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Assessment of Household Water Insecurity and its Associated factors in Dera Woreda, South Gondar Zone, Amahara, Ethiopia

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BAHIR DAR UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH



ASSESSMENT OF HOUSEHOLD WATER INSECURITY AND ITS
ASSOCIATED FACTORS IN DERA WOREDA, SOUTH GONDAR
ZONE, AMAHARA, ETHIOPIA

A THESIS SUBMITTED TO BAHIRDAR UNIVERSITY COLLAGE OF
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MASTER IN PUBLIC HEALTH

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DECLARATION

The undersigned, declare that this thesis is my original work, has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

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ACRONYM AND ABBREVIATIONS

CMP	Community Managed Project
FAO	Food and Agriculture Organization
GO	Governmental Organization
GTP	Growth and Transformation Plan
JMP	Joint Monitoring Program
NGO	Nongovernmental organization
ORDA	Organization, for Amhara Development and Rehabilitation
SPSS	Statistical Package for the Social Sciences
UAP	Universal Access Plan
UN	United nation
UNDP	United nation Development Program
UNICEF	United Nation Children's Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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ABSTRACT

Background: Water security is the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. Ensuring safely managed water for every household is one of the goals of Sustainable Development Goal by the year. However credible evidence on households with improved water security is limited in the country particularly in Dera.

Objective: This study aimed to determine the level of household water insecurity and associated factors in Dera woreda, Ethiopia.

Methods: Community-based cross-sectional study was done on 640 households from March to June, 2017 in Dera Woreda, South Gondar Zone of Amhara region, Ethiopia. There are 32 kebeles (lowest administrative units) in the district, of which 8 kebeles were selected randomly. From selected kebeles, 640 households were selected using systematic random sampling. Data were collected using pretested structured questionnaire by trained data collectors. Data were manually entered to SPSS version 20.0 for cleaning and analysis. Binary multivariable logistic regression was used to identify factors associated with water insecurity in the study area.

Results: In the study woreda the proportion of household water insecurity was 92% (95% CI 90 to 94%). Based on the findings the household water insecurity had no associations with socio-demographic factors such as age, education, religion, family size, household income and marital status.

Conclusions: This study revealed that household water insecurity was high in the study area. Hence, proper attention should be given during developing of water source to ensure the need of family members. According to the result of this finding household water insecurity had no association with socio-demographic factors

Key words:- Ethiopia-Factors-Household-Water insecurity-Dera woreda

1. INTRODUCTION

1.1. Background

Water security is one of the global challenges in the 21st century[1] and it is under severe pressure as a result of a complex of factors that include hydrological conditions, rapid population growth, rural–urban migration, increased per-capita water use, pollution of water resources, over-abstraction of groundwater and climate change and variability[2]. As a result, 80% percent of the global population faces a high level risk to water security. Between 2016 and 2040, global demand for fresh water will also increase, but the supply of fresh water will not keep pace with demand absent more effective management of water resources[3]. Despite progress over past decades in expanding access to clean drinking water, 4 billion people (two-thirds of the world’s population) face severe water scarcity each year and an estimated 663 million people remain without access to water sources protected from outside contamination[4].

The consequences of limited water availability include negative effects on Water Policy, health, poverty, and vulnerability. Water is central to all aspects of development, underpinning every social and economic sector. Capturing a common definition of water security will strengthen the coordination, formulation, and achievement of common sustainable development goals[5]).

It is well known that access to safe water is an essential step towards improving living standards. But many low-income countries face greater water security risks and have the least ability to mitigate such risk through appropriate and sequenced investments, infrastructure and institutions. The poorest live in the most vulnerable areas, such as urban slums, rural hinterlands and floodplains, yet have the least capacity to invest in resilient and flexible measures to mitigate risk[6]. The communities with inadequate water supply services are the most venerable for various water related diseases. Hence improving access to safe drinking water is central to any poverty alleviation strategy for developing countries[7] .

Domestic water demand in terms of quantity and quality is for four basic human needs: drinking water for survival, water for human hygiene, water for sanitation services, and modest household needs for preparing food. The United States Agency for International Development, the World Bank and the World Health Organization have recommended between 20 ℓ and 40 ℓ/cap/d to meet basic needs[8].

Water security is the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability (UN water). The concept of water security is also based on the creation of mechanisms that ensure the poor have secure and sustainable access to water resources, which in turn means strong links to participation and the governance conditions that dictate this access [9].

It is also defined as the quantity of water reliably supplied to achieve the design daily requirement of water. However, the concept of “Safe Water” in the definition is not well understood because it has multiple standards, safe water can mean, clinical safety, cultural safety, perceptual safety, minimum pollutant standard etc. Hence, the word “Safe Water” is still been used loosely in context. Water security revolves round issues of water availability, accessibility, usage and quality[10]

Developing countries are vulnerable to water insecurity which is interconnected and hindering their ability to eradicate poverty. Lack of access to basic resources, such as safe drinking water, is a crisis that contributes to poor quality of life, spread of disease, morbidity, mortality, and lack of environmental sustainability.

In many Sub-Saharan African countries, water insecurity is more severe than other developing countries and its burden is laying on women and girls. The long distances to be traveled as well as much waiting time have greater impact to attend schooling and lowers social prosperity. Clearly, access to safe, local and accessible drinking water is vitally important[11]

Ethiopia is the second most populated country in Africa with over 91 million inhabitants, most of which live in the rural areas. According to international conventions and underlying government laws, all citizens in Ethiopia have the right to have access to safe domestic water for their basic human needs. But according to 2015 JMP report 46% of the population in the country still using water sources that were unimproved[7].

In Amhara region despite huge investments over the years in the water and sanitation sector by Government and non-government organizations, millions of rural poor communities still remain without adequate water supply and lack improved sanitation services. Even in the country at large numerous schemes have been planned and implemented, only a proportion of these schemes continue to provide water to the communities that they were intended to serve[12].

Therefore, this study will contribute to show the gap of household water insecurity problems for governmental and nongovernmental waters supply project implementers in Dera Woreda, Amhara region, Ethiopia.

1.2. STATEMENT OF THE PROBLEM

Lack of access to clean water is also one of the challenges to tackle poverty throughout the world. Even though the issue of water is observed as a general problem for both the male and the female population, female breathe greatest burden because of their social gender roles in collecting water for their households[13].

Lack of access to water also leads to high number of morbidity and mortality among vulnerable groups of the community. Worldwide, 663 million people lack access to safe water although there is regional variation. The populations without access to safe drinking water are mainly in Sub-Saharan Africa and Asia accounting for 84.33% of total. Of the 663 million people, 319 million people (51.88%) are in Sub-Saharan Africa while 260 million people (39.22%) are in Asia (JMP and USBC 2015).

Sub-Saharan Africa has the largest population without access to safe water. Millions of people in rural communities and poor urban centers throughout this region suffer from lack of clean, safe water (The Water Project, 2015). Safe drinking water provision in rural areas of Africa and Asia is a major challenge.

According to the latest estimation of WHO/UNICEF joint monitoring program (JMP 2015 report) 5.9 million children under five die annually from all causes. Among these, diarrheal disease is the third leading cause of death among children under five and more than 340,000 children under five die annually from diarrhea diseases due to poor sanitation and hygiene, or unsafe drinking water – that is almost 1,000 per day. In addition to this 161 million children suffer from stunting, or chronic malnutrition, which has been linked to WASH and particularly open defecation.

