantitative Information from Secondary Sources	20
3.2. Qualitative approach	20
4. Study Materials	22
4.1. Questionnaires and Checklists	22
4.2. Translation of Questionnaires.....	22
4.3. Training Manual and Data Collection Guide.....	22
4.3.1. Fieldwork Organization and Staffing.....	23
4.3.1.1. Composition of Field Staff and Work Organization.....	23
4.3.1.2. Recruitment of Field Staff.....	23
4.3.1.3. Pre-testing.....	24
4.3.1.4. Training of Field Staff.....	24
4.3.1.5. Data Collection	24
5. Data Management and Processing	25
5.1. Data Editing, Coding, Entry and Cleaning.....	25
5.2. Data Analysis and Reporting.....	25
5.3. Data Quality Assurance	25
6. BASELINE SURVEY FINDINGS	27

6.1. GENERAL INFORMATION.....	27
6.2. WATER SUPPLY	28
6.2.1. Water facilities constructed, quantity of water used and locations	28
6.2.2. Management/administration of Water sources	30
6.3. SANITATION CONDITIONS	30
6.3.1. Latrine access and utilization	30
6.3.2. Solid and Liquid Waste Management.....	35
6.3.3. Management/administration of Sanitation Facilities.....	36
6.4. HYGIENE PRACTICES.....	36
6.4.1. Knowledge on Water and Sanitation	36
6.4.2. Handwashing.....	38
7. CONCLUSION.....	39
8. RECOMMENDATION.....	43
9. REFERENCES	45
10. APPENDICES.....	46

ACRONYMS

AACA	Addis Ababa City Administration
AMREF	African Medical and Research Foundation
AWSHP	Access to Water, Sanitation and Hygiene Promotion
FGDs	Focus Group Discussions
HEWs	Health and Extension Workers
KAP	Knowledge, Attitude and Practices

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Executive Summary

This report presents the main findings of the baseline study on Access to Water, Sanitation, and Hygiene Promotion Project in District 05 of Gulele Sub City, Addis Ababa conducted in 2011 by AMREF Ethiopia. The overall objectives of the study were to know the actual coverage of safe water and basic sanitation, i.e., to identify drinking water infrastructures, improved sanitation, their status and the number of beneficiaries benefiting from each facility, and to determine the knowledge, attitude and practice (KAP) of the community on personnel, family and environmental hygiene and sanitation.

Both quantitative and qualitative data collection techniques were employed. Quantitative measures were obtained using structured questionnaires while qualitative information was collected by means of focus group discussions, key informant/in-depth interviews and personal observations. Data from secondary sources (such as; health facilities, district/sub-city health office, sub-city water and sewerage authority, urban health extension workers, Central Statistical agency, sub-city and AMREF offices related to water, sanitation and hygiene) was also gathered and carefully analyzed.

In district 05 of Gullele sub city, a total of 424 interviews were conducted amongst households. The majority of the respondents (76.2%) were observed to be females. The education profile showed that 124 (29.2%) were illiterate and the remaining 300 (70.8%) had from read and write to college or university level education. Regarding occupation, 133 (one third) - 32.3% identified themselves as handcrafts, 97(23.5%) of the respondents were house-wives followed by 10.2% employee of Government organization, 9.5% employee of private organization, 8.5% merchant or trader, 7.3% daily laborer and the remaining 8.7% were engaged in other occupations. Even though there is great variation in family incomes with a maximum of 5,000 Ethiopian Birr per month, the median household income is reported to be 400.00 Ethiopian birr per month.

Water Supply

The main source of drinking water for the study households was reported as piped water into yard/plot/building 324(76.4%). Similarly, 69 (16.3%) and 31 (7.3%) respondents used procurement from private pipe water and public tap/stand pipe as a source of water respectively. It was estimated that the quantity of water used for all purpose was 11.5 liters per capita per day. Regarding access to water points, the traveling time required to fetch water from the source varied from 1-100 minutes with an average being 20.70 minutes. The average waiting time, on the other hand, was observed to be 11.63 minutes.

Sanitation Conditions

Majority of the interviewed households 386 (91.3%) possessed latrine facilities (private or communal or public) while the rest 38 (8.7%) did not possess any latrine. As regards the setting, 211(75.4%) of the latrine were reported to be located elsewhere inside the yard while 60 (21.4%) of the latrine were located outside the yard. Only 9 (3.2%) are located inside or attached to dwelling. Latrine observation was conducted in order to define whether the latrines are improved or unimproved. It was therefore observed that only 42.5% of the latrines were improved.

Solid and Liquid Waste Management

Two hundred forty three (57.3%) and 90 (21.2 %) of the households interviewed discharge their liquid wastes into open field and along the road sides respectively. it is only 42 (9.9%) who dispose their liquid wastes either through septic tank accumulation and emptied by the Addis Ababa City Administration Water and Sewerage Authority or use soak away pits. On the contrary, the majority 407(96%) reported that they used to give to small scale enterprise crews who are engaged in the solid waste collection. Similarly 12(2.8%) mentioned that they put into the public waste container. Very limited numbers throw in the compound/premises, out of the premises, along road sides, add to rivers and give to *'qoralews*.

Hygiene Practices

Concerning respondents' knowledge of possible causes of diarrheal diseases, the majority (31.8%) mentioned that it is microorganisms, 20.5% eating contaminated food, and 18.2% contamination of food and drink with flies. Similarly 15.9% reported drinking contaminated water, eating food without washing hands and defecating in open fields are some of the risk factors for occurrence of diarrhea.

Handwashing

Four hundred three (95.3%) of the households have had soap in their home during interview time. Ninety seven percent of them have also responded using soap for handwashing purposes. The handwashing practices with soap at critical times was found to be 323(76.2%) after using toilet, 264(62.3%) before breast feeding, 208 (49.1%) before preparing food, 158 (37.3%) before eating and feeding food and 27 (6.4%) after washing child's bottom. It is also reported that 305 (71.9%) wash their hands early in the morning while get off beds/ sleeping.

1. INTRODUCTION

This report presents the findings of a baseline survey carried out in the project area in District 05 and District 05 of Gullela sub-city in the Addis Ababa City Administration (AACAA). It is here that AMREF-Ethiopia is planning to implement Access to Water, Sanitation and Hygiene Promotion (AWSHP) Project with financial support from AMREF-UK and AMREF-Spain. AMREF-Ethiopia has already a presence in the project area with programs aimed at reducing the gap between vulnerable communities and the Ethiopian Health System. The proposed project interventions are intended to supplement this ongoing effort.

In the project area different studies indicated that the majority of the houses are managed by female-headed, availability of houses that use for up to three or more families with up to 15 persons, presence of few latrines per house, and the practice of the majority of the residents to defecate into the plastic bags and other materials at night and to throw them out into the street where children play. The project area also well-known in the existence of high number of HIV infected and affected women and AIDS orphans, and a gap especially in strategic needs that are related to water, sanitation and personal hygiene. It is the goal of the AWSHP Project to contribute to the process of improving access to water and sanitation facilities primarily through reduction of water and sanitation related diseases in district 05 and district 05.

The project seeks to achieve three specific objectives. The first is to decrease (by 20%) the water and sanitation related diseases by improved access to water and sanitation facilities. The second objective underscores improved capacity of the target communities (by 80%) to manage and maintain water and sanitation facilities. The third immediate objective is to increase (by 20%) the communities' awareness, Knowledge, Attitude and Practices (KAP) on personnel, family and environmental hygiene and sanitation of the project beneficiaries.

To monitor the attainment of these objectives, benchmark values are needed for the expected outcome and effect indicators selected to gauge the performance of the project. The purpose of this baseline survey is to generate and elaborate values that are verifiable and measurable for indicators specified in the Project Proposal.

1.1. DESCRIPTION OF BASELINE SURVEY

1.1.1. AWSHP Project

Recognizing lack of access to clean water, severity of sanitation and personal hygiene in Gulele sub-city, particularly in the slum districts of District-05 and District-05; AMREF-ET began a project in February 2011 to improve access to water and sanitation facilities in-order to reduce morbidity and mortality resulted from water and sanitation related-diseases. Two districts were selected as project sites for the implementation of the project.

The implementing body for AWSHP Project is the project management team under the Deputy Country Director of AMREF-ET. The project management team works with the AACAA government offices of Bureau of Finance and Economic Development, Bureau of Health, Water and Sewerage Authority and with the sub-city Water and Sewerage Authority. In addition, with sub-city and district Administration offices, Health offices, Water and sanitation committee, Health and Extension Workers (HEWs) and hygiene promoters, school teachers from neighborhood schools, and direct beneficiaries /communities/.

1.1.2. Definition of Key Terms

Building on the baseline survey instruments and to provide similar understanding to the study, the study team has defined the following key terms on international standards that are continuously available and asked by the baseline survey instruments.

- i. Sanitation:** in this baseline survey report, it is to mean latrine, liquid and solid waste management
- ii. Hygiene:** refers to practices associated with ensuring good health and cleanliness. This includes Handwashing with soap and water at critical times most notably after defecation or before contact with food and strict observation of the safe drinking water chain.
- iii. Public latrine:** publicly owned latrine and used for any people in the area and managed by the district
- iv. Communal latrine:** a latrine owned by 3-4 households per seat and managed by the users
- v. Private latrine:** a privately constructed and owned latrine by one household
- vi. Community:** the people with common characteristics or interests living in a particular area
- vii. Improved Sanitation:** According to the Joint Monitoring Programme for Water Supply and Sanitation (World Health Organization and UNICEF), “improved sanitation” methods include the following:

- Connection to a public sewer
- Connection to a septic tank system
- Pour-flush toilet
- Hygienic pit toilet (a toilet which does not contaminate water bodies; prevents contact between human beings and excreta; confines excreta in ways that make it inaccessible to flies or other insect vectors, and domestic or wild animals; and prevents emission of foul gases and odours).
- Ventilated improved pit (VIP) toilet.

viii. **Unimproved Latrine:** Sanitation options which are not considered “improved” include:

