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Rural water supply management and sustainability in Ethiopia with special emphasis on water supply schemes in Adama area

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ABSTRACT

Ethiopia is situated at the area where the weather is complimented with relatively higher amount of rainfall. This has given the country with enormous water resource potential. Accordingly, it was estimated that the country has an annual surface runoff of 122 billion cubic meters of water (EWRMP, 2001). The country's groundwater potential has been estimated to be 2.6 billion m^3 (ADF, 2005).

In spite of this immense water resource potential, sizable proportion of the country used to have faced uneven water distribution and inconsistency of its accessibility in terms of time and space (IMWI, 2007).

The major sources of drinking water for the vast majority of the rural population (84% of the country total) in Ethiopia are surface run offs represented by unprotected springs, ponds, rivers, and hand dug wells whose health risk is significant as they are exposed to contamination caused by human beings, livestock, wildlife and uncontrolled flooding. The research Questions to be assessed involve: the extent community participation and management influence sustainability of safe drinking water supply schemes; the role of other external agencies influence in the management and sustainability of rural water supply schemes and determinants of sustainability in rural water supply system. The case study research method was employed to conduct the study. It involves household survey questionnaire, focus group discussions and key informant interviews as quantitative and qualitative data collection instruments.

As for the major findings of the study, the average house hold water consumption rate is short of meeting the national average of 20liters per person/day. The quality of drinking water has been affected by human feces, livestock, wildlife, uncontrolled flooding and untreated waste water from domestic and agro-industrial activities. Cost sharing has been widely practiced and what matters is water supply system functionality and seasonal fluctuation. It was discovered that the study community members are duly participate in order to sustain the water supply services and befits over time.

Based on the study findings, it can be concluded that the community members in the study communities take the lead in initiating the project idea of the water supply scheme. Meanwhile, their participation in decision making related to choice of technology is very limited. Communities need to be given due consideration and wider platform that give them greater opportunity to manage and decide on issues affecting their livelihood. The practice of cost sharing is well maintained by user communities and can be shared as a best practice for other communities. An option for additional safe water source has to be considered as the average house hold water consumption rate is short of meeting the national average of 20liters per person/day. These are major areas that need to be given due emphasis in line with sustaining the study communities water supply services and befits over time.

Keywords: Community participation, cost sharing, sustainability, rural water supply, water committee, women, community management, safe water

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ADB	Africa Development Bank
ADF	African Development Fund
AMCOW	African Ministers Council on Water
ADP	Area Development Programme
AWMISET	Agricultural Water Management Information System of Ethiopia
BOFED	Bureau of Finance and Economic Development
BOWME	Bureau of Water, Mine & Energy
CSA	Central Statistics Authority
E.C.	Ethiopian Calendar
EU	European Union
EWRMP	Ethiopia Water Resource Management policy
FGD	Focus Group Discussion
HH	Household
IWMI	International Water Management Institute
KI	Key Informant
KPA	Kebele Peasant Association
masl	Meter above sea level
MOFED	Ministry of Finance and Economic Development
NASA	National Aeronautics and Space Administration
NHSSAP	National Health & Sanitation Strategic Action Plan
O&M	Operation and Maintenance
OWMERDB	Oromia Water, Mineral and Energy Resources Development Bureau
PRA	Participatory Rural Appraisal
SPSS	Statistical Package for Social Sciences
UN	United Nation
UNDP	United Nation Development Program
UNICEF	United Nations International children's Emergency Fund
USDS	United States Department of State
VIP	Ventilated and Improved Pit Latrine
WASH	Water Sanitation and Hygiene
WHO	World Health Organization

1. INTRODUCTION

1.1 Background

Ethiopia is geographically located at a region where the climate is complimented with comparatively higher amount of rainfall. This has given the country with immense water resource potential. Based on some preliminary studies conducted, it was estimated that the country has an annual surface runoff of close to 122 billion cubic meters of water excluding ground water (EWRMP, 2001). The country's groundwater potential has not yet adequately studied but professional estimates has put an approximate figure of 2.6 billion m^3 (ADF, 2005). In spite of this immense potential reality, sizable proportion of the country used to have faced uneven water distribution and inconsistency of its accessibility in terms of time and space (IMWI, 2007).