Also World Health Organization report indicated that 1.6 million deaths per year are attributed to the use of unsafe water[14]. To alleviate the problem WHO, estimation indicate 75 liters of water a day is necessary to protect against household diseases and 50 liters a day necessary for basic family sanitation. The universal access plan (UAP) specifies 15 liters per capita per day within 1.5KM distance for rural population. Access is defined as the availability of at least 20 liters of water per person per day from an improved water source within a distance of 1 km[13].

In Ethiopia eighty-four percent of the population lives in rural areas and depends on subsistence farming. According to (JMP 2015 report) only 54% of the population has access to drinking water, in spite of the large number of water resources available in the country. Though the problem is high earlier studies conducted on water supply and sanitation both at international and national levels focused mainly on big cities.

Dera is one of the major focuses of many NGOs to implement WASH issues in the region. But public action (government policies, donor or NGO interventions) may have a positive or negative impact on water supply, access, utilization or risks. To ensure whether the communities are successfully secured the domestic water demand or not this situation necessitated research work to look at the issues in the area closely and deeply in order to give clear description of the problems for GOs and NGOs who are implementing water supply projects in the woreda.

Therefore, the aim of this study was to assess house hold water insecurity and its associated factors in Dera woreda, south Gondar zone, Ethiopia.

1.3. SIGNIFICANCE OF THE STUDY

Since the research focuses on assessing household water insecurity and associated factors in Dera woreda, it is expected to increase the knowledge and up to date information on the magnitude of water insecurity and its associated factors at household level. It will also serve as a working document to policy makers in the water sector, the nongovernmental organizations (NGOs) and the community. The findings may be also useful to the Woreda in making informed decisions related to water supply in the future. The study will further serve as baseline data for any further investigation, as a useful material for academic purposes, and as an added literature to the existing knowledge.

2. LITERATURE REVIEW

2.1. Level of water insecurity

Water insecurity is a lack of access by all people, at all time, to adequate water for an active and healthy lifestyle[15]. Like food insecurity, water insecurity may differ at the community, household, and individual level[5]. However, (UN-Water 2013) asserts that water security is an essential component of human security and addressing it in the developing world can contribute to long-term governance stability. On the contrary the problem of water shortage is not just a local, provincial, or national phenomenon but a global issue that affects individuals, industries as well as the economies at large. Due to this Worldwide, 663 million people lack access to safe water although there is regional variation. The populations without access to safe drinking water are mainly in Sub-Sahara Africa and Asia accounting for 84.33% of total. Of the 663 million people, 319 million people (51.88%) are in Sub-Saharan Africa while 260 million people (39.22%) are in Asia (JMP and USBC 2015 report). Sub-Sahara Africa has the largest population without access to safe water. Millions of people in rural communities and poor urban centers throughout this region suffer from lack of clean, safe water (The Water Project, 2015).

Also the long-term sustainability of water, sanitation, and hygiene (WASH) interventions is widely recognized as a complex and persistent challenge facing communities, governments, and international development partners alike. These entities have collectively invested billions of dollars in interventions over the past decades, resulting in tens of millions of unserved people gaining new access to improved water supply and sanitation infrastructure. However, it is also commonly acknowledged that a significant proportion of those who are “served,” rather than “unserved,” also can experience major failings in access, sometimes within a few short years[16]. Because the water may be seasonally unreliable, far from homes, expensive, and provide insufficient quantity[4].

In addition to these as the Rural Water Supply Network (RWSN 2010) indicates an average rate of 36% non-functionality for hand-pumps is in sub-Saharan Africa. Safe drinking water provision is a major challenge in rural areas of Africa. As a result according to the latest estimation of WHO/UNICEF joint monitoring program (JMP 2015 report) 5.9 million children under five die annually from all causes. Among these, diarrheal disease is the third leading cause of death among children under five and more than 340,000 children under five die annually from diarrhea diseases

due to poor sanitation and hygiene, or unsafe drinking water – that is almost 1,000 per day. Also 1.6 million deaths per year are attributed to the use of unsafe water[14]. In addition women and men in rural areas are differently affected by water insecurity. In many contexts, women are disproportionately negatively affected by water insecurity associated with climate variability[17].

Therefore, as population increases and development calls for increased allocations of groundwater and surface water for the domestic, agriculture and industrial sectors, the pressure on water resources intensifies, leading to tensions, conflicts among users, and excessive pressure on the environment. The increasing stress on freshwater resources brought about by ever rising demand. Hence, to address the problem WaSH, and water security for the home, is a key part of helping women, and men, gain health and productive opportunities[17].

But more Water' is "Not Enough" if household water security is defined as 'access by all individuals at all times to sufficient, safe water for a healthy and productive life and sustainable livelihood', then the concept incorporates elements relating not only to water supply but also access, water quality (minimum thresholds of purity or absence of contaminants/pollutants), and the minimization of water-related risks (to health and livelihoods). These elements can be grouped under three main headings: Availability, Access, and Usage. Without access to a minimum of 15 to 20 liters of safe water per person per day, a household faces serious risks. Unsafe water, sanitation and hygiene together represent the 6th highest risk factor in relation to the global burden of disease—but in developing countries with high mortality rates water problems jump to 3rd in the list of risks to health[1]. So Water is critical in sustaining life, crucial to economic growth, social development as well as environmental sustainability[18].The concept underlying the current water security definition is very comprehensive and too broad for an analysis of micro-level health outcomes. Water security, or access to water and control of water resources, is dependent upon a sense of security and beliefs at the individual level, which can be assured through recognition of the human right to water and sanitation.

The burden of Diarrheal disease is also the major challenge for Ethiopia due to poor accessibility of water infrastructure. The situation also aggravated by the frequent occurrence of drought. In Amhara region despite huge investments over the years in the water and sanitation sector by Government and non-government organizations, millions of rural poor communities still remain without adequate water supply and lack improved sanitation services. Even in the country at large

numerous schemes have been planned and implemented, only a proportion of these schemes continue to provide water to the communities that they were intended to serve[12].

Regarding the water quality a study in Ethiopia, Nicaragua, Jordan, Nigeria and Tajikistan in which they analyzed the water quality of improved water sources in order to estimate the proportion of improved water sources that could be considered safe for drinking. After testing the improved sources for water quality compliance, they found that the proportion of the population that had access to a “safe” water source (i.e., not just improved) fell by 11 percent, 16 percent, 15 percent and 7 percent in Ethiopia, Nicaragua, Nigeria and Tajikistan respectively. Thus, they showed that using only access to “protected water sources” as a criterion can lead to substantial overestimation of the proportion of people with access to safe water[15]. Also another study conducted in Ethiopia to assess household water insecurity and women’s psychological distress in South Wollo and South Gondar Zone (Amhara region), Ethiopia, results indicated that household water insecurity was associated with women’s psychological distress[4]

2.2. Factors affecting water security

Factors which affect household water security can either be manmade, that is, as a result of inappropriate policies and programme or can emanate from the forces of nature. Both manmade and natural factors can interact to affect water security. When these factors interact and threaten households and their individual members they pose an existential threat if not well addressed through effective policies, strategies and plans[19]. Therefore to address the problem the notion of water security is increasingly being used to present a holistic approach that includes physical, social, economic and environmental factors[20].