- Public or shared toilet
- Open pit toilet
- Bucket toilet

For further comparison of the definition, see the following table

IMPROVED SANITATION	<p>Use of the following facilities:</p> <ul style="list-style-type: none"> • Flush or pour-flush to: <ul style="list-style-type: none"> • piped sewer system • septic tank • pit latrine • Ventilated improved pit (VIP) latrine • Pit latrine with slab • Composting toilet 	<p>Use of the following facilities:</p> <ul style="list-style-type: none"> • Flush or pour-flush to elsewhere (that is, not to piped sewer system, septic tank or pit latrine) • Pit latrine without slab/open pit • Bucket • Hanging toilet or hanging latrine <p>Shared facilities of any type</p> <p>No facilities, bush or field</p>	UNIMPROVED SANITATION
IMPROVED DRINKING-WATER	<p>Use of the following sources:</p> <ul style="list-style-type: none"> • Piped water into dwelling, yard or plot • Public tap or standpipe • Tubewell or borehole • Protected dug well • Protected spring • Rainwater collection 	<p>Use of the following sources:</p> <ul style="list-style-type: none"> • Unprotected dug well • Unprotected spring • Cart with small tank or drum • Tanker truck • Surface water (river, dam, lake, pond, stream, canal, irrigation channel) • Bottled water⁷ 	UNIMPROVED DRINKING-WATER

ix. **Health Facilities:** units delivering health services for the community

x. **Water Facilities:** place that provides a water supply service

xi. **Functional:** water or sanitation facilities that are currently providing services to the public

xii. **Not-functional:** water or sanitation facilities that are not currently providing services to the public

1.1.3. Background of the Study Areas

Like other regions of the country, the AACA is divided into ten sub-cities and 116 districts. The Gulele sub-city, where the study areas (districts) located, is one of the ten sub-cities and it is divided into ten districts. District-05, where AMREF-ET is currently operating, is one of the study areas that are located in the Gulele sub-city. The district is positioned in the place named as ‘Kechene’ area. District-05 is located in the center of the ‘Kechene’ area. The district is divided into four Kebeles each. These are Kebele 15, 16, 17, and 18. All these kebeles were covered in the baseline survey. Weaving, handcraft, Petty trade, small shopping, local drinks selling, and prostitution are the mainstay of the majority of the dwellers in the district.

The main health problems identified from the existing health institutions in the study areas are diarrhea, parasitic infection and malnutrition. It is a very common event to get families with members who are a sick from HIV/AIDS. The districts can be characterized as water scarce. Water in the study areas is purchased from rare standpipes in specific parts of the districts, which creates a huge burden for women who have to carry it to the house. Lack of sanitation facilities especially latrine, living in a small hovels house more than a family poor personal hygiene are the main features of the study areas.

1.1.4. Objective of the Baseline Survey

The baseline survey has two objectives. The first is to know the actual coverage of safe water and basic sanitation (i.e. drinking water infrastructure, improved sanitation, and their status and number of beneficiaries benefiting from each facility) in the study areas. The second objective is to determine the KAP of the community on personnel, family and environmental hygiene and sanitation. The more specific objectives of the survey is to determine benchmark values (baseline level) of eleven selected key indicators of the AWSHP Project, which would be compared with a final evaluation of the same indicators after two years of the intervention, i.e. January 2012.

1.2. OVERVIEW OF SURVEY PROCESS

At the outset of the study, to establish a common understanding on the inception of the survey, a brainstorming session particularly with knowledgeable staff of the AWSHP Project was conducted. To deeply understand the subject matter of the baseline survey, the study team was reviewed number of relevant documents, the project profile and particularly the selected eleven key indicators. Subsequently, preparation of the survey instruments, which include both qualitative and

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quantitative methods as well as training manuals and data collection guides, were developed in English version. Then, draft survey instruments were submitted to the AMREF-ET for review and comments. During a half day discussion with AWSHP Project Coordinator, M and E and Research Manager, and M and E Officer from the AMREF Head Office, the study team was acquired constructive feedbacks to finalize the designing of the survey instruments. Based on the comments of the client, the study team amended and finalized all the survey instruments. The finalized version of the survey instruments was translated into Amharic version. To this end, a pre-test was conducted in Arada sub-city District 01/02 around Black lion secondary school along with data collectors' recruitment and training program.

Data used for the analysis was collected through application of quantitative and qualitative methods. The former involved a household survey covering 850 households, and the latter in-depth interview/key informant interviews, focus group discussions (FGDs) with stakeholders, and personal observations of study team members while visiting key sites of water and sanitation facilities. Quantitative measures were obtained using a structured questionnaire while qualitative data was collected by means of FGDs, meetings, in-depth interviews and personal observations. Data from secondary sources (from relevant Regional, Sub-city and District Offices) were also gathered. Experienced editors coded the data collected. Qualified clerks were used to enter edited and coded data into computers using an CSpro data entry software package. After cleaning the data final output of the survey was processed using the SPSS software. Finally, the draft report was produced and submitted to the AMREF for comment and approval.

1.3.STUDY TEAM

The study team comprises of three national professionals with background in Public Health (BSC, MPH), Economics (MA) and Statistics (MSc). Mr. Getachew Belaineh, the team leader, is WASH specialist and Public Health professional. Mr. Melkamu Engida is a researcher and Mr. Eskinr Tenaw is senior statistician responsible for the overall data management and analysis.

The overall survey was lead under the guidance and direction of the team leader, Mr. Getachew Belaineh. He was also responsible for facilitating the data collectors training, pre-testing and liaising with the client.

The field research work was directed by Mr. Melkamu Engida. The data collection team consisted of three supervisors, four qualitative data collectors and 16 enumerators.

Designing of the survey instruments and data from two districts were managed, processed and analyzed by Mr. Eskindir Tenaw.

The baseline survey report was prepared by all study team members.

2. Literature Review

According to WHO/UNICEF Joint Monitoring Programme (JMP) progress on sanitation and drinking water 2010 update report, the use of improved sources of drinking-water is high globally, with 87% of the world population and 84% of the people in developing regions getting their drinking-water from such sources. Even so, 884 million people in the world still do not get their drinking-water from improved sources, almost all of them in developing regions. Sub-Saharan Africa accounts for over a third of that number, and is lagging behind in progress towards the MDG target, with only 60% of the population using improved sources of drinking-water despite an increase of 11 percentage points since 1990².

Similarly JMP report indicated that 2.6 billion people do not use improved sanitation facilities. These facilities are used by less than two thirds of the world population. Virtually the entire population of the developed regions uses improved facilities, but in developing regions only around half the population uses improved sanitation. There are notable increases in the use of improved sanitation in Northern Africa, South-eastern Asia and Eastern Asia, whereas there has been no progress in the Commonwealth of Independent States and a decline in Oceania. Among the 2.6 billion people in the world who do not use improved sanitation facilities, by far the greatest number are in Southern Asia, but there are also large numbers in Eastern Asia and Sub-Saharan Africa².

Poor water and sanitation provision promotes diarrhea and intestinal parasites. It also contributes to malnutrition by challenging children's immune systems; nutrients that would otherwise support growth go instead towards supporting the immune response. Furthermore poor environmental sanitation and lack of access to safe water sources increase the vulnerability of humans to the impact of infection and as a consequence, more and more people will be infected and affected by HIV/AIDS. Additionally the association of tuberculosis with overcrowding has long been demonstrated; one study also reported that tuberculosis notification rate increases by 12 percent for each percentage increase in the number of persons living in overcrowded accommodations².

Highly communicable diseases like Acute Watery Diarrhea (AWD) still affect communities in developing countries. Diarrhoea, which spreads easily in an environment of poor hygiene and inadequate sanitation, kills about 2.2 million people each year, most of them children under five.

Ethiopia has federal government structure composed of nine Regional States and two city Administrations. These regional states and city administrations are further divided in to 817 woredas (districts) and about 16,253 kebeles. The morbidity and mortality statistics indicate that

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the major health problems are communicable diseases in the country. Over 65% of those communicable diseases are attributable to unsafe water supply, poor sanitation, hygiene practices and malnutrition. According to FMOH, the average Ethiopian child suffer 5 to 12 diarrheal episodes a year basically resulted from poor environmental sanitation and between 50, 000 to 112,000 under five children die annually due to the same cause¹.

In the country, despite continued dedication made over the past few decades, still part of the population remain without adequate and improved water supply and basic sanitation services. According to recent government figures access to the water supply stands at 68.5% (MoWR, 2010), calculated by considering 15liters per capita per day within 1.5kms for rural and 20liters per capita per day within 0.5km for urban while that of access to both unimproved and improved latrine facilities is 60% (FMOH, 2008/9).But the WHO/UNICEF Joint Monitoring Programme (JMP) progress on sanitation and drinking water 2010 update report indicated that the country achieved 28% improved sanitation and 35% improved drinking water supply³.

The government of Ethiopia is dedicated to attain the MDG targets and is now, committed to reduce the heavy burden on its people by enhancing the provision of these basic necessities. The design and implementation of various innovative initiatives including the Plan to Accelerate Sustainable Development to End Poverty (PASDEP) the then Growth and Transformation Plan(GTP) and the Universal Access Plan (UAP) envisaging 98% water supply coverage and 84% improved sanitation as well as the implementation of the Health Extension Program (HEP) along with issuing of National Sanitation and Hygiene Strategic Action Plan and protocol are some of the fundamental steps taken in recent years. These all interventions directly help to achieve MDG 7, which is to halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation. These are vital in themselves but also key prerequisites for reducing child and maternal mortality (MDGs 4 & 5) and combating major communicable diseases (MDG 6)¹.

Along with safe stool disposal and safe and adequate household water supply, handwashing is also one of the most effective means of preventing diarrheal diseases. Evidence suggests that improved handwashing can have a major impact on public health in any country and significantly reduce the two leading causes of childhood mortality – diarrheal disease and acute respiratory infection. Because handwashing with soap can prevent the transmission of a variety of pathogens, it may be more effective than any single vaccine or hygiene behavior. Promoted broadly enough,

handwashing with soap can be viewed as an essential ‘do-it-yourself vaccine’. Handwashing with soap at critical times, however, is not widely practiced. If the millennium development targets for reduction in child mortality are to be met, handwashing habits must be improved along with access to safe water and sanitation⁴.

In 2010, under the National Hygiene and Sanitation Taskforce (NHSTF) and UNICEF, the first national formative research on handwashing practices was undertaken in five regions (Somali, SNNPR, Tigray, Amhara, and Oromia) in 60 schools and 2,000 households. This research depicted that 34% of children and 10% of caregivers do not wash their hands after defecation. Of those washing their hands after defecation, only 18% and 19% of children and caregivers do not use soap respectively. Similarly 22% of caregivers do not wash their hands after cleansing babies’ bottom and out of those washing their hands, only 20% used soap. As we all know, most foods in Ethiopia are eaten with hands so that it requires critical attention. The study indicated that 10% of school aged children do not wash their hands before eating⁶.