It all happened due to the fact that 80-90% of the country's water resource is located in the western and south-western part of the country that involves Abay (Blue Nile), Tekeze, Baro Akobo, and Omo Gibe river basins. Some 30-40% of the total population is living in this area where as east and central river basins representing 10-20% of the country's water resources serving over 60% of the total population of Ethiopia (EWRMP, 2001).

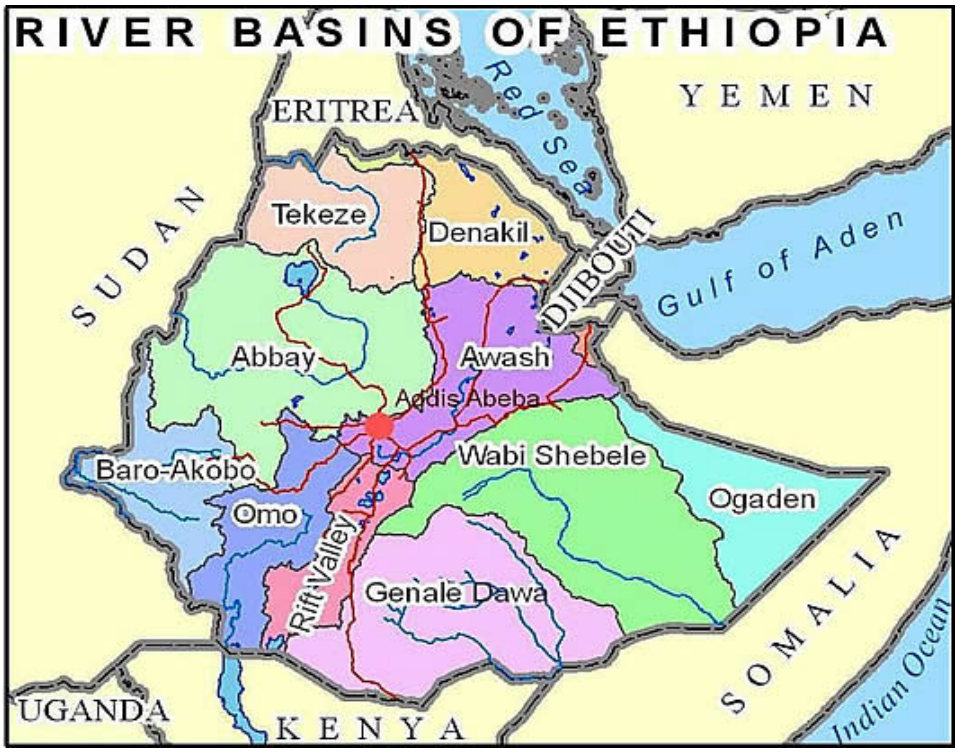


Figure1. River Basins of Ethiopia (Source: Ethiopian Ministry of Water Resources –AWMISET)

As Dessalegn has noted (1999), rural safe drinking water supply provision has commenced during the late 1950s of the Imperial administration. This being the case, there was no responsible authority to deal with the different issues of water utilization and development until the Water Resources Commission was established in 1971. Since then, efforts have been made to provide safe drinking water for urban and rural areas although there was marked urban bias of previous governments that has strongly affected rural water supply investments. This condition coupled with other factors, has contributed a lot for the low level of safe drinking water supply provisions of the country until quite recently. Conditions have been improved somehow after years of consistent effort and the current national access coverage has been scaled up to 68.5 % (ADB, 2010), from what has been 19% in 1990 (UNDP Ethiopia, 2010).