2.3. Physical and demographic factors

One of the factors, which affect the use of water within each household, is the physical distance of housing units from the water point. Large distance involves considerable energy and time expenditure, which limits the frequency of fetching and the size of containers and hence reduces the per capital daily water consumption[21]. A study made by Mesert in Simada district in Ethiopia suggest that the per capita water use is negative and significantly determined by the distance of water source from the households (i.e. keeping other factors constant, as the distance of water source from a household increases), the per capita water use significantly decreases. This implies that water facilities should be accessible to all segments of the population to better satisfy daily water requirement of residents. It also shows that convince of location of water source is a

significant determinant of water use at household level. This means that households located nearer to water source are likely to use more than others located farther away[21]. In dealing with the demographic factors like age and sex, Desalegn suggested that a one unit increase in age (one year) the daily per capita consumption decreases. In terms of sex female headed households will have lower per capita daily water consumption than the male headed households[22]

2.4. Socio economic factors

Among the enormous socio-economic factor that affect household waters consumption pattern the most significant one's are household size, household income, and level of education, monthly expenditure of a household and profession of a household head

A. Household size and level of education

When there is an increase in household size, the probability of collecting more water for large household size than individual household. As a result there is a positive relationship between household size and total consumption. However, the per capita water consumption decreases with an increase in household size. When considering the supply necessary to meet the needs of large family, there is a problem of access and adequacy. This implies that there is a negative relationship between household size and per capita daily water consumption[21]. Further investigation of data shows that as household size increases, the amount of water used per day significantly decreases. This suggest that although larger households increase the frequency of travel per day to water sources they still are not able to increase the available water at the house hold enough to satisfy the daily requirement of their individual hose hold members.

The significant decrease in per capita daily water use because of additional household members might be explained by the fact that available water at house hold level is limited by the factor such as distance and waiting time at the water source. Thus additional members share this limited amount clearly reducing per capital daily water use[21]. The educational level of a house head is positively related with the per capita daily water consumption. Households with less educated head consume less water than a house hold whose head is more educated. This is because the higher the educational level of ahead of family, the higher the awareness about the benefits that could be gained from water[21].

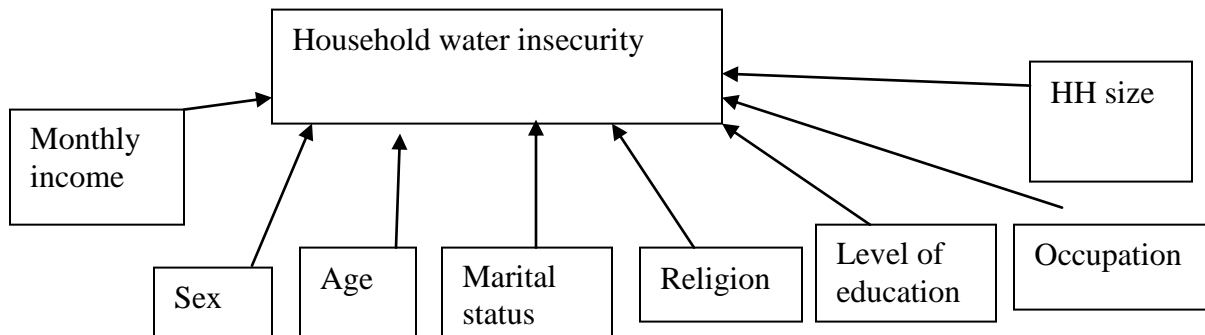
B. Household income and monthly expenditure

A study revealed that there is a positive relationship between monthly income and per capital daily water consumption. This result confirms with economic theory which states that an individual's

demand for a particular commodity depends on his/her income and quantity demanded are positively related, except in the case of inferior goods. The result of the survey shows that higher income groups have higher per capital daily water consumption than lower income group[21].

Monthly expenditure of a house hold was found to have a positive relation with the per capita daily water consumption of house hold because family members of better household are more likely to have frequent bath, showering, frequent washes of cloth and more water for cooking as compared with worse off house hold taking in to consideration the household life style and sanitation preference of better- off house hold[22].

3. CONCEPTUAL FRAMEWORK OF THE STUDY



According to the literature reviewed household water insecurity depends on Demographic factors (Age, Sex, Marital status, religion and occupation) and Socio-economic factors (HH size, Level of education, Monthly income), Quantity of water (HH consumption), Accessibility of water and Quality of water. Hence, this study was conducted to determine the extent of household water insecurity and identify factors associated with household water insecurity in Dera Woreda.

4. OBJECTIVE

4.1. General Objective

To assess household water insecurity and its associated factors in Dera woreda, south Gondar Zone, Amhara region, Ethiopia.

4.2. Specific Objectives

- To determine the level of household water insecurity in Dera woreda
- To identify factors associated with household water insecurity in Dera woreda