To address the above behavioral and social challenges, the driving force for change is Ethiopia’s Health Services Extension program with its emphasis on provision of preventive health care at household level and designed to bring about production of health at a household level. Based on the concept and principles of Primary Health Care, it is designed to improve the health status of families, with their full participation, using local technologies and the community's skill and wisdom. In the HEP, seven out of the 16 Health Extension Packages (HEPs) focus on Hygiene and Environmental Sanitation. These are Water supply and safety measures, Food hygiene and safety measures, Healthy home environment, Control of insects and rodents and Personal hygiene. To implement these packages, more than 35,000 Health Extension Workers are deployed to the lowest administrative levels (more than 16,253 kebeles) in the country. The HEWs are expected to provide hygiene education for the public both in rural and urban centers⁵.

3. Methodology

In fulfilling the objectives of the survey, both quantitative and qualitative data collection techniques were employed. Quantitative measures were obtained using structured questionnaires while qualitative information was collected by means of focus group discussions, key informant/in-depth interviews and personal observations. Data from secondary sources (such as; health facilities, district/sub-city health office, sub-city water and sewerage authority, urban health extension workers, Central Statistical agency, sub-city and AMREF offices related to water, sanitation and hygiene) was gathered and carefully analyzed.

Quantitative measures using detailed structured questionnaire were collected from households residing in district 05. In order to fill gaps and also triangulate data from different sources qualitative information was also collected from the secondary sources. Appropriate qualitative data collection guides were prepared and qualitative information gathered from Addis Ababa, sub-city and district health offices and facilities, water and sewerage authority, health workers including extension workers, CBO's, schools communities, youth and women groups, etc.).

The findings from the various methods was used to answer the same research questions and therefore integrated into one report. In fact, the final report was organized around each research question – integrating findings from all methods, rather than around the data collection strategy.

3.1. Quantitative Method

This method was used to collect quantitative information to establish baseline data for the district 05 Gullele sub-city project sites. It provided detailed formative information that can help to fulfill the survey objectives. Representative sample households with adequate number of cases that enabled us to accomplish meaningful analysis were drawn. The whole picture of the employed sampling strategy is as given below.

3.1.1. Coverage

It is the geographical extent that the survey planned and covered. Accordingly, the baseline household study covered o5 district of Gullele sub-city of Addis Ababa.

3.1.2. Target Population

It refers to the entire group about which conclusions are drawn. Thus, the target population for the baseline household study was people residing in districts 05 of Gullele sub-city.

3.1.3. Domain of Estimation (Reporting Level)

It refers to the geographical level in which the survey findings reported. Hence, the domain of estimation for the baseline household survey was district in which the separate reliable estimates provided for district 05.

3.1.4. Sample Design

According to the newly implemented urban health package, a Health Extension Worker in Addis Ababa is responsible for an average of 500 households (one health extension domain). Each Health Extension Worker is thus responsible to register and document the list of all the 500 households along with some key health related characteristics. This new government structure was considered in designing the sample survey.

Hence, a two-stage stratified cluster sample design¹ was employed in conducting the baseline household survey. Multi-stage sampling is generally used when it is costly or impossible to form a list of all the units in the target population. Although multi-stage sample gives less precise estimates than a simple random sample of the same size, it is often more precise than a simple random sample of the same cost, and it is for this reason that the method is employed. Districts and health extension domains were the strata and clusters of the survey respectively. While health extension domains were the primary sampling units, households, on the other hand, was chosen in the second stages of sampling.

3.1.4.1. Sampling Frame

¹ Multi-stage sampling is generally used when it is costly or impossible to form a list of all the units in the target population. Although multi-stage sample gives less precise estimates than a simple random sample of the same size, it is often more precise than a simple random sample of the same cost, and it is for this reason that the method is employed.

It was the entire group of all the units of analysis whose characteristics were estimated. It was from this material that samples were selected. The list of health extension domains of district 05 was used to select sample health extension domains. The list was obtained from district health office. Sample households, on the other hand, were chosen from the list of households of each sample health extension domain. The list was obtained from district 05 health office/health extension workers.

3.1.4.2. Selection Scheme

A popular method of selection especially when units are many and are serially numbered from the first to the last is systematic sampling. It was a probability sample selection method in which the sample was obtained by selecting every k^{th} element of the population where k is an integer greater than 1. The first number of the sample was selected randomly from within the first k elements. This method ensures that the sample was more spread across the population.

Health extension domains have more or less the same size of households (500 households on average). An equal probability instead of varying probability (Probability Proportional to Size-PPS) selection was the most appropriate technique in selecting sample health extension domains. Thus, an equal probability systematic sample selection scheme was employed in order to identify sample health extension domains. Likewise, sample households from each health extension domain were also selected using an equal probability systematic selection procedure.

3.1.4.3. Sample Size Determination and Allocation

Sample size is the pivotal feature that governed the overall design of the sample. Computation of necessary sample size varied according to the measurement objective desired. The procedure followed in computing the required sample size when key measurement objective was estimating changes that occurred between surveys, and when our objective was to measure (estimate) a proportion within a given precision were also different.

The main objective of this survey is to provide reliable baseline estimates for selected indicators. These baseline values of indicators were, in fact, enable us to evaluate future project performances. Thus, to follow sample size computation procedures used for estimating not of changes between levels but of only level would suffice our purpose.

Required key indicators of the study were mostly proportions. In determining sample size, with no prior information about the variability of the population proportion, which was measured, the
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variance of the population proportion is often guessed by taking the population proportion to be equal to 0.5. Therefore, setting the population proportion (p) equal to 0.5 and assuming a design effect of 2 to make an adjustment for the clustering effect, a minimum sample of 392 households per domain was found to be sufficient to attain a 95% confidence with a margin of error of 7%. The formula used to compute the desired sample size was the following.

$$n = deff \frac{(Z_{\alpha/2})^2 * p(1-p)}{\varepsilon^2}$$

Where,

n = required sample size

Z_{α/2} = the α / 2 standard normal distribution score, usually 95% value (1.96) is considered as appropriate

p = estimated value for the particular indicator (0.5 in our case)

ε = margin of error, 7% for our purpose

deff = anticipated design effect, the default value is 2

To keep the design effect as low as possible, apart from using smaller cluster size in terms of number of households that is feasible and using a constant cluster size instead of variable, it was recommended to use as many clusters as feasible. Increasing the number of clusters, on the other hand, may incur extra costs. Hence, considering both constraints 25 households per cluster is determined to be optimum. In selecting 25 households per cluster minor adjustment for the determined sample size is required. Thus, making the above adjustment and allowing 5% additional households for possible non-respondents, the final number of samples became 425 households for district 05.

3.1.4.4. Quantitative Information from Secondary Sources

Checklists were prepared to enable data collectors of the key quantitative information from secondary sources. Using the checklists, the quantitative information was gathered from health facilities, district/sub-city health offices, sub-city water and sewerage authority, urban health extension workers, Central Statistical Agency, sub-city and AMREF offices.

3.2. Qualitative approach

An effective study should at least be participatory, process and content focused, gather both qualitative and quantitative data, be systematic, practical and decision oriented.

While numerical data are required to determine indicators, descriptive data collected by observation and dialogue were found more useful for learning people's opinions and feelings.

Thus, Focus group discussion, in-depth/key informant interviews, direct observation and review of secondary data were the main qualitative approaches used for the baseline study. The qualitative studies were conducted as follows.

- **Two focus group discussions:** each with female and male, adults and adolescents of age 15-24 years were conducted in district 05. Thus, 4 FGDs were carried out in district 05. The focus groups were conducted with groups of 6-10 persons. Efforts were made to include diverse participants. Among others the group included individuals from different age and economic categories. However, great care was also taken so that only discussants having similar socio-economic characteristics could form a focus group discussion. An FGD guide was prepared so as to help the moderator and facilitator to identify participants and carry out the task properly. The moderator and note taker were of the same sex in order to get intended information without suspect among the members of the focus group. Focus group interviews were audio taped.
- **In-depth interview/key informant interview:** one in-depth interview each with; Addis Ababa City Government, sub-city Administration, and district health offices and facilities, water and sewerage authority, school principals, development Committees, and health workers including health extension workers conducted through a standard discussion guide, which was developed before the beginning of the actual data collection. Key informants were identified from CBO's, youth groups, women groups, and others and discussions conducted.
- **Personal observation:** Direct observation of project sites and assessment of the situations of available infrastructures and districts water, hygiene and sanitation has also a significant importance. Hence, three senior experts (the Environmental health expert, the economist and statistician) made direct observation of district 05.
- **Review of Secondary data:** All available secondary sources including secondary data from sub city and district health office, AMREF offices and the Central Statistical Agency were carefully reviewed and utilized.

4. Study Materials

4.1. Questionnaires and Checklists

Structured questionnaires, semi-structured questionnaires, guidelines, checklists and other relevant survey tools were prepared before the actual survey. The structured questionnaires were designed in such a way that the quantitative information gathered enabled data users in developing all the required indicators.

The questionnaires, guides and other study tools were developed in the inception phase of the assignment based on the program objectives and information needs of the study. The draft questionnaire was agreed beforehand with the Client. Apart from introductory guides and identification items, the questionnaires consisted of a series of questions related to essential socio-economic characteristics (age, sex, marital status, educational level, etc), the characteristics of the physical and social environment of the respondents, and essential information on water, sanitation and hygiene.

Draft questionnaires, guidelines, and checklists were submitted to the Client for review and comments, and finalized up on approval.

4.2. Translation of Questionnaires

The questionnaires, guides, and checklists for the survey were first prepared in English. Then, all finalized versions were translated into Amharic. Hence, the questionnaires were initially translated into Amharic framed in plain and objective expressions. These were further refined through back translation from Amharic to English (the source language) versions to ensure contextual and verbal consistency, and accuracy of translation. The feedback gathered from the back translation was used to further refine the Amharic language version tools.

4.3. Training Manual and Data Collection Guide

Training Manuals and data collection guides were prepared in Amharic by the statistician/ survey designer. The documents are aimed to serve as quick reference guide for field staff. Contents of the Manuals included interview and supervision guides, explanations on survey objectives, and definition of procedures to be adhered to interviews and supervision. The manual provided item by item instructions (see annex_).