The driving force behind the expansion of access to safe drinking water in Ethiopia was attributed to the incidence of drought and famine that hard hit the very livelihoods of the country in the 70s and the 80s. In response to this devastating situation, and adverse effects associated with years of environmental crises, quite a lot of multi-lateral and bilateral international NGOs, donor agencies and indigenous organizations have devoted significant proportion of their fund

for the provision of rural safe drinking water supply and vigorously engaged in this endeavours (Dessalegn, 1999).

Sustainable livelihoods requires safe and adequate water supply system where due consideration is given for the protection of ecosystem. Besides, it necessitates the formation of conditions for an enhanced cooperation of stakeholders involved in water use and minimizes competition. This in turn calls for stakeholders' preparation of disaster management plan and producing implementation modalities as per the specific area context. Last but not least, stakeholders need to capitalize on the significance of water, scale up the awareness level of water, and give due emphasis for management and governance of water resources (UN World water, 2003).

To that effect, considerable progress has been made globally in terms of safe drinking water supply and sanitation. As per the recently published WHO/UNICEF progress report (2010), it was well noted that significant proportion of the world population (87%) has got access to safe drinking water, which is accounted for a progress of 10% within the last two decades. In spite of this marked progress, about 884 million people worldwide, out of which Africa south of the Saharan accounts for 37% this figure, who are still using drinking water from unsafe supply spots (WHO/UNICEF, 2010). Concerning countries safe drinking water access worldwide, it was estimated that a little over 10 countries do have less than 50% access (world water, 2010).

Regarding the case of Africa, the situation is not that much promising as 340 million Africans are still in need of access to safe drinking water and the continent is lagging behind the attainment of the Millennium Development Goal (UN world water, 2009). According to WHO/UNICEF 2010 update, the proportion of the African population who get accessed to safe drinking water accounts for only 60%, which is about 11% increase compared to the situation in 1990. Concerning the progress in Ethiopia, things are promising as the once lowest national safe drinking water coverage has been improved somehow and scaled up to 68.5% by 2010. This was attributed to formidable effort that was made in the sector since the last couple of years (ADB, 2010).

1.2 Problem Statement

For sizable proportion of the rural population(84% of the country total) in Ethiopia, the major sources of drinking water are surface run offs represented by unprotected springs, ponds, rivers, and hand dug wells whose health risk is significant as they are exposed to contamination caused

by human beings, livestock, wildlife and uncontrolled flooding. The safety and quality of drinking water is further in jeopardy as the culture of open defecation has been socially accepted and widely practiced in most of the rural settings and partly in urban areas as well (Aschalew, 2009). For these very reasons, the prevalence of water born diseases caused by accessing to unsafe drinking water sources has increased at alarming rate. The low level of economic growth, coupled with soaring population growth, high level of illiteracy rate and low level of education/awareness have also contributed to the burden of ill health country wide (UNESCO, 2006).

Despite active mobilization of resources by international, local NGOs and the Ethiopian government, the national safe drinking water coverage of the country has not been improved that much, and this holds very true taking in to account the situation of rural areas where 84% of general population lives (ADF, 2005). The main reasons for this very low level of performance in the supply of safe drinking water, and the quandary for not efficiently utilizing the water resources potential of the country towards realizing sustainable development of the nation, is attributed to lack of articulate and holistic water policy and insufficient investment for safe drinking water supply (EWRMP, 2001).

Besides, Dessalegn (1999) has noted urban bias in water supply investment, lack of water tariff national guidelines, absence of target community participation, management and governance of water supply schemes as additional factors that have contributed to the low level of achievement. The last two factors are key elements that are closely associated to the pitiable record of sustainability of the existing water supply projects in the country.

Late alone the situation in rural areas, the supply and quality of safe drinking water in urban area in terms of adequacy and reliability has become an issue that need to be solved as the demand is ever increasing (Ethiopian water policy, 1999). According to the definition given by Ministry of Water Resources (1996) "adequate water supply to mean 20 liters of water per person per day and accessible within a range of 0.5 to 1.0 km from a dwelling place". Any improvement made in safe water access has to be measure as per this definition. Taking this definition in to account, Dessalegn (1999) has stated that significant proportion of households with safe drinking water access will have greater chance of not securing adequate amount of water that is quite necessary for their wellbeing.