5. METHODS AND MATERIALS

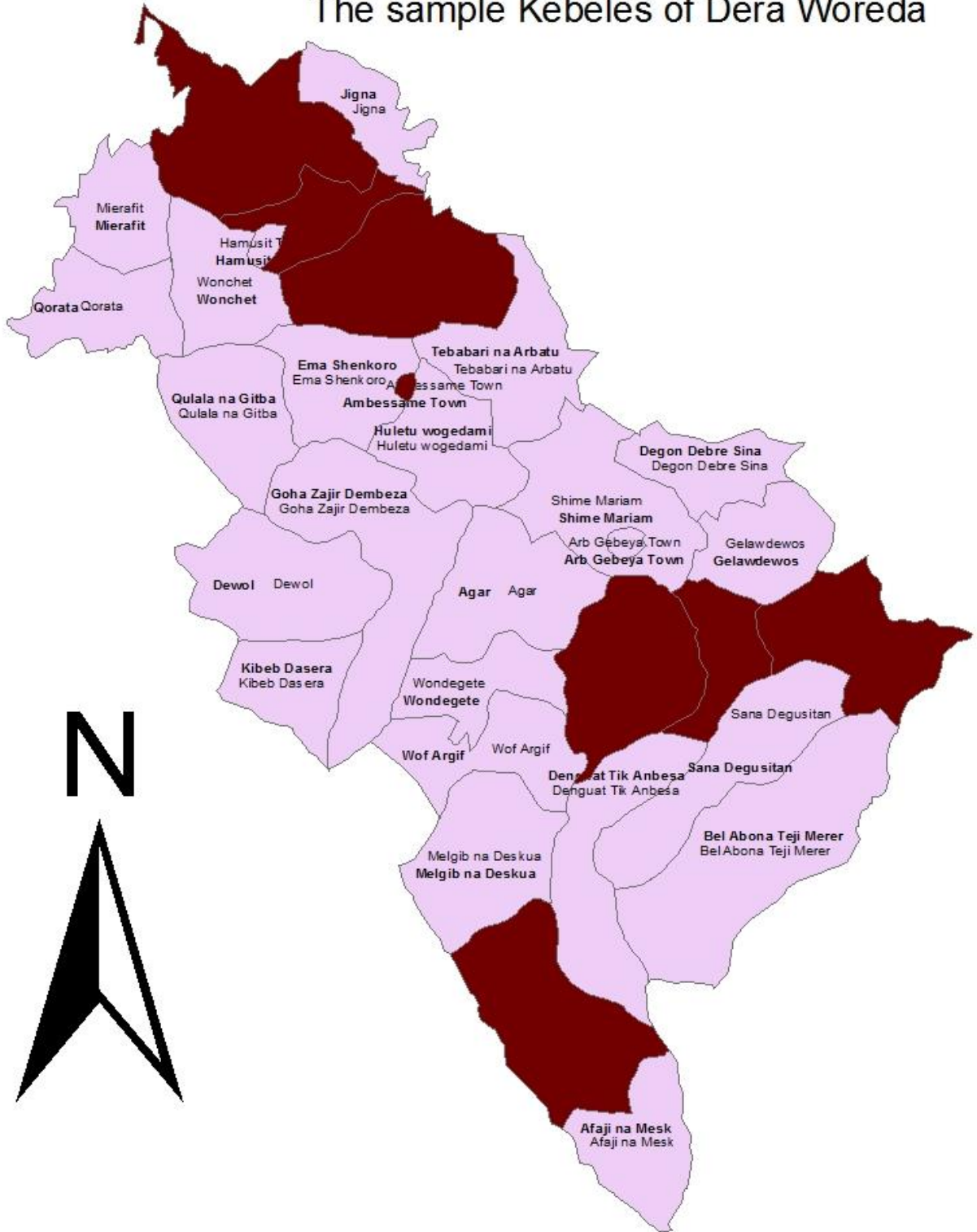
5.1. Study Area

The study is carried out in Dera woreda one of the 14 woredas of in South Gondar Zone in the Amhara Region, Ethiopia .It is bordered on the south by the Abay River which separates it from the West Gojjam Zone, on the west by Lake Tana, on the north by Fogera, on the northeast by East Este, and on the east by West Este. It has a land area of 1,497 square kilometers, subdivided into 29 rural and 3 urban kebeles. About ninety percent of the woreda's population lives in rural areas earning their livelihood from mixed crop and livestock agriculture. Dera woreda is located within the altitudinal range of 1500-2300 above sea-level. Climatically, Dera woreda falls into two climatic zones known as "Dega" and "Woyina-dega" (85 % of the Woreda falls woinadega). It receives a mean annual rain fall of 1001-1600mm which puts it among the relatively moisture sufficient woredas in the country[23].

According to Amhara region bureau of finance and economy report Dera woreda has a total population of 286,708, of which 142,403 were male and 144,305 were female. From the total population 260,938 living in the rural kebeles of which 131225 are females and the rest 25,770 are in the town (13086 females).

According to 2016 Dera woreda water, irrigation and energy office report the water coverage of the Woreda is 59.31 % of which 61.01in rural and 42.31 % in the town. Non-governmental organizations which are working in Dera woreda in the water sector are organization for Amhara rehabilitation and development (ORDA), World Vision, Helvetas, Care and community managed project (CMP).

The sample Kebeles of Dera Woreda



5.2. Study design

The study design was community-based cross-sectional study employed from March to June 2017 to assess household water insecurity and associated factors in Dera woreda, South Gonder Zone, Ethiopia. The study carried out in Dera woreda on 640 households. Out of 32 kebeles (lowest administrative units) in the district, 8 kebeles were selected randomly. Then from 8 kebeles, 640 households were selected by using systematic random sampling. Data were collected using pretested structured questionnaire by trained data collectors.

The tool was a structured household survey, administered by trained enumerators, to assess household demographics, socioeconomic variables and household water insecurity issues. Water insecurity items in the water insecurity scale were assembled by pooling reported experiences of water insecurity derived from free-lists and carried out in Dera woreda South Gondar (Amhara Region, Ethiopia) in 2017. The scale addressed water access, adequacy, safety, and lifestyle factors (Table 2). It comprised 18 yes/no questions divided into four broad themes: perceived safety and sufficiency of water supply (e.g., ‘In the last 30 days did you or anyone in your household drink water that you thought might not be safe for health?’), obstacles to water access, social tension related to water, and thirst (e.g., ‘Did you or anyone in your household go to sleep thirsty because there was not enough water?’). ‘Yes’ answers were coded as 1, and ‘no’ answers as 0.

5.3 Study population and Selection

All households in the district were source population. We studied households selected from specific chosen Kebeles. Thus, from 32 kebeles in the study district, 8 kebeles were selected by using simple random sampling technique. Then from 8 kebeles, 640 households were selected using systematic random sampling technique.

Inclusion and exclusion criteria

All households in the selected units of the district which had household head able to talk were included. Those with household heads who were unable to communicate for different reasons (seriously ill, mental problems) were excluded

5.4. Sample size determination

Single population proportion formula was used to determine the sample size using the following assumptions: proportion of water insecurity (P=50%) since there is no previous study, 95% confidence interval, Z value = (1.96), margin of error (d=0.05), and design effect of 1.5. By considering 10% non-response rate might be due to inconvenience, work load and lack of interest, the final sample size is 640HHs.

$$n = \frac{(Z_{\alpha/2})^2 \cdot P(1-P)}{d^2}$$

$$n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 640 \text{ households}$$

5.5. Sampling procedure

Data were collected using pretested and structured questioners including 28-h water insecurity recall questions. Of 640 supposed study participants. The tool was pretested on 32 households in none selected HHs before survey for validation. Data were collected by face-to-face interview of household head at his/her home by trained enumerators .Supervisors monitored data collection process daily and corrected errors at field. Before departure from the site kenbeles, questionnaires were checked critically for completeness and consistency by supervisors. To select sample kebeles multistage sampling was used. From the total of 32 Kebeles (29 rural and 3 urban) the study covered 25% of Dera woreda kebeles. To select the sample kebele first kebeles were divided in to urban and rural in order to avoid bias since there is clear difference in water supply. After this seven rural kebeles and one urban Kebles (totally 8 Kebles) were selected using a simple random sampling technique. To make the sample representative cluster sampling was also used ie Dega, Woina dega and Kolla and the seven kebeles are randomly selected from each zone proportionally Each household was selected using systematic random sampling proportionally. First, the total numbers of households were known, then the amount of sample required calculated proportionally.

As a result, the number of households was 80 in Mecho, 51 in Ambesami, Mitsli 105, 77 in Zara, 114 in Gedamgeregera, 74 in Mehatsedewoin 54 in Wotmera, and 85 in Derebawochit.

5.6. Method of Data Collection

Data were collected using interviewer administered structured questionnaire. The questionnaire comprised questions on socio-demographic and economic characteristics, source of water, quantity, and household water security like availability, usage, accessibility and domestic water demand. Structured questioners was employed to collect primary data from the household heads.

5.7. Data quality control

The questionnaire was first prepared in English and translated into Amharic then translated back to English to ensure consistency of the question by different persons. Before survey for validation pre-test was conducted on 32 HHs to check the understandability of the household questionnaire and accordingly some adjustment of the questions was made. Eight data collectors were recruited for data collection. Training was offered to data collectors. Day to day monitoring was held by the principal supervisor.

5.8. Data processing and analysis

Data were entered SPSS version 20.0 for cleaning and analysis. All descriptive statistics were carried out through univariate analysis for each variable. Binary logistic regression was applied to examine the association of a single variable with water insecurity (outcome). Then after, multivariable logistic regression was carried out to identify predictors of water insecurity. Finally, adjusted odds ratio (AOR) at 95% CI was used as effect measure for measuring association of predictor variables and outcome controlling for potential confounders

5.9. Study variables

5.9.1 Independent variables

- ✓ Socio-demographic factors such as Age, Sex, Marital status, religion , occupation, HH size, Level of education, and Monthly income

5.9.2 Dependent variable/Outcome variable

Household water insecurity

5.10 Operational definition

Households with ‘Yes’ response to at least one of 1–19 items listed here based on household head interview were classified water insecure. These items include (1) ‘Worry about not having enough water,’ (1) ‘Unable to cook food because of water shortage,’ (4) ‘ not collect water when they need,’ (8) ‘go to sleep thirsty,’ (16) ‘go the whole day thirsty,’ (17) and others.

Kebele: The lowest government administrative hierarchy

Household water security: water security is access by all individuals at all times to sufficient safe water for a healthy and productive life

Household water insecurity is :- defined as ‘‘inadequate, unreliable, and unaffordable water for a healthy life

Household water insecurity was measured using composite variables from different dimensions :-

Quantity:- The amount of water required for the family members a minimum of 20 l/c/day

Accessibility: Water services must be accessible to everyone in the household or its vicinity on a continuous basis.