4.3.1. Fieldwork Organization and Staffing

4.3.1.1. Composition of Field Staff and Work Organization

The Fieldwork Staff mobilized for data collection comprised of interviewers, supervisors, qualitative data collectors, and a coordinator. While quantitative and qualitative data collectors and supervisors were recruited from the market, one of the consultants served as coordinator of the study. The purpose of assigning the consultant as coordinator, instead of external staff, was to ensure effective organization of fieldworks, efficient execution of surveys, and close data quality control.

Nine data collectors were assigned to collect quantitative information from the project district. **One** health extension domain is assigned for a data collector. **Five** questionnaires were filled-in per day. Thus, **seven days** were required to collect the necessary quantitative data from all the sample households. **One** supervisor was assigned for five data collectors. Thus, two supervisors deployed for the survey activity.

One facilitator and one note taker for the FGDs and two interviewers for the key informant/in-depth interviews assigned. One FGD conducted per day. Thus, four days required for carrying out all the four FGDs of the district 05. Five days assigned to complete the key informant/in-depth interviews of a district. While supervisors were ensuring the quality of field data and collecting secondary data from district, the coordinator (along with other consultants) was responsible to conduct the on-site observation apart from managing and guiding the field team.

4.3.1.2. Recruitment of Field Staff

The field personnel were recruited based on a clear set of criteria. Interest to participate in the survey and availability for the survey period, experience in similar sample surveys, specific experience in data collection, permanent residence in the study area, linguistic ability (in Amharic), and examination of their testimonials on their previous assignments were key essentials candidates should fulfill. Regarding education, at least secondary school completed and university first degree holder individuals were deployed to collect quantitative data, and serve as qualitative data collectors and supervisors respectively.

The recruitment process involved three independent but interrelated stages: initial long list for screening, short list before training, and final list after the training course. Final selection of supervisors and fieldwork staff were based on their skills in leading the questions, communication skills and their performance during the training sessions, exhibit interest in the survey, and their attendance of the training program regularly.

4.3.1.3.Pre-testing

Field testing of the final draft Amharic version questionnaires found to be essential for obtaining an approximate idea of how well the draft questionnaire pages work. The questionnaires pretested to ensure cultural sensitivity, simplicity of message, gender sensitivity, message harmony, and clarity of questions to the intended respondents.

To this end, the pretest was conducted in Arada Sub City, one purposively selected district of Addis Ababa (a place commonly called postal office and back side of Tikur Anbessa Senior Secondary School). A total of 10 households from the selected district covered. The pretest exercise was carried out by experienced interviewers, under the supervision of the consultants. The questionnaires was revised and finalized based on results of the Pretest.

4.3.1.4.Training of Field Staff

Two types of manuals (data collectors'/enumerators' manual and supervisor manual) developed with the objective to provide data collectors the necessary concepts, definitions, procedures and every essential procedure in carrying out both the quantitative and qualitative study. The supervisor manual, on the other hand, was solely concentrated on the mechanisms and ways of supervision.

One day intensive technical training regarding the concepts, definitions and methods of collecting data was provided to interviewers and qualitative data collectors. The training program involved sessions for explaining the purposes of the survey, staff responsibilities, coordination and supervision procedures, approaches used in interviews and steps to be followed. Key sessions of the training program was also included explanations of the different sections of the questionnaires, the manner of filling-in responses and survey questions, and mechanisms of carrying out discussions and observations. The training included role-playing and mock interviews.

4.3.1.5.Data Collection

In order to gather the required data, interviews and discussions conducted in Amharic. This was carried out by a team of trained interviewers and the supervisor in the selected sample sites.

The interviewers/enumerators served as field editors. They exchanged questionnaires and edit and correct inconsistencies and unreliable figures. The field supervisor reviewed the questionnaires in the field to ensure completeness and consistency. The Coordinator was responsible for organizing the teamwork and at the same time reviewing a sample of the questionnaires in the field for quality control.

Throughout the fieldwork, continuous and close communication maintained between the central office and the fieldwork team. The completed questionnaires were revised at the field level twice by the supervisor and again by the coordinator, while giving their feedback directly to the interviewer(s) during the data collection phase. The completed questionnaires sent from the field as soon as possible, and then reviewed by the office editors.

5. Data Management and Processing

5.1. Data Editing, Coding, Entry and Cleaning

As soon as the fieldwork is completed, data editors and coders and data entry clerks recruited based on a set of criteria to ensure quality output. Hence, experienced data editors and coders recruited based on the requirements including level of education, practical experience in undertaking similar assignments, etc. After the recruitment, the statistician gave training for the recruited office editors and coders and data entry clerks. In addition to the training manual, codebooks necessary to give codes for variables that were not pre-coded or have not been given codes on the field prepared and used to give codes when necessary.

Properly edited and coded data entered to computers using data entry software packages like CSpro by qualified data entry clerks. Rigorous edit specifications prepared and captured data carefully cleaned using computer algorithms. To ensure quality, double entry system was employed.

5.2. Data Analysis and Reporting

Quantitative data analysis and submission of the final out put of the survey was accomplished using the most frequently used statistical software package of analyses - SPSS. Reporting of findings and all the relevant survey outputs was delivered in agreed formats and in accordance with the instructions given in the TOR.

Following the survey, draft report prepared and submitted to the client for review and comments. The Final reports then produced incorporating relevant comments and other requirements. In addition to these reports, copies of survey tools and cleaned data sets submitted in agreed formats. A PowerPoint presentation of key findings made after completion of the study.

5.3. Data Quality Assurance

The quality of the research heavily relies on the quality of data to be collected from the field. To this effect, various quality assurance mechanisms applied to ensure data quality at the stages of design, data collection

and processing. The specific mechanisms that helped in ensuring the acquisition of high quality data explained under the different sections of this proposal above and summarized as follows:

- Use of highly qualified and experienced experts in different fields to work as a team in a complementary and integrated manner.
- Designing of sound sampling methodology and development of questionnaires following applicable scientific standards with simple guides, skip rules, etc.
- Questionnaire translation into local language and back translation to the source language to ensure clarity and consistency.
- Client reviews and comments on the questionnaires.
- Close follow-up and supervision of the survey by experienced supervisors and consultants.
- On-site editing of possible inconsistencies and errors.
- Assigning one of the consultants as a coordinator, instead of external staff, for efficient field organization, overall supervision and data quality control at the field level.
- Utilizing data entry software that is specifically designed for processing survey data of similar type.
- Employing double entry system.

6. BASELINE SURVEY FINDINGS

6.1. GENERAL INFORMATION

A sample of 424 households was interviewed in district 05. From these study participants, it was found that the majority 76.2% were females, whereas 23.8% were males. The majority (52.5%) of the respondents covered by the survey reported married, 21% never married, and 20.3% and 6.1% were widowed and divorced respectively. Thus, one-fifth of the respondents who are household heads are single and this may create undue pressure on them both economically and socially.

The education profile showed that 124 (29.2%) were illiterate and the remaining 300 (70.8%) had from read and write to college or university level education. Regarding occupation, one hundred thirty three (one third) 32.3% identified themselves as handcrafts, 97(23.5%) of the respondents were house-wives followed by 10.2% employee of Government organization, 9.5% employee of private organization, 8.5% merchant or trader, 7.3% daily laborer and the remaining 8.7% were engaged in other occupations (see table 1 below). Even though there is great variation in family incomes with a maximum of 5,000 Ethiopian Birr per month, the median household income is reported to be 400.00 Ethiopian birr per month.

Table 1. The socio economic and socio demographic characteristics of household Respondents in Gullele subcity, district 05, April 2011, Addis Ababa

Characteristics	Frequency	Percent (%)	
Sex of respondents	Male	101	23.9
	Female	323	76.2
Marital status	Never married	89	21
	Married	222	52.5
	Divorced	26	6.1
	Widowed	86	20.3
Educational status	Illiterate	124	29.2
	Read and write	57	13.4
	Grade 1-6	55	13
	Grade 7-8	47	11.1
	Grade 9-12	95	22.4
	TVET	15	3.5
	College/University	31	7.3
Occupation	House wife	97	23.5
	Government employee	42	10.2
	Private employee	39	9.5
	Daily laborer	30	7.3
	Crafts man	133	32.3
	Trader	35	8.5
	Other	36	8.7

6.2. WATER SUPPLY

6.2.1. Water facilities constructed, quantity of water used and locations

Water in quantity and quality at reasonable distance from any dwelling is very important to maintain the health of the community through promoting hygienic practices. The main source of drinking water for the study households was reported as piped water into yard/plot/building 324(76.4%). Similarly, 69(16.3%) and 31(7.3%) respondents used procurement from private pipe water and public tap/standpipe as a source of water respectively. The majority 348(87.9%) of the respondents reported that the water sources are constructed by the government while 22(5.6%) and 14(3.5%) were by the Non Governmental Organization and Community, and Non Governmental Organizations respectively. The community alone could construct 1(0.3%) of the existing water sources. The 385(96%) of respondents reported that these water sources were not available all year round. Sometimes became non-functional. During these times, 193(59%) and 131(40.1%) of reported that the community use prior storage of water in larger household containers and other sources respectively. Nearly 1% of respondents reported from unprotected well and spring sources (Table 2).

Table 2: The water sources, construction and availability reports in Gullele sub city, district 05, April 2011, Addis Ababa

Variables	Frequency	Percent (%)
What is the main source of water for your family?		
Piped water into yard/plot/building	324	76.4
Public tap/standpipe	31	7.3
Tube well/borehole	-	-
Protected hand dug well	-	-
Unprotected hand dug well	-	-
Protected spring	-	-
Unprotected spring	-	-
Rain water collection	-	-
Surface water (river /pond/lake/dam/ Stream/	-	-
Procure from the private	69	16.3
Other(specify)	-	-
Who constructed your water source?		
Government	348	87.9
NGO	14	3.5
The community	1	.3
Government and NGO	3	.8
Government and community	8	2
NGO and community	22	5.6
Other (Specify)	0	0

Is the source available all year round?	Yes	16	4
	No	385	96
	Total	401	100
If not what other source do you use?	River	0	0
	Unprotected Spring	2	.6
	Unprotected well	1	.3
	Prior storage of water	193	59
	Other(specify)	131	40.1

From the qualitative data, a key informant women association coordinator and CBR director in the district stated that there is shortage of water and most of the people are using “*bono scheme*”, a format where by communities are getting water from communal water source. Besides the numbers of bonos are not enough in the kebeles for example kebele 06 have only six bonos. Though some community members have their own tap water due to the shortages most of the people are forced to join the “*bono system*”. Similarly, if we take kebele 17, there is recurrent interruption of water and people used to fetch water by going to another place known as “*Chilot Sefer*”. Moreover, they are traveling to the water point by using taxi as the place is far from their residence. As of key informant, the FGD discussants also stated that there is shortage of water, lack regularity and took shower by going to other areas.