It is worth mentioning that the country need to act consciously towards having in depth understanding of the causes of the stated problems, as to have well-organized, effectual, lasting functional system that contribute towards improved access to safe drinking water, adequate and quality water supply service delivery, and ensuring system sustainability in terms of clean drinking water supply for the rural population (Zelalem, 2005). The conclusion that one can possibly draw from this trend is quite clear, as the cumulative effect of household livelihoods affected by poor sanitation practices and consumption of unsafe drinking water, will also have an adverse effect towards materializing sustainable development for the community at large (Aschalew, 2009).

1.3 Literature Review

1.3.1 Overview

Water is a movable natural resource that can be administered in various methods pertaining to specific socio-economic activities. This involves ground water drilling, rainwater harvesting, hauling, stockpiling and redirecting (Dessalegn, 1999). These are typical features of the water that makes it unique as compared to other innate reserves. This being the case, any kind of water management that hamper the natural course will result in an adverse effect upon the natural environment and put human health at risk (Ibid,).

As water is part of an intricate ecological unit that involves great variety of flora and fauna, land, aquatic and others, the irrational utilisation of the water by stakeholders will jeopardise the water resource as well as the environment. To this effect, any water management system that is working towards materializing sustainability has to give due emphasis for the natural cycle of the water regime (Ibid,).Water by its very nature is an indispensable resource that is responsible for sustainable livelihood and considered as a major ingredient for sustainable development. It is a precondition that need to be in place for mankind to lead vigorous and secured life and thereby materialize socio-economic progress (Asia-pacific forum, 2002).

As per the Millennium Development Goal (MDG) summit Report (2010), progress on the MDG 7 target ‘to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015’ is presently on pathway. However rural areas in developing countries across the world remain severely underprivileged, with eight out of ten people not having access to an improved water supply. According to WHO/UNICEF update (2010), 87% of

the world population has got access to safe drinking water, a progress of 10% within the last two decades. Despite this progress, stated the same report, 884 million people worldwide, out of which 37% living in sub-Saharan Africa, are still utilize drinking water from unsafe supply spots.

Africa is lagging behind the attainment of the Millennium Development Goal as 340 million Africans are still in need of access to safe drinking water (UN world water, 2009). To this effect, the proportion of the African population who get accessed to safe drinking water accounts for only 60%, which is about 11% increase compared to the situation in 1990 (WHO/UNICEF 2010). As for the case of Ethiopia, the once lowest national safe drinking water coverage has been reversed and scaled up to 68.5% by 2010. This was attributed to formidable effort that was made in the sector since the last couple of years (ADB, 2010). As per urban-rural disparities concerning safe drinking water access, it was estimated that of those segments of the world population who lack access to improved drinking water, 84% are living in rural areas (world water, 2010). Accordingly, urban safe drinking water coverage for Africa is estimated to be 85% (281 million) as compared to the rural coverage which is about 51%, representing 294 million people (WHO/UNICEF, 2008). In this respect, Ethiopia has made an encouraging progress as rural safe drinking water access has increased from 35% in 2004/05 to 65.8% in 2009/10, and that of urban access coverage has been increased from 80% to 91.5% for the time specified (UNDP, 2010).

In accordance with WHO/UNICEF estimates (2010), sizable proportion of the population in many Sub-Saharan Africa countries, devotes more than 30 minutes round trip to fetch water from communal collection points, to be used for house hold consumption. In terms of rural Ethiopian context, residents in rural areas used to have travel more than an hour away from their homes in order to fetch insecure and irregular water from unprotected springs, rivers and other unsafe sources. According to MICS and DHS surveys conducted at 45 developing countries (Ibid,.), it was discovered that households whose premises are not connected to piped drinking water are supposed to place major burden upon women (64%) to collect drinking water from sources followed by men (24%), girls (8%) and boys (4%).