Water Quality: Water has to be safe for consumption and other uses, so that it is no threat to human health

5.11. Ethical consideration

A letter of ethical clearance was obtained from Bahir Dar University, college of medicine and health science, department of public health Ethical clearance committee. Written consent was asked from South Gonder Health department, Dera woreda health office and Kebele leaders. Additionally, an informed verbal consent was obtained from each study subjects. Respondents name was indicated on the questionnaires for confidentiality purpose, and interviews were made at house to house.

5.12. Dissemination of results

Result of the study will be disseminated to Dera woreda water, mine and energy office, South Gondar zone water office, the Regional Water Bureau, other relevant organizations working on WASH program and the community. In addition, efforts were made for the publication of the result in well-known journals.

6. RESULTS

6.1. Socio demographic characteristics

The edited data was coded and manually entered in to Statistical Package for Social Science (SPSS) version 20 computer software to analyze the data. Therefore according to the result of this

study a total of 638 household heads were participated in this study, which made the response rate 99.7%. With regard to the age 254(39.81%) between the age of 45 and 64 years, 203(31.82%) between the age of 36 and 44 years, 154(23.82%) between the age of 18 and 35 years and 29(4.55%) of the respondents were above 65 years. The marital status of the respondents were 548 (85.89%) married, 41(6.43%) divorced, 38(5.96%) widowed and 11(1.72%) single. The family size of the respondents were also 185(29%) less than or equal to three, 313(49.06%) between 4 and six and 140(21.94%) were above 6.

The education level of the respondents explained that 438(68.65%) had no formal education or unable to read and write, 154 (24.14%) were able to read and write, 21 (3.29%) above grade 12, 20 (3.13%) primary school completed and 5(0.78%) secondary school completed. With regard to religion 626(98.12%) orthodox, 9(1.41%) Muslim, 2 (0.31%) catholic and 1(0.16%) protestant. Occupation of the respondents explained those 588 (92.16%) farmers, 21(3.29%) civil servants, 15 (2.35%) merchants, 5(0.78%) NGO employee and 4(0.63%) daily laborers .With regard to the residence 566(88.85%) rural, 45(7.05%) urban and 27(4.24%) semi-urban. And finally the monthly income of the respondents showed that 382(59.87%) of the respondents monthly income was < 100 ET birr, 153(23.98%) 1000-2000, 60 (9.40%) 2001-3000 and 43(6.74%) was >3000ETHbirr (Table 1)

Table 1 Socio demographic characteristics of households at Dera Woreda (*N* = 638)

Characteristics	N (%)
<i>Sex of household heads</i>	
Male	304(47.65)
Female	334(52.35)
<i>Age distribution of household heads (years)</i>	
18–35	152 (23.82)
36–44	203 (31.82)
45–64	254 (39.81)
65 and above	29 (4.55)
<i>Marital status of household heads</i>	
Married	548 (85.89)
Single	11(1.72)
Divorced	41(6.43)
Widowed	38(5.96)
<i>Educational status of household heads</i>	
Literate	154(24.14)
Illiterate	438(68.65)
Primary school completed	20(3.13)
Secondary school completed	5(0.78)
12 and above	21(3.29)
<i>Household or family size</i>	
Less or equal to 3	185(29)
4 -6	313(49.06)
Above 6	140(21.94)
<i>Religion</i>	
<i>Orthodox</i>	626(98.12)
<i>Catholic</i>	2(0.31)
<i>Muslim</i>	9(1.41)
<i>Protestant</i>	1(0.16)
<i>Occupation</i>	
<i>Civil servant</i>	21(3.29)
<i>NGO worker</i>	5(0.78)
<i>Farmer</i>	588(92.16)
<i>Merchant</i>	15(2.35)
<i>Daily laborer</i>	5(0.78)
<i>Others</i>	4(0.63)
<i>Residence</i>	
<i>Rural</i>	566(88.85)
<i>Urban</i>	45(7.05)
<i>Semi-urban</i>	27(4.24)
<i>Income category</i>	
<100	382(59.87)
1000-2000	153(23.98)
2001-3000	60(9.40)

>3000	43(6.74)
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6.2. Level of water insecurity

The level of water insecurity as measured using composite variables was 91.8% (95%CI 90 to 94%). Based on the finding of this study, the proportion of households gave affirmative response to worrying not having enough water for all household needs were 609(95.45%). Households reported experiencing taking water from neighbor and the other family members took water from the interviewed households vice versa because of water shortage were 594(93.10%) and 587(92.01%) respectively. Also households thought that the water they drink might not be safe for health and the households collect water from un desirable source or dirty source were 579(90.75%) and 596(93.42%) respectively(Table 2)

Table 2: Distribution of responses to Household water insecurity and associated factors questions at Dera woreda (N = 638)

HH water insecurity and associated factors questions/indicators/	Occurrence	
	Yes No(%)	No No(%)
Worried households		
Households perceived safety and sufficiency of water supply		
In the past 30 days worried households because of that not have enough water for all of your household needs	609(95.45)	29(4.55)
In the past 30 days the amount of water reduced For drinking because of no enough water	559(87.62)	79(12.38)
In the past 30 days the amount of water reduced For cooking because of no enough water	558(87.46)	80(12.54)
In the past 30 days the amount of water reduced For making tella(home brewed beer)/coffee because of no enough water	556(87.15)	82(12.85)
In the past 30 days the amount of water reduced For planting and watering vegetables because of water shortage	416(65.20)	222(34.80)
In the past 30 days the amount of water reduced For watering crops because of water shortage	380(59.56)	258(40.44)
In the past 30 days the amount of water reduced for watering animals because of water shortage	428(67.08)	210(32.92)

In the past 30 days the amount of water reduced For washing utensils because of water shortage	524(82.13)	114(17.87)
In the past 30 days the amount of water reduced For bathing because of water shortage	557(87.30)	81(12.70)
In the past 30 days the amount of water reduced For washing hands because of water shortage	539(84.48)	99(15.52)
In the past 30 days the amount of water reduced For washing before prayer because of water shortage	539(84.48)	99(15.52)
In the past 30 days the amount of water reduced For washing clothes because of water shortage	507(79.47)	131(20.53)
In the past 30 days the amount of water reduced For cleaning the house/for plastering floor using cow dung because of water shortage	503(78.84)	135(21.16)
In the past 30 days fetching water from unimproved source(unprotected spring, unprotected wells rivers)	10(7.3)	128(92.7)
In the past 30 days household drink water that might not be safe for health	579(90.75)	59(9.25)
In the past 30 days member of your household collect water from an undesirable or dirty source because of not collect from preferred source	596(93.42)	42(6.58)
In the past 30 days member of households not cook a desirable food because there was not enough water	268(42.01)	370(57.99)
In the past 30 days household members take water from a neighbor because of water shortage	594(93.10)	44(6.90)
In the past 30 days member of other family members take water from interviewed house because of shortage	587(92.01)	51(7.99)
In the past 30 days male school children go to school late or stay home from school to help with water collection	230(36.05)	408(63.95)
In the past 30 days female school children go to school late or stay home from school to help with water collection	225(35.27)	413(64.73)
In the past 30 days household members sleep very few hours because they wake up very early in the morning to go for collecting water	496(77.74)	142(22.26)
In the past 30 days household members unable to complete all of the work due to water collection	514(80.56)	124(19.44)
In the past 30 days household members go a whole day without	122(19.12)	516(80.88)

drinking water because there was not enough water		
In the past 30 days household members go to sleep thirsty , because there was not enough water	164(25.71)	474(74.29)
Social tension related to water		
In the past 30 days household members that had a quarrel with a neighbor or other person related to collect water	499(78.21)	139(21.79)
in the past 30 days married households that had a quarrel with spouse about the water needs of your household	323(50.63)	315(49.37)
In the past 30 days married households that had a quarrel with spouse about not completing daily work	303(47.49)	335(52.51)
In the past 30 days household members not participate in church/mosque, not call on someone who was ill, or not attend a funeral, wedding, or community meeting when you wanted to because of water collection duties	221(34.64)	417(65.36)