The type of containers used to transport water from the source to their home was also surveyed. Majority 226(64.4%) were accustomed to use jerry cans followed by buckets (17.9%) and barrel/drum 33(9.4%). Based on these container volumes and frequency of fetching water for all purposes, it was estimated that the quantity of water used was 11.5 liters per capita per day. Regarding access to water points within reasonable distance, respondents were also asked how long it took to fetch water from the source if it is outside their premises. The traveling time consumed varied from 1-100 minutes with an average being 20.70 minutes. In most areas of the survey it is indicated that in addition to traveling to the source to fetch water there is also a great challenge. It is waiting time elapsed. The waiting time was found to be for at most 30 minutes to get water at the source which varied from 1-60 minutes with an average of 11.63 minutes.

Table 3: The water container, quantity and frequency of fetching reports in Gullele sub city, District 05, April 2011, Addis Ababa

Variables	Frequency	Percent (%)
With what containers do you transport drinking water for drinking, cooking food, washing clothes, animals, garden, etc from the source?		
Bucket	63	17.9
Jerry can	226	64.4
Bottle/Plastic bags	0	0
Pots/clay	1	.3
Barrel/drum	33	9.4
Other (specify)	28	8
Average frequency of collecting/transporting water per day from the water source		3.0
Average time in minutes required getting water, and coming back?		
Travel and back to house		20.70
Waiting time elapsed		11.63

6.2.2. Management/administration of Water sources

During technical field visits to the district 05, there were water points constructed by the Cheshire foundation and Christian Children’s Fund (CCF) where water and sanitation committee took the responsibility in managing the water supply points. The households are charged 20 and 30 cents per any volume of water container when they are residents of that particular area and externals respectively. Usually an average of 80-90 Ethiopian Birr is collected per week per water facilities. The collected money would be used to maintenance expenses. The major problem reported is the discontinuation of water which could not be available at all times. A male, Environmental health senior expert key informant stated that public water facilities are managed by the community while Public latrines are managed and controlled by the public and the government.

6.3. SANITATION CONDITIONS

6.3.1. Latrine access and utilization

The respondents were asked and observed for the possession of latrines. Majority 386 (91.3%) possessed latrine facilities (private or communal or public) while the rest 38 (8.7%) did not possess latrine. Among the respondents 188 (48.6%) stated that they have access to private latrine and 196

(50.6%) stated their latrine is communal. The remaining 3 (0.8%) reported access to public latrines. Those who had a latrine were also asked the location of the latrine. Two hundred and eleven 75.4% of the latrine were located elsewhere inside the yard while 60 (21.4%) of the latrine were located outside the yard. Only 9 (3.2%) are located inside or attached to dwelling.

In this regard, a women association coordinator and CBR director key informant said that there is a sanitation and hygiene problem and shortage of toilets. Community members are not motivated to keep the area clean and there is variation from kebele to kebele. Kebele 15 and 16 voluntarily clean their own toilet rooms but kebele 17 and 18 are not voluntarily doing. According to information from male environmental health senior expert, it is the community that is requesting and constructing sanitation and hygiene facilities by contributing up to birr 100 from each household. The FGD discussants also proved that even though the community is interested in constructing latrines, there is economic problem.

Regarding the distance of the outside yard latrine from the house, the responses were 42% less than 10m and 40% between 10m to 20m. Of the remaining outside yard latrine 12% were distant between 20m to 50m while 6% were more than 50m from the house.

Table 4: Reported latrine possession, ownership and locations in Gullele sub city, district 05, April 2011, Addis Ababa

Variables	Frequency	Percent (%)
Possession of private, communal or public latrines		
Yes	386	91.3
No	38	8.7
Latrine ownership		
Private	188	48.6
Communal	196	50.6
Public	3	0.8
Location of latrines		
Inside or attached to dwelling	9	3.2
Elsewhere inside yard	211	75.4
Outside yard	60	21.4
Estimated distance of latrine from the house		
Below 10meters	80	41.9
10-20meters	83	39.5
20-50meters	26	12.4
More than 50meters	13	6.2

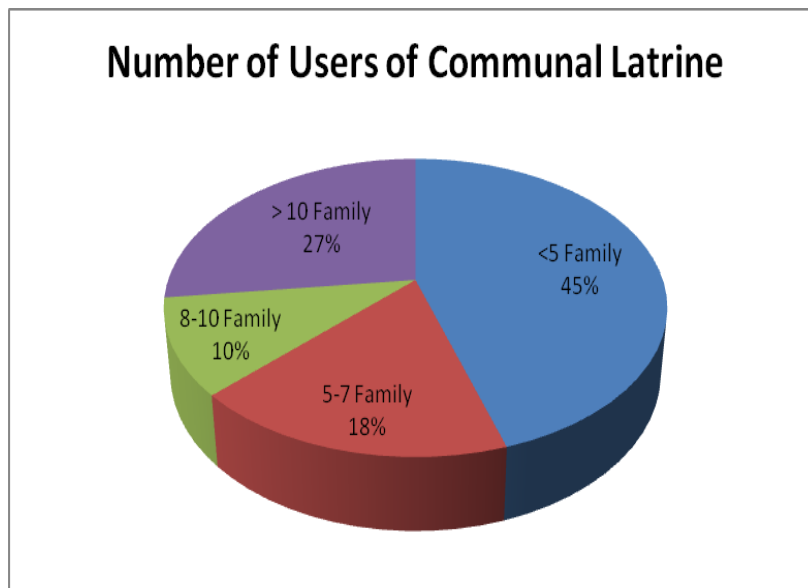
Those who had latrines were also asked why they constructed the latrines. The majority (53.4%) reported that it is for privacy; 25.8% said that it is to use at any time; 17.4% for dignity; and 2.9% and 0.5% of the respondents reported that it is to prevent filth born disease and it is sign of richness respectively.

Latrine observation was conducted in order to define whether the latrines are improved or unimproved. It was found that 42.5% the latrines were improved. Out of these improved latrines, 20.4% were improved pit latrine, 10.7% were pour-flush toilet/washable with water, and 9.6% were VIP latrine (table 5).

Table5: Latrine conditions and types in Gullele sub city, 05district, April 2011, Addis Ababa

Variables	Frequency	Percent (%)
Is the latrine unimproved or improved?		
Unimproved	161	57.5
Improved pit latrines	57	20.4
VIP latrine	27	9.6
Pour-flush toilet/washable with water	30	10.7
Other	5	1.8
Possible reasons for construction of latrines		
Privacy	203	53.4
Use at any time	98	25.8
Prevent filth born disease	11	2.9
Dignity	66	17.4
Sign of richness	2	0.5
Just to do what other people do	-	-
Pressurized by responsible persons	-	-

Among those owned communal latrine, the respondents were asked about number of users per communal latrines. The responses were 45.1% was less-than five family members and 26.9% more-than 10 family members. Of the remaining households 17.6% and 10.4% said that we used the latrine for 5-7 and 8-10 family members respectively (figure 1).



For respondents who have no latrines, it was asked where the family members defecate. Even though the responses were not adequate, see table 7 below. It indicated that the open defecation is common in the district 05.

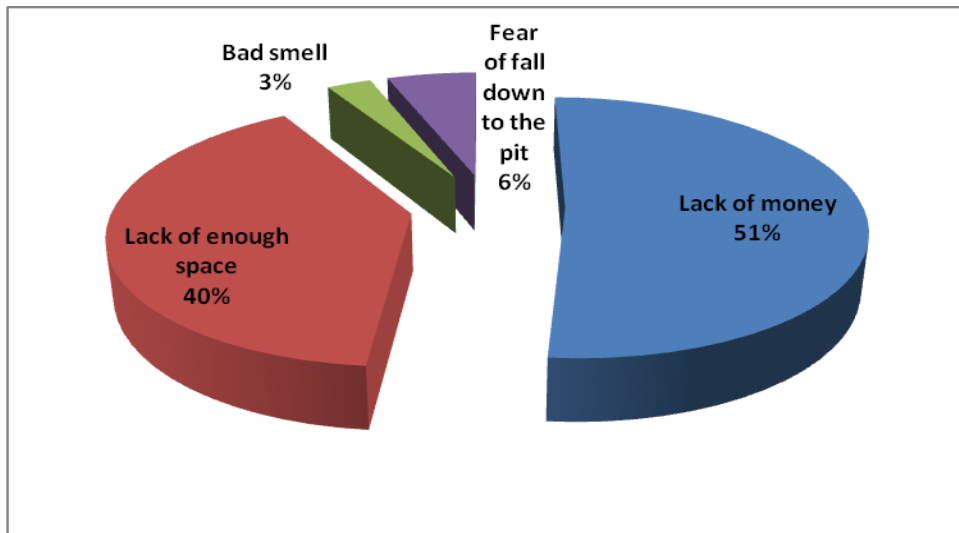
Table 6: Alternative defecation sites for the under five, between five and 18 and above 18 in Gullele sub city, district 05, April 2011, Addis Ababa

Variable	Under five years		5-18 years		Above 18 years (Adults)	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
In bucket	4	44.4	1	6.7	4	11.8
Around yard	3	33.3	2	13.3	2	5.9
In school	-	-	-	-	1	2.9
Out of yard	-	-	3	20.0	15	44.1
In the farm	-	-	-	-	1	2.9
Water fetching sites	-	-	-	-	-	-
Fly toilet	1	11.1	2	13.3	1	2.9
Other	1	11.1	7	46.7	10	29.4
	9		15		34	

During site visits, people were openly defecating along with river such as ‘*Mariam river*’ in district 05 of Gullele Sub city.

The reasons why 38(8.7%) of the respondents don’t construct latrines was also asked. The majority 51.4% and 40% mentioned that it is due to lack of money and enough space respectively. The remaining 8.6% depicted that it was due to fear of fall down to the pit and bad smell (figure 2).

Figure 2: Reported reasons for not constructing latrines in Gullele Sub-City district 05, April 2011, Addis Ababa



6.3.2. Solid and Liquid Waste Management

The proper solid and liquid waste disposal is important in preventing various communicable diseases. The situation in district 05 as reported from the respondents was found to be 243(57.3%) and 90 (21.2 %) discharge the liquid wastes into open field and along the road sides respectively. Only 42 (9.9%) dispose the liquid wastes either through septic tank accumulation and emptied by the Addis Ababa City Administration Water and Sewerage Authority or use soak away pits.

On the contrary, the majority 407(96%) reported that they used to give to small scale enterprise crews who are engaged in the solid waste collection. Similarly 12(2.8%) mentioned that they put into the public waste container. Very limited numbers throw in the compound/premises, out of the premises, along road sides, add to rivers and give to 'goralews.' (Table 7).

Table 7: Solid and liquid waste disposal in Gullele Sub-City district 05, April 2011, Addis Ababa

Variables	Frequency	Percent (%)
How do you dispose liquid wastes?		
Discharge into open field	243	57.3%
Septic tank	6	1.4%
Soak away pits	34	8.0%
Emptied by Water and Sewerage authority	2	.5%
Connecting to run off tube	58	13.7%
Along roads/add to run off tubes	90	21.2%
other	17	4.0%
How do you dispose solid wastes?		
Throw in the compound/premises	2	0.5
Throw out of the premises	2	0.5
Add to rivers	1	0.2
Throw along road sides	1	0.2
Give to small scale enterprise crews	407	96
Add to waste containers	12	2.8
Give to 'goralew'	1	0.2
Others	4	0.9

During field visits, it was observed that the residents have no proper solid and liquid waste disposal facilities. Households dispose solid wastes indiscriminately to every corner of the living quarters and to the rivers. No adequate solid waste containers in the district and those filled once were not picked timely. It was observed that dogs, cats and other scavengers were searching food items from spit out solid wastes from the containers. Similarly there was no proper sewerage system in the district so that people connected the latrines and other discharges to the rivers.

6.3.3. Management/administration of Sanitation Facilities

During technical field visits to the district 05, there are communal latrines constructed by the Cheshire foundation and Christian Children's Fund (CCF) where water and sanitation committee took the responsibility in managing the sanitation facilities. One communal latrine was constructed with the consideration of 3-4 households per latrine seat.

6.4. HYGIENE PRACTICES

6.4.1. Knowledge on Water and Sanitation

Regarding household water safety, 325(76.8%) and 83(19.6%) of respondents think that the usual water sources are safe and unsafe respectively. About 15 (3.6%) reported that they do not know whether it is safe or unsafe. One hundred and fifty eight 55.9% of the respondents who considered as safe are knowledgeable in justifying the possible reasons such as colorless, free of turbidity and disease causing organisms. Similarly the majority of the respondents 394 (95.4%) are found knowledgeable on the use of latrines.

The respondents reported the knowledge of the possible causes of diarrheal diseases. The majority (31.8%) mentioned that microorganisms, 20.5% eating contaminated food and 18.2% contamination of food and drink with flies. Similarly 15.9% reported drinking contaminated water, eating food without washing hands and defecating in open fields are some of the risk factors for occurrence of diarrhea.

Four hundred and two 97.3% of the respondents knew that diarrheal diseases can be prevented. Two hundred fifty four 61.1%, 184(44.2%), 160(38.5%) of the respondents could explicitly indicate the possible methods of prevention of diarrhea through washing hands with soap, medication and hygienic preparation and safe storage of food respectively.

Table 8: knowledge of respondents on water and sanitation in Gullele Sub-City district 05, April 2011, Addis Ababa

Variables	Frequency	Percent (%)	
Do you think the usual water source you are using is safe?	Yes	325	76.8
	No	83	19.6
	Don't know	15	3.5

If yes, could you please tell why you said safe?			
	Colorless water	90	31.8
	Water with tastes	34	12
	Water free of turbidity	31	11
	Water free of coli forms (microorganisms)	37	13.1
	Other (specify)	91	32.2
Have you received health education on Water, Sanitation and Hygiene from Health Extension Workers?			
	Yes	118	27.9
	No	305	72.1
Do you know the use of latrine?			
	Yes	394	95.4
	No	19	4.6
If yes, what do you think the cause of the diarrhea?			
	Drinking contaminated water	7	15.9
	Eating contaminated food	9	20.5
	Eating food without washing hands	7	15.9
	Defecating in open fields	7	15.9
	Contamination of food and drink with flies	8	18.2
	Germs(microorganisms)	14	31.8
	I do not know its cause	1	2.3
	Others(specify)	2	4.5
Do you think diarrheal diseases can be prevented? (n=413)			
	Yes	402	97.3
	No	11	2.7
	I do not know	0	0
If yes, could you please mention how it could be prevented?			
	Washing hands with soap	254	61.1
	Using latrine	93	22.4
	Adding children's feces into latrine	34	8.2
	By Covering latrine holes(always)	36	8.7
	Keeping latrine clean regularly	99	23.8
	Drinking safe water	154	37
	Safe storage of drinking water	128	30.8
	Hygienic preparation and safe storage of food	160	38.5
	Cooking food properly	62	14.9
	Keeping the leftover foods covering properly	32	7.7
	Proper management of solid and liquid wastes	56	13.5
	Keeping the residence compound clean	92	22.1
	Medication	184	44.2
	Traditional healers	1	0.2
	Other (specify)	40	9.6

6.4.2. Handwashing

During the data collection, 403(95.3%) of the households have had soap in their home. They also reported that 97% of the respondents are using soap for handwashing purposes. Only 98(25.1%) were found to use substitutes of soap such as ash (50%), soil/sand (40%) and leaves/grass (10%).

The handwashing practices with soap at critical times was found 323(76.2%) after using toilet, 264(62.3%) before breast feeding, 208 (49.1%) before preparing food, 158 (37.3%) before eating and feeding food and 27 (6.4%) after washing child's bottom. It is also reported that 305 (71.9%) wash their hands early in the morning while get off beds/ sleeping. This would be important practice but is not included in critical times for handwashing.

Table 9: Knowledge on handwashing practices in Gullele Sub-City district 05, April 2011, Addis Ababa

Variable	Frequency	Percent (%)
Do you have soap in your household currently?		
Yes	403	95.3
No	20	4.7
Have you used soap today or yesterday?		
Yes	404	97.3
No	11	2.7
Do you use other materials to wash your hands other than soap?		
Yes	98	25.1
No	286	73.1
I do not use other	7	1.8
What other materials other than soap do you commonly use?		
Ash		
Soil/sand	45	50
Leaves/grass	36	40
	9	10
At what times you wash your hands?		
After using toilet	323	76.2
After washing child's bottom	27	6.4
Before preparing food	208	49.1
Before eating and feeding food	158	37.3
Before breast feeding	264	62.3
Early in the morning while get off beds/ sleeping	305	71.9
Others (specify)	80	18.9

7. CONCLUSION

General Information

From the sample of 424 households interviewed in district 05, it was found that 76.2% were females, 21% never married, and 20.3% and 6.1% were widowed and divorced respectively. Thus, 4 in 5 households were females and one-fifth of the respondents who are household heads are single and this may create undue pressure on them both economically and socially. One third identified themselves that they were engaged in handcrafts for livelihoods. This is informative that residents of district 05 need more support in improving the income generating options.

Water Supply

Even though the main source of drinking water for the study households was reported as piped water into yard/plot/building 324(76.4%), from the qualitative data, a key informant women in the district stated that there is shortage of water and most of the people are using “*bono scheme*” besides which the number of bonos are not enough in the kebeles especially in kebele 06 have only six bonos and in kebele 17 where there is recurrent interruption of water and people used to fetch water by going to another place known as “*Chilot Sefer*”. Though some community members have their own tap water due to the shortages most of the people are forced to join the “*bono system*”. Based on the type of containers used to transport water from the source to their home volumes and frequency of fetching water for all purposes, it was estimated that the quantity of water used was 11.5 liters per capita per day. This is low as compared to the national water policy, 20 liters per capita per day within 0.5kms radius in urban centers.

During technical field visits to the district 05, there are water points constructed by the Cheshire foundation and Christian Children’s Fund (CCF) where water and sanitation committee took the responsibility in managing the water supply points. The households are charged 20 and 30 cents per any volume of water container when they are residents of that particular area and externals respectively. Usually an average of 80-90 Ethiopian Birr is collected per week per water facilities. The collected money would be used to maintenance expenses. The major problem reported is the irregularity of water which could not be available at all times. Even stand pipes commonly called ‘*bono schemes*’ were not found delivering water all the times. It is only in the morning and evening

for limited times. As male, environmental health senior expert, key informant stated the public water facilities were managed by the community while public latrines were managed and controlled by the public and the government.

Latrine access and utilization

The respondents were also asked and observed for the possession of latrines in which majority 386 (91.3%) possessed latrine facilities either private or communal or public. Among these the 48.6% stated that they have access to private latrine. The reasons why 38(8.7%) of the respondents don't construct latrines was due to lack of money 51.4% and lack of enough space 40%. According to information from male environmental health senior expert, it is the community that is requesting and constructing sanitation and hygiene facilities by contributing up to birr 100 from each household. However one FGD discussant also proven that even though the community is interested in constructing latrines, there is economic problem. When latrines were observed in order to define whether the latrines are improved or unimproved. It was found that 42.5% the latrines were improved. When this figure compared to WHO/UNICEF JMP 2010 update report (12%), it looks better. As indicated in the HSDP IV Ministry of Health, we need to work hard to achieve 84% improved latrine coverage at the end of 2015.

The major reason for constructing latrines were for privacy 53.4%, to use at any time 25.8%, for dignity 17.4%, to prevent filth born diseases 2.9% and sign of richness 0.5%.The primary reason for constructing latrines is to break chain of disease transmission in which 2.9% in this finding. Hence it requires more promotional work in improving this key behavior.

In this regard, a women association coordinator and CBR director, key informant said that there is a sanitation and hygiene problem and shortage of latrines. Community members are not motivated to keep the environment clean. Kebele 15 and 16 voluntarily clean communal latrine rooms but kebele 17 and 18 are not voluntary doing. For this purpose social mobilization and promotional works are highly required to create demands within communities.

During field visit, it was noted that open defecation was practiced in some parts of district 05.