As the result of this study indicated among the reasons that households did not collect water when they wanted to were due to take too long to wait at the source or queue long was higher 422(66.14%) followed by no enough water at the source 383(60.03%) were the two major reasons compared to others(Table 3)

Table.3 Factors that prevents the household to collect enough water at Dera woreda

	Reasons for not collecting enough	Yes NO (%)	No NO(%)
1	It was too far	300(47.02)	338(52.98)
2	It was too risky	119(18.65)	519(81.35)
3	Takes too long to wait at the source	422(66.14)	216(33.86)
4	No enough water at the source	383(60.03)	255(39.97)
5	It was too sick or weak to collect water	172(26.96)	466(73.04)

6.3. Factors associated with water insecurity

Bivariate analyses were carried out to select candidate variables for multivariable analysis. Based on set criteria, the socio-demographic factors had no statistically significant association with household water insecurity. (Table 4)

Table 4:- Predictors of household water insecurity at Dera woreda, 2017 (N= 638)

variables	Household water insecurity status		AOR (95% CI)
	Yes (586)	No (52)	
Male	278	26	1.00
Female	308	26	1.26(0.67, 2.37)
<i>Age (years)</i>			
18–35	141	11	1.00

36–44	185	18	0.84 (0.37,1.92)
≥ 45	260	23	1.05(0.47,2.36)
<u>Education status</u>			
Illiterate	398	40	1.00
Literate	188	12	1.54 (0.77,3.08)
<u>Marital status</u>			
Married	504	44	1.00
Single/divorced/widowed	82	8	0.92(0.38,2.26)
<u>Family size</u>			
≤ 3	167	18	1.00
4-6	297	16	2.10(1.00, 4.41)
≥ 6	122	18	0.73(0.34,1.58)
<u>Family income</u>			
<1000	348	11	1.00
1000-2000	141	18	1.06(0.52,2.13)
≥ 2001	97	23	1.76(0.70,4.47)

In binary logistic regression, socio-demographical variables did not show significant association with household water insecurity. ”^{[15].[24]}

7. DISCUSSION

This study assessed the magnitude of household water insecurity and associated factors at Dera woreda. The household water insecurity measurement revealed that (92.0%) of households were water in secured in Dera woreda which is higher than the finding in Mexico at El Paso County (33 %) , Hidalgo County (24 %) [25] and Ngamil in Botswana (74%) of the households experienced of water security problems [26] .A similar study conducted in Shinle and Konso revealed that the people living in the two Woredas were water in secured [27].The difference in the findings might be due to variation in study settings and data collection seasons. The relatively higher prevalence of household water insecurity in this study might be due to the data collection period, which was dry season in the area. This might have overestimated the magnitude of the problem. Thus, seasonal data with repeated surveys may give better evidence.

Based on household water insecurity and associated factors questions, the findings revealed that 95.45% of households worried because of that not have enough water for all of the household needs. 93.10% said that household members take water from a neighbor because of water shortage,77.74% said that household members sleep very few hours because they wake up very early in the morning to go for collecting water,19.12% household members go a whole day without drinking water because there was not enough water and 25.71% said that household members go to sleep thirsty .The inadequate water supply trend of the households is because of take too long to wait at the source , no enough water at the source ,travelling long distances and seasonal variation of ground water were some factors contributed for the water security problem. In addition to these reasons population growth, geographical location of the woreda, the large area covered by the woreda and the sustainability problems of the constructed water schemes in the woreda might be additional factors.

According to the world water forum report, in Africa the cost of water insecurity is very high and weak governance and lack of finance (highly linked) are at the core. Huge investment is needed for infrastructure with public finance taking the lead. Africa has recently shown significant economic growth but water insecurity is changing faster with increased risks from climate change.

Another study conducted in Amhara showed that , 48% of the people have no access to improved water source[28].Besides to that, 62 percent of the Amhara women interviewed admit to using

unprotected water sources for drinking during the rainy seasons, and 64 percent confess to taking this health risk in the dry seasons. In the rural village of Qoma, Ethiopia, 98 percent use unprotected water, taking an immense health risk with each sip[29]. On top of that a study conducted in Dera woreda revealed that (15.4%) of the rural community in Dera woreda were traveling more than 30 minutes to fetch water for their daily consumption. Also (20.4%) of the rural community and (20.9%) the urban community in Dera woreda were also not getting water all year round. Besides as the study showed that the average daily water consumption of families was found to be 9.43 liters/person/day and 8.34 liters/person/day for urban and rural households, respectively[30]. But a study conducted in Aman-Jordan revealed that Households that consumed 10 to 15 liters per capita per day experienced 2.5 times more diarrhea than those that consumed more than 30 liters[8].

According to the result of this study though there has been progress towards ensuring household water security in the different kebeles of Dera woreda by accessing clean water through improved sources, households across the woreda experienced water security problems.

But the 2015 7th world water forum indicated that provision perspective, alongside human rights perspectives, highlights need to secure universal use of basic water and sanitation and simplifies the primary goal to 100% coverage. Also another study showed that the period up to 2015 is characterized by an attempt to increase the construction of more rural water sources, particularly from groundwater, and to keep up coverage for increasing urban populations by a mixture of in-household piped water and stand pipes[31]. Besides due to the great drinking water coverage disparity between the rural and urban population the national coverage of improved water source usage reached 57% still 43% of the total Ethiopian citizen's rely of unimproved drinking water sources. 51% of the rural population still depends on unimproved drinking water sources for day to day activities While a human rights perspective would suggest that such a pervasive inequality would merit remedy, debate often suggests higher service levels or standards for urban than rural areas. Also problem of maintenance of facilities is therefore of much greater importance than in 1990 .Therefore everywhere, use of 'improved sources' of drinking water is substantively lower in rural than urban populations. Globally, 81% of the rural population has such access, whereas the urban figure is 96%; in sub-Saharan Africa, these figures are 49% and 83%, respectively [32]. .

Regarding water quality though laboratorial analysis was not conducted to assess the water quality in the study kebeles, majority of the respondents thought that the water which they drink might not be safe for health. To strengthen this idea as a study conducted in Ethiopia revealed that the inadequacies water supply affect health adversely both directly and indirectly, improvements in various aspects of water supply represent important opportunities to enhance public health In Ethiopia. In Ethiopia, water pollution due to fecal matter contamination and poor sanitation practice may be the major cause of the top ten leading causes of outpatient visit, hospital admission and death among children and elderly. Typhoid Fever alone is responsible for 1,205,970 inpatient and outpatient cases throughout the country in the last 5 years. The quality and quantity of water supplied has role in reducing or increasing the possibility of water related diseases. Some drinking water microbial studies revealed that the microbial quality of improved and or protected drinking water supplies have been proven positive for total coli forms and fecal coliforms. For instance at national level microbial water quality that is used by people have been contaminated from a range between 14.4% to 87.5%% with fecal coliforms. Specifically drinking water samples from different regions of Ethiopia shows 28.6%-84.3% in Amhara region, 17%-87.5% in Oromia region, 25%-85.7% in Southern Nation Nationalities regional state, 83.3% in Dire Dawa were positive for indicator organism (total coliforms and fecal coliforms) that indicates the possibility drinking water has been contaminated by faces or presence of waterborne pathogens. Microbial contamination can be highly variable in time and space, and occasional testing can miss important risks. This shows that providing treated or protected water will not be enough to reduce the contamination level rather inadequate volumes of water (quantity) may result poor hygiene practices and therefore water quantity is also important in controlling infectious diarrheal diseases. The reduction of morbidity and mortality from infectious diarrheal diseases requires improvements in the quality and availability (quantity) of water, excreta disposal and general personal and environmental hygiene[32].