Solid and liquid waste management

Regarding solid and liquid waste disposal situation in district 05, it is reported that more than half and one fifth of respondents discharge the liquid wastes into open field and along the road sides respectively. Only one tenth disposes the liquid wastes either through septic tank accumulation and emptied by the Addis Ababa City Administration Water and Sewerage Authority or use soak away pits. On the contrary, the majority 96% reported that they used to give solid wastes to small scale enterprise crews who are engaged in the solid waste collection. Similarly 2.8% mentioned that they put into the public waste container. Very limited numbers give to 'qoralews. From this one can understand that recycling may be considered as an alternative solid waste disposal and income generating mechanism.

Generally, it was observed that the residents have no proper solid and liquid waste disposal facilities. Households dispose solid wastes indiscriminately to every corner of the living quarters and to the rivers. No adequate solid waste containers in the district. Those filled once were not also picked timely. It was observed that dogs, cats and other scavenge were searching food items from spit out solid wastes from the containers. Similarly there was no proper sewerage system in the district so that people connected the latrines and other discharges to the rivers.

Knowledge on water and sanitation

The knowledge of respondents to water safety and sanitation issues were assessed. The household water safety, 76.8% and 19.6% of respondents think that the usual water sources are safe and unsafe respectively. About 3.6% reported that they do not know whether water they are using is safe or unsafe. One hundred and fifty eight 55.9% of the respondents who considered water as safe are knowledgeable in justifying the possible reasons such as colorless, free of turbidity and disease causing organisms. Similarly the majority of the respondents 95.4% are found knowledgeable on the use of latrines. Similarly the respondents reported that the knowledge of the possible causes of diarrheal diseases. The majority 31.8% mentioned that microorganisms, 20.5% eating contaminated food and 18.2% contamination of food and drink with flies. Similarly 15.9% reported drinking contaminated water, eating food without washing hands and defecating in open fields are some of the risk factors for occurrence of diarrhea. In this area it requires more health promotion works to raise knowledge and practices of the community. On the other hand, it is reported that 97.3% of the respondents knew that diarrheal diseases can be prevented.

Handwashing

During the data collection, 95.3% of the households have had soap in their home. They also reported that 97% of the respondents are using soap for handwashing purposes. Only 25.1% were found to use substitutes of soap such as ash 50%, soil/sand 40% and leaves/grass 10%. The handwashing practices with soap at critical times was found 76.2% after using toilet, 62.3% before breast feeding, 49.1% before preparing food, 37.3% before eating and feeding food and 6.4% after washing child's bottom. The behaviors of handwashing before eating and feeding food and after washing child's bottom were found low as compared to other critical times.

8. RECOMMENDATION

Water Supply

- Even though the main source of drinking water for the study households was reported as piped water into yard/plot/building, there is shortage of water and most of the people are using “*bono scheme*” which are also not enough and not available at all times to satisfy the water demands of the community since the quantity of water used was 11.5 liters per capita per day. This is low as compared to the national water policy, 20 liters per capita per day within 0.5kms radius in urban centers. Hence it is advisable to construct more stand pipes and supply of water reservoirs with high containing capacities.
- Construct adequate communal shower or bath rooms to some households to enhance the habits of keeping personal hygiene by avoiding unnecessary travel to search shower rooms.
- Promotion of household water treatment with proven water treatment methods and safe storage

Latrine access and utilization

- Majority of the study households possessed latrine facilities either private or communal or public. But only 48.6% have access to private latrines and 42.5% of the existing latrines were improved. When this figure compared to WHO/UNICEF JMP 2010 update report (12%), it looks better. The HSDP IV of the Ministry of Health planned to achieve 84% improved latrine coverage at the end of 2015. Hence it is commendable to work towards the country’s plan and work on improving quality i.e. to make the existing and new latrine facilities improved.
- Only 2.9% of interviewee’s knew that constructing latrines is to break chain of disease transmission and people were found practicing open defecation in some parts of district 05. Hence it is highly advisable to work on social mobilization and promotional activities to create demands within communities and to end open defecation.

Solid and liquid waste management

- Households in the study area dispose solid wastes by giving to small scale enterprise crews, putting into the public waste container where available and very limited numbers give to ‘*qoralews*’. Strengthening the existing solid waste collectors by capacity building (training, supplying carts, etc) and advocating recycling as an alternative solid waste disposal and income generating mechanism.

- Advocate district administration on timely picking of the filled public solid waste containers to avoid attraction of dogs, cats and other scavengers searching food items from spit out solid wastes from the containers.
- Regarding solid and liquid waste disposal, only one tenth dispose the liquid wastes either through septic tank accumulation and emptied by the Addis Ababa City Administration Water and Sewerage Authority or use soak away pits. The remaining discharge the liquid wastes into open field and along the road sides. It will be commendable to create awareness in the public either to construct their own soak away pits or encourage timely use of Addis Ababa City Administration Water and Sewerage Authority for emptying.

Knowledge on water and sanitation

- Develop IEC/BCC materials focusing on household water treatment and safe storage, benefits of latrine utilization and handwashing with soap at critical times.
- Promote prevention and control of WASH related diseases specifically the mode of diarrheal diseases transmission, prevention and control methods.

Handwashing

- The handwashing practices with soap at critical times were found at least more than half after using toilet and before breast feeding. The remaining behaviors such as before preparing food, before eating and feeding food and after washing child's bottom were found below half. The Federal Ministry of Health planned in HSDP IV that to achieve 77% at the end of Growth and Transformation Plan period (2015). Hence it is commendable to work towards the country's plan and work on improving handwashing with soap (substitute) at critical times.

Sustainability

- Empower community to own the Water Supply, Sanitation and Hygiene Projects through behavior changes, trainings and connecting to Addis Credit and Saving institution to involve in the collecting and recycling of wastes.

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10. APPENDICES

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036	^{3/4} pTØ ui□“ SÝLYM Ā%LM wK“ < ÁevK<;	<p>>- 1</p> <p>^{3/4}KU 2</p>	→038
037	SMe- >- ÝJ’ □“Èf SÝKYM Ā%LM; (^{3/4}vK“ <“ G<K< UM;f ÁÉ`Ņ<)	<p>• Ī S• Öw1</p> <p>SiÇÍ u?f SÖkU2</p> <p>^{3/4}Qí“f “ǎ’ UÉ’ uSiÇÍ u?f SÚS’3</p> <p>SiÇÍ u?f“ G<MŅ>²? S;ǎ”4</p> <p>G<MŅ>²? SiÇÍ u?f“ u“Ī” uSÁ’5</p> <p>“Ī<l “ <H SÖkU6</p> <p>“ <H” u“Ī” uTekSØ7</p> <p>U□□□“Ī” T²ÒÈf” TekSØ8</p> <p>UÓw” u>Óvu < TwcM----- 9</p> <p>^{3/4}²ÒĪ “ǎU ^{3/4}[ð UÓw” uT>Ņv ÝÉ• TekSØ--...10</p> <p>^{3/4}ǎ[p“ õXi qhh” u>Óvu < uTe“ŅÉ11</p> <p>^{3/4}S•]Á Óu=“ <“ u“Ī” uSÁ’12</p> <p>uQ;U”13</p> <p>uvl© QiU”14</p> <p>K?L “K ĀŅKê99</p>	
038	uu?f- “ <eØ u>G<’ < Ņ>²? dS<“ >L<G<; (S•\” □“Ç=Ád;f >É`Ņ<)	<p>>- 1</p> <p>^{3/4}KU 2</p>	
039	³ “ǎU f““ f uXS<“ }ÖpS ^a M ;	<p>>- 1</p> <p>^{3/4}KU 2</p>	
040	ÝXS<“ K?L “ǎU XS<“ ÝK?□ □Ī-“ □□□ □□□□□ uK?L ‘Ņ` Ā• ÖvK<;	<p>>- 1</p> <p>^{3/4}KU 2</p> <p>>L“ <pU 88</p>	<p>→042</p> <p>→042</p>
041	Ý}Öks< U” >ǎ’f S• Öu=Á ĀÖTK<;	<p>>SÉ 1</p> <p>>ð’>g^a 2</p> <p>pÖL pÖM/ X` 3</p>	
042	uXS<“ □Ī S□Öw ^{3/4} T>ÁeðMŅ“ < u ^a “f SŠ SŠ ““ <;	<p>ÝSiÇÍ u?f S□e ----- 1</p> <p>^{3/4}M□“ □Ī” m□ □>ÖwÝ< □□□----- 2</p> <p>UÓw ÝT²ÒÈ, uòf -----3</p> <p>ÝSwL, □□ MĪ” ÝSSŅu? uòf ----- 4</p> <p>UÓw Ý□□□ □□□-----5</p>	

	(T"uw >ÃðkÉU Ý>"É uLÃ UM;f TÉ[Ó □□ Ã%oLM)	□□ □□□□ □□□ -----6 K?L "K ÃÑKê -----99	
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N. □□<H □□□□□ □□ □□□□□			
043	a'—□< ¾□<H SÑ—Ÿ¾f '□<;	□Óu= □<eØ "K"□< vD"vD 1 □x• □<H TÁÁ 2 □ØMp Ń<ÉÖÉ □<H 3 Ÿ}Öuk ¾•Ī Ń<ÉÖÉ □<H 4 "M}Öuk ¾•Ī Ń<ÉÖÉ □<H 5 Ÿ}Öuk U"ß 6 "M}Öuk U"ß 7 Ÿ"w Ÿ}Ö^kS □<H 8 Ÿ"'" 9 Ÿ□□□□ □□□□□ --..... 10 K?L "K ĀÑKê 99	
044	¾□<H SÑ—□<□ □□ □□ □□□□□;	□□□□□-----1 □.□.□-----2 □□□□□□-----3 □□□□□□ □.□.□-----4 □□□□□□ □□□□□□ -----5 □.□.□□ □□□□□□-----6 □□ (□□□□)-----99	
045	□<H ¾T>Ń~uf x□ ~S~" uS<K< >Ās[ØU;	>- □□□□□□ 1 Ās[×M 2	→047
046	□<H □□□□□ □□ u>T^B'f ¾UfÖkS<f Ÿ¾f '□<;	Ÿ"'" 1 □□□□□□ □□□ 2 "M}Öuk Ń<É□<É..... 3 □□□□□ □□□□□□--- 4 K?L □□ ĀÑKî 99	
047	Ÿ□<H SÑ— "Ā u?f □□□□□□□□ □□□□□□□□□□□□ □□□□□ □□□□□□□ ...□□□ □□□□□□ □□□□□□ □□ uU" SÁ¹ □< ¾T>ĀÖÑ<²<f; (□□□□□□ □□□ □□□□ □□□□)	vMÇ= (----- □□□) 1 Ī]"' (----- □□□) 2 Ö`S<e /ýLe+j/(----- □□□) 3 □□□□/TEÒ/□□□ (----- □□□) 4 u`T@M (-----) 5 K?L "K ĀÑKî ----- (----- □□□) ---- 99	
048	□□□ □□□□□□□ □□□ □□□ □□□□ □□□□ □□□ □□ □□ □□ □□□□;	----- ----- -----	
049	¾□<H SÑ— ŸÓu= □<Ü ŸJ' kÉ,, KSSKe U" ĀIM Ń>²? ĀđIM;----- Āmn KSH@É □□ KSSKe -----.....-----.. Āmn "[ó KSÖup	
050	¾UfÖkS<uf □<H "Ī<l '□< □□□ □□□□	>------ 1 ¾KU----- 2 >L"□<pU----- 88	→052 →052
051	"Ī<l '□< "K< ĀK<uf" G<'@□ u=ŃMèM";	Ÿ<MM ĀK □<H 1 c=kSe Ø\ n" ĀK"□< 2 ĀMĀđ[c □<H 3 ŸĒ`V< ¾iÇ □<H 4 K?L "K ĀÑKê 99	
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¾ Key Informant Interview SSJÁ