Regarding to the school children go to school late or stay home from school to help with water collection as a study conducted in 70 Amhara women, 18.5 percent admitted they have kept a girl home from school to assist with water collection. However, the distance barrier is only so strong and will not stop a human from satisfying their physiological need for water—no matter how strenuous the journey is to a source. With increased accessibility to water, it would take each

woman less retrieval time and suffer fewer opportunity costs. As a result, these women would not take away something almost as valuable as quenching their thirst—a young girl’s education[35].

Regarding to the households unable to complete all the work due to water collection as a studies revealed that the time and labour requirements to access water often compete with those of other household activities and in particular agricultural labour, Therefore, people were reducing farm work in favor of water collection. Women are primarily responsible for water collection. Some households emphasized that they miss their farm work repeatedly, and the constant demands of water collection leave little opportunity to compensate for lost labour inputs at a later date. As a result, the cumulative impacts can be serious[27].

Also the study showed that household members quarreled with neighbor or other persons related to collect water; women reported occasional minor conflicts in queues for water points, mainly occurring when somebody is seen to jump the queue. These were mostly not said to be serious, but in the rare event of escalation it is regarded as the role of men in the community to resolve them.

8. Limitation of the study

Households’ experiences for nineteen very commonly seen features of water insecurity in the last 4 weeks were interviewed. Therefore, recall bias expected though small. The cross-sectional nature of our design makes arguments on association weaker, but the study used assumptions for higher sample size. Also the study was limited to Dera woreda residents. The study tried to only measure the perception of Dera woreda residents against water accessibility, quantity and quality. Much of the data came from self-reporting, often concerning quantities, accessibilities and quality according to the community perception that cannot be cross-referenced. Besides some of the water schemes were not giving services for the community outside of the home periodically or seasonally due to a broken pump handle, low yield water supply during excavation, disputes between neighbors, and climatic factors during our studies.

9. CONCLUSION AND RECOMMENDATION

9.1. Conclusion

The findings of this study revealed a considerable proportion of households were water insecure at Dera district. The Socio-demographic factors such as sex, age, religion level of education, family size and household incomes had no significant association with household water insecurity in the study area. Households with severe water insecurity need urgent response to reduce the prevalence of water related diseases that occurred due to unsafe water supply in the woreda. Moreover, intervention measures should focus to address remote kebeles suffered from water insecurity problems based on evidences of the study findings. HWI methods are currently dominated by measures of water quality, quantity, sources, and affordability but further researches with broader scope were recommended to evaluate water quality issues both at the source and at point of use in the woreda as well as household water insecurity challenges related to economic, socio-cultural, and political dynamics.

9.2. Recommendation

- Water supply intervention program should consider the remote and hard to reach kebele's
- The woreda should ensure hand dug well excavation for the maximum water yield and adequate water supply to the community throughout the year.
- The woreda should give an emphasis to take an immediate actions on the functionality of community water supply
- Special intervention strategy should be designed to improve the household water security problems
- The woreda should give emphasis for Water quality monitoring both at the source and at point of use

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11. ANNEX

Annex 1: Questioner (English version)

Household Water Insecurity and Associated factors Research questioner to be conducted in Dera woreda South Gonder zone

Hello, my name is _____I Came from Bahir Dar university. I am conducting a research on household water insecurity In Dera woreda particularly in this kebele and village. Your household has been randomly chosen to participate in this study. The survey is a confidential exercise and your name will not be disclosed anywhere. Please feel free to answer these questions as they will help in future to show the water security gaps of the village or the kebele as a whole for the concerned body. Would you be willing to have a discussion with me?

1 Socioeconomic questions

S/N	Question	Response
1	Name of Interviewee----- --	Kebele-----village-----
2	Sex	1 Male 2 Female
3	Age of respondent	-----
4	Marital status	1 Married 2 Unmarried 3 Divorced 4 Widowed
5	Household head	1 Male 2 Female
6	House hold size or number of families	1 Male 2 Female 3 Total
7	Education	1 Grade 1-8 2 Grade 9-12 3 Above grade 12 4 Read and write 5 Illiterate

8	Residential area	1 Urban 2 Rural
9	Religion	1 Orthodox 2 Muslim 3 Catholic 4 Protestant 5 Other specify
10	Occupation	1 Farmer 2 Tannery 3 Weaver 4 Civil servant 5 Daily laborer 6 Merchant 7 Blacksmith 8 Other specify
11	Income per month in ETB	_____

2 Water Insecurity questioner

S/N		Yes	No
1	In the past 30 days, did you worry that you would not have enough water for all of your household needs? (Quantity)		
2	In the past 30 days ,did you reduce the amount of water you used for -----because there Was not enough water or because it was too difficult to collect water? (instruments from 2a-2l in the blank) (quantity)		
2a	For drinking?		
2b	For cooking?		
2c	For making tella(home brewed beer)/coffee ?		
2d	For planting and watering vegetables?		
2e	For watering crops?		

2f	For watering cattle, sheep and goats?		
2g	For washing utensils?		
2h	For bathing?		
2i	For washing hands?		
2j	For washing before prayer?		
2k	For washing clothes?		
2l	For cleaning the house/for plastering floor using cow dung?		
3	In the past 30 days did you or any one in your household drink water that you thought might not be safe for health? (Water quality)		
4	In the past 30 days did you or someone in your household not cook a desirable food because there was not enough water? (quantity)		
5	If household contains male school- children in the past 30 days, did any boy children in your household, who is a student, go to school late or stay home from school to help with water collection? (Accessibility)		
6	If household contains female school- children in the past 30 days, did any girl children in your household, who is a student, go to school late or stay home from school to help with water collection? (Accessibility)		
7	In the past 30 days, did you or anyone else in your household sleep very few hours because they wake up very early in the morning to go for collecting water? (Accessibility)		
8	Within the past 30 days, was there any time that you or anyone else in your household did not collect water when you wanted to? if no; go to 9 :(Accessibility) if yes was it because----		
8a	It was too far away/takes too long to get there?		
8b	It was too risky/dangerous for life?		
8c	Takes too long to wait at source /queue to long?		
8d	Not enough water at the source?		

8e	Was to sick or weak to collect water?		
9	In the past 30 days did you or any family members fetch water from an improved source (unprotected spring or, unprotected wells or rivers?)		
10	In the past 30 days, did you or any member of your household collect water from an undesirable or dirty source because you could not collect from your preferred source? (Water quality)		
11	In the past 30 days, did you or anyone else in your household, because of a lack of water at home, take water from a neighbor? (quantity)		
12	In the past 30 days, did anyone who is not a member of your family take water from your house because of shortage? (quantity)		
13	In the past 30 days, were you or anyone in your household unable to complete all of your work due to water collection? (accessibility)		
14	In the past 30 days, have you or anyone else in your household had a quarrel with a neighbor or other person related to collect water? (accessibility)		
15	If married in the past 30 days, have you had a quarrel with your spouse about the water needs of your household? (accessibility)		
16	In the past 30 days, did you or anyone else in your household go to sleep thirsty, because there was not enough water? (quantity)		
17	In the past 30 days, did you or anyone else in your household go a whole day without drinking water because there was not enough water? (Accessibility)		
18	If married in the past 30 days, have you had a quarrel with your spouse about not completing daily work? (Accessibility)		
19	In the past 30 days, did you or anyone else in your household not participate in church/mosque, not call on someone who was ill, or not attend a funeral, wedding, or community meeting when you		

		4 ሁለተኛ ደረጃ ጽ/ቤት ጠናቀቀ 5 ከዚያ በላይ
7	ሀይማኖት	1 ኦርቶዶክስ 2 ካቶሊክ 3 እስላም 4 ፕሮቴስታንት 5 ሌላ ካለይገለጽ
8	ስራ	1 የመንግስት ሰራተኛ 2 መንግስታዊ ደረጃ ሰራተኛ 3 ገበሬ 4 ነጋዴ 5 የቀንሰ ሰራተኛ 6 ሌላ ከሆነ ይገለጽ
9	መኖሪያ ቦታ	1 ገጠር 2 ከተማ 3 የገጠር ከተማ
10	የቤተሰብ ወርገቢ	-----

2 የቤተሰብ ወጋጅ ሁኔታ መጠየቅ

ተቁ	ጥያቄ	መልስ	
		አዎ	አይደለም
1	ባለፉት 30 ቀን ትላቤት ወስን ጥፍጅታዊ ማህን ወሃ ጠፍቶ የተቸገሩ ሩብ ትጊዜ ነበር ?		
2	ባለፉት 30 ቀን ትበቂ ወሃ ባለ መኖሩ ምክንያት ወሃ ቆጥቶ ሆኖ የተጠቀሙ ሆስፒታል ከተዘረዘሩት ተግባራት ለየቱ ነበር ?		
2ሀ	ለመጠየቅ?		
2ለ	ለማሰባሰብ?		
2ሐ	ለጠላ መጥመቂያ /ለቡና ማፍያ?		
2መ	ለአትክልት መትከያ /ለአትክልት ማጠናቀቂያ?		
2ሠ	ለሰብላማ ማጠናቀቂያ?		
2ረ	ለእንስሳት ማጠናቀቂያ?		
2ሰ	ለዕቃ ማጠናቀቂያ /		
2ሸ	ለገላ መታጠቢያ?		
2ቀ	ለእጅ መታጠቢያ?		
2በ	ያለትከ ማድረግ በፊት ለመታጠብ?		
2ተ	ለልብስ ማጠናቀቂያ?		
2ቸ	ለቤት ማጽጃ ወይም ለቤት መላቀሻ ቀለቂያ?		

3	ባለፉት 30 ቀናት እርስዎ ወይም ሌላ የቤተሰብ አባላት ንጽህና ወካል ተጠባቂ ወይም ለጠፍ ጠንቅ ሊሆን ይችላል ብላችሁ ካሰባችሁት ወሃ የጠጣሰውን በር ?		
4	ባለፉት 30 ቀናት እርስዎ ወይም ሌላ የቤተሰብ አባል ለምሳሌ ጋጅት ፈልጎ ግን ወሃ ባለ ሞኖሩ ምክንያት ሳይዘጋጅ የቀረበት ጊዜን በር ?		
5	በቤት ውስጥ ጥት ምህርት የሚደረግ ድተማዎ ምን ዓይነት ለባለፉት 30 ቀናት በወሃ ችግር ምክንያት ወሃ ለመቅዳት አርፍዶ የሄደ ወይም ሌላ ቀን ከት ምህርት ቤት ሳይሄድ የቀረተ ማይን በር ?		
6	በቤት ውስጥ ጥት ምህርት የሚደረግ ሴትተማዎ ምን ዓይነት ለባለፉት 30 ቀናት በወሃ ችግር ምክንያት ወሃ ለመቅዳት አርፍዶ የሄደ ችግር ወይም ሌላ ቀን ከት ምህርት ቤት ሳይሄድ የቀረ ችተማይን በር ?		
7	ባለፉት 30 ቀናት እርስዎ ወይም ሌላ የቤተሰብ አባል ወሃ ለመቅዳት በሌሊት የተነሳሰውን በር ?		
8	ባለፉት 30 ቀናት ወሃ መቅዳት ፈልጎ ጋጅት ሆነ ወሃ ባለ ሞኖሩ ምክንያት ሳይቀዳብት የቀረ ጊዜን በር ? ከነ በር ምክንያቱ፡ -		
8ሀ	ወሃ የሚቀዳበት ስፍራ ሩቅ በመሆኑ ?		
8ለ	ለ መቅዳት አስጊ በመሆኑ ?		
8ሐ	ከፍተኛ ወረቀት በመኖሩ ?		
8መ	ከሚቀዳበት ቦታ በቂ ወሃ ባለ ሞኖሩ ምክንያት ?		
8ሠ	በህመም ወይም በድካም ምክንያት መቅዳት ስለልቻላችሁ ?		
9	ባለፉት 30 ቀናት እርስዎ ወይም ሌላ ማንኛውም የቤተሰብ አባል ካልተጠባቂ ምን ጭዕደ ምት ድን ድወይም ጥራት ወይም ምን ዝቀድታችሁ ታወቃላችሁ ;		
10	ባለፉት 30 ቀናት ውስጥ እርስዎ ወይም ሌላ የቤተሰብ አባል ትሐል ጊዜ የምትቀዳብት የ ወሃ ተቋም ችግር አጋጥሞት ከሌላ ንጽህና ወካል ተጠባቂ ምን ጭዕደ ምት ወይም ምን ዝቀድታችሁ ትጊዜን በር ?		
11	ባለፉት 30 ቀናት እርስዎ ወይም ሌላ የቤተሰብ አባል ወሃ ከቤት አቋርጦ ከጉረቤት አምጦታችሁ የተጠቀሙት ሆኑት ጊዜን በር ?		
12	ባለፉት 30 ቀናት ውስጥ ከቤቱ ወሃ አቋርጦት ከእናንተ ማንኛውም ጠይቆ የወሰደ ጉረቤታችሁ ነ በር ?		
13	ባለፉት 30 ቀናት ውስጥ ከቤተሰብ ሙሉ ከልሰራውን አቋርጦ ወሃ ለመቅዳት የሄደ		

	ነበር ?		
14	ባለፉት 30 ቀናት ወስጥ እርሰዎ ወይም ሌላ የቤተሰብ አባል የያዘውን ስራ አቋርጦ መላ ፍለጋ የሄደሰውን በር ?		
15	ያን በከሆነ ባለፉት 30 ቀናት በቤት ወስጥ ወሃ ችግር በማጋጠም ማንን ያትከ ባለቤተኛው ርተኝ ጋግረው (ተጋጭተው) ነበር ?		
16	ባለፉት 30 ቀናት እርሰዎ ወይም ሌላ የቤተሰብ አባል በቤት ወስጥ ወሃ ባለመኖሩ ማንን ያትወሃ ተጠምቶ ሳይጠጥድ ደረሰውን በር ?		
17	ባለፉት 30 ቀናት እርሰዎ ወይም ሌላ የቤተሰብ አባል ትበቂ ወሃ በቤት ወስጥ ባለ መኖሩ ማንን ያትቀኑን ማላውሳይ ጠጥቶ ዋለሰውን በር ?		
18	ባለትዳር ከሆኑ ባለፉት 30 ቀናት ወስጥ ወሃ ፍለጋ ሂደት ስራዎችን ባለሙያ ቀቀዎክ ባለቤተኛው ጋር አለመገባባት ተፈጥሮ ነበር ?		
19	ባለፉት 30 ቀናት ከቤተሰብ መካከል ወሃ ለመቅዳት ብለክ ሰርግ ወይም ከቀብር ወይም ይምክስ ብሰባ ወይም ካምጥኩት ቦታ የቀረሰውን በር ?		