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Ý}:"Áž Ò" □"Á}Ñ"-l/i ¾SÉS]Á" < }Óv` u>Óvu< WLUD Tplw" Ý¾}f □"ÁSxli/i □" ¾Sxlu f/¾Sxlu f }Óv` U" □"ÁJ' uT>Ñv SÓKî ÁJ"M:: uSkÖMU K"<ÁÁ~ ðnÁ"□+"<" ÖÄp/ÖÄm:: kØKA ¾cð\ f"" u}SU Á[í ¾T>k'u<f" ¾"<ÁÁf S'h ØÁo-< KT"H@ÉU >Óvw'f ÁL+"<" ÓKcx< Ø"~ uT>Ñ"uf "[Ç Ý¾}T>Ñ-<" ÝT>SKÝ□+" < É'ï,,<' SU[Ø ÁeðMÒM::

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002	ÁK-f ¾Y^ É'h	
003	u;MK</□/□□□/"[Ç" < eLK" < ¾" < H'¾□□□ □□□□ □□□□ □" GÄï" G<'@□ K=ÑMi<M" Ä<LK<;	
004	¾²=l ;M□/□/□□□/"[Ç "E]-< " < H Ý¾}f □"ÁT>ÁÑ-< K=ÑMi<M" Ä<LK<; Ø^~e □"Èf □¾}Öuk "' < wK" < ÁevK<;	
005	u;MK</□/□□□/"[Ç□ ¾T>Ñ-< ¾" < H" X'>,i" }sTf □"Èf □"ÁT>}ÇÄ\ u=ÑMi<M";	
006	Tlu[cu< ¾□□□ □□□□ □□□□ GÄï" }sTf" uSÑ"vf }dfö 'u[" <; }dfö Ý'u[" <& u•`e- ÓUf uÑ"²w ¾'u[" <" >e}ª± □"Èf ÄÑMi<□M;	
007	u;MK</□/□□□/"[Ç□ ¾" < H'¾□□□ □□□□ □□□□ HÄï" Ñ<ÇÄ< LÄ ¾S"Óef" >e}ª± □"Èf ÄÑSÓS<□M; >"Æ pÉT>Á ¾}cÖ" < Ñ<ÇÄ "' < wK" < e ÄÑU• K<;	
008	u;MK</□/□□□/"[Ç" ¾□□□ □□□□ □□□□ HÄï" Ñ<ÇÄ< □"Èf "' < • ¾}eóñ/• ¾}ª¹l/□□□□ □¾}Ä[Ñ< ÁK<f; uf" <" <p/Teóóf/øaVf TÉ[Ñ< H>Áf U" IMö SMª; S}LKö >Kv+" < ÄLK<;	
009	¾□□□ □□□□ □□□□ HÄï" Teóóf/f" <" <p/ □□□□/ Y^" T" "' < >w³--<" Ñ>²? ¾T>ÁÝ" <" <; u"vu=- ¾Ö?" >?je□"i" vKS<Á-< ¾}cT\ SJ' <" Á" <nK<;	
010	u□`e- >SK"Ýf uTlu[cw "ÄU u?}cw Á[í c-< eK □□□□ □□□□ HÄï" ÁL+" < >SK"Ýf }K" <xDM ÄLK<; SMe- >- ÝJ' }Úvß UXK? K=Öpc<M" Ä<LK<;	
011	u□`e- >SK"Ýf c-< uSiÇí u?f Ó"v□ □" >ÖnkU LÄ ÁL+" < >SK"Ýf }K" <xDM ÄLK<; SMe- >- ÝJ' }Úvß UXK? K=Öpc<M" Ä<LK<;	
012	u;MK</□/□□□/"[Ç" eLK" < ¾Ä[p □" ðdi qhh >"ÖÑÉ MUÉ K=Áw^M" Ä<LK<;	

3/4 Focus Group Discussion SS]Á

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Ä"x<: "□Á"Ç"Æ]"ÄÄ 3/4S"Ñ"/ Gdu<" 3/4SÓKî □ÉM K=cÖ"< eKT>Ñv >"Æ K?L"< uT>"Ñ"uf Ñ>²? Gdu<" dÄÜ'e □"ÇÁs'Ö"< Mw □"uM. K"" Ø" f c=vM "<ÄÄ□<" u"c?f ÄkÇM:: ÄG<"" L[ØÓØL<G< 3/4U"Ä"< T"t"<U 3/4ÑKí%Et< /3/4)"Ä³/4"vt"< Ñ<ÇÄ< G<K< uT>eØ 3/4T>Á²< ÄJ"K<."

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001	□"[Ç"< eLK"< 3/4"<H'3/4□□□ □□□□□ □□□□□ GÄI" G<'@□ K=ÑMi<M" Ä<LK<;
002	3/4²=I "□□ "E]-< <H Y3/4f □"ÁT>ÁÑ-< K=ÑMi<M" Ä<LK<; Ø^~e □"Èf □3/4)Öuk "'< wK"< ÁevK<;
003	u"[Ç"< 3/4T>Ñ-< 3/4"<H' X',i" }sTf □"Èf □"ÁT>]ÇÄ\ u=ÑMi<M";
004	u"[Ç"< 3/4"<H'3/4□□□ □□□□□ □□□□□ HÄI" Ñ<ÇÄ< LÄ 3/4S"Óef" >e)ªi± □"Èf ÄÑSÓS<□M; >"Æ pÉT>Á 3/4)cÖ"< Ñ<ÇÄ "'< wK"< e ÄÑU• K<;
005	Tlu[cu< 3/4□□□ □□□□□ □□□□□ GÄI" }sTf" uSÑ"vf }dfö 'u["<; }dfö Y'u["<& u•`e- ÓUf uÑ"²w 3/4'u["<" >e)ªi± □"Èf ÄÑMi<□M;
006	u"[Ç"< 3/4□□□ □□□□□ □□□□□ HÄI" Ñ<ÇÄ< □"Èf "'< □3/4)eón/□3/4}ª"/□□□□□ □3/4)Ä[Ñ< ÁK<f; uf"<"<p/Teóof/□□□□ □TÉ[Ñ< H>Áf U" IMö SM°i,,< S]LKö >Kv+"< ÄLK<;
007	u□`e- >SK"Yf uTlu[cw "ÄU u?)cw Á[c-< eK X',i"" HÄI" ÁL+"< >SK"Yf }K"<×DM ÄLK<; SMe- >- YJ' }Úvß UXK? K=Öpc<M" Ä<LK<;
008	u□`e- >SK"Yf c-< uSiÇ[u?f Ó"v□ □" >ÖnkU LÄ ÁL+"< >SK"Yf }K"<×DM ÄLK<; SMe- >- YJ' }Úvß UXK? K=Öpc<M" Ä<LK<;
009	u"[Ç"< eLK"< 3/4Á[p □" □□i qhh >"ÖÑÉ MUÉ K=Áw^M~ Ä<LK<;

ŸG<K}— U”B (Secondary Source) S[Í Scwcu=Á pî

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- □v_i-f” ¾T>Ÿ}K<f” ØÁo-< uÖ?” }sS< ŸT>Ñ” ¾2002 .U 10 a” a” ¾ui□ “Á’,,< (ten top diseases) “<eØ “Á”< □□□□□□ □□□□□ □□□□□

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¾}pTØ/Diarrhea/ ui• Ÿ5 “Sf u□< uJ’< lí”f LĂ			
¾}pTØ/Diarrhea/ ui• uG<K<U ¾4°ÉT@ ;MM			
¾-Ă” ui□ (f^†T)			
¾qÇ ui•			
¾10 a” a” ¾ui□ “Á’,,<” ÉU`			

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springs						
boreholes						
tape water						
hand dug wells						
stand pipes						

3.2 3/4"î<l SÖØ " <H }p`xf ió" u"[Ç" < U" □□□ □□;-----

3.3 □□□ □□□ □□□□□□□ □□□ □□□□□□□ □□□ □□□□□□ □□□□□□ □□□ □□ □□;-----

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u"[Ç< 3/4T>Ñ-<f" 3/4SW} MTf' 3/4<H }sTf • " >ÑMÓKAf' □"Ç=G<U 3/4>"vu="<

"êl" □"Ç=G<U 3/4"êl" >ÑMÓKAf G<'@□ uSej p~f (Personal/ On-Site Observations) c=Á[Ó

vKS<Á"< YK?KA< }Óv^f u}ÚT] KT>Y}K<f IMö ÔÇ3/4< M; fÿ<[f TÉ[Ó

ÄÖupu• M::

IØ`	3/4>ÑMÓK A~ -Ä'f	>É^h	ÁKuf G<'@• (>ÑMÓKAf 3/4T>cØ/ 3/4TÄcØ	3/4}ÖnT>-< G<'@•		3/4>ÑMÓKAf >c×Ø G<'@•		>ÑMÓKA~ u;öÁ Y}' □v;- " 3/4T>Y}K<f"		
				u?}cx<	c-<	'í	u;öÁ	3/4;öÁ SÖ"	u~ 3/4T>Ñ~ Ñu= SÖ" (uw`)	3/4Ñu= >ÖnkU
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>ScÓ"KG<