As for the progress made regarding sanitation facilities, the situation is not that much promising as 2.6 billion people worldwide are not in a position to utilize improved sanitation facilities.

Significant proportions (72%) of those are living in Southern and Eastern Asia and the remaining segment of the population are from Sub-Saharan Africa. Africa is still lagging behind the attainment of the Millennium Development Goal as 500 million others are living in poor sanitary conditions (UN world water, 2009).

Regarding the use of improved sanitation facilities, it was estimated that 61% of the world population has been accessed so far and maximum effort need to be in place in order to meet the MDG target (WHO/UNICEF update, 2010).

Out of those 2.6 billion people without improved sanitation, three out of 10 are living in urban areas while the remaining 7 reside in rural areas (world water, 2010). The situation in Africa is very disappointing in this regard, as the culture of open defecation has been widely practiced by sizable proportion of the rural population (228 million) who don't have any kind of sanitation facility. To that effect, the rural sanitation coverage for Africa is only about 29% while that of urban area is 53% (WHO/UNICEF, 2008). In accordance with the Ethiopian context, where the vast majority of the population reside in a typical rural area the consumption of unprotected and contaminated drinking water do contribute a lot in aggravating infant and child mortality rates. Accordingly, the under five mortality rate has become 85/1,000, while that of infant mortality has been rated as 45 per 1000 live births (UNDP Ethiopia, 2010). As for the case of general morbidity and mortality rates of the population in rural Ethiopia, 70% of the cases are attributed to the consumption of contaminated water and poor sanitation practices (ADF, 2005). In this regard Africa is far behind meeting the MDG target and formidable effort need to be exerted in order to reverse the prevailing adverse situation.

1.3.2 The Concept of Sustainability

The concept of sustainability has taken its root from the debate on sustainable development during the early 70's. It becomes a concept that is found out to be more 'complex and contested' (Pretty, 1995). As per the United Nations document entitled "Our Common Future" (1987),"sustainable development is development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs." This being the case, different organizations used to produce their own version of definition in line with addressing their intended objective.

Accordingly, various studies conducted pertaining to water supply services have produced scores of definitions concerning the essence of sustainability in the context of water supply projects. Most of these definitions capitalize on financing of regular operation and maintenance costs by users, minimal external assistance in the long term, and continued flow of benefits over a long period (Parry-Jones S. et al 2001). As for the purpose this study, the researcher has preferred to adopt the following water supply sustainability definition of Len Abrams (1998): "Sustainability is about whether or not water and sanitation services and good hygiene practices continue to work over time. No time limit is set on those continued services and accompanying behavior changes. In other words, sustainability is about lasting beneficial change in WASH services and hygiene practices." According to this definition, the achievement of sustainability engrosses the realization of enduring 'beneficial' changes in rural water services. In this case, the issue of sustainability is considered further than limiting itself on technical functionality debate; the expression 'beneficial' highlights the outcome on the lives of people and it indicates to services other than technology (Jansz S, 2011).

1.3.3 Conceptual Frameworks of Sustainability in Rural Water Supply System

Over years, several conceptual frameworks have been produced to better understand the essence of rural water supply sustainability. Among those developed conceptualization frameworks, the one that has been shared by many researchers divided it into five key dimensions (Parry Jones et al, (2001), (1998); Abrams, (1998); Mukherjee, (1998): institutional (organizational), social, environmental, technical, financial/economic. It is well noted that the success of lasting sustainable water supply services is dependent on the interaction of a combination of factors that give due emphasis for community participation, external collaboration and technical support in order to ensure operation and maintenance of the system (Ibid.,). In order to have a close look at the interplay of these factors, the researcher present below the recently produced conceptual framework of sustainable water services by Carter (2011).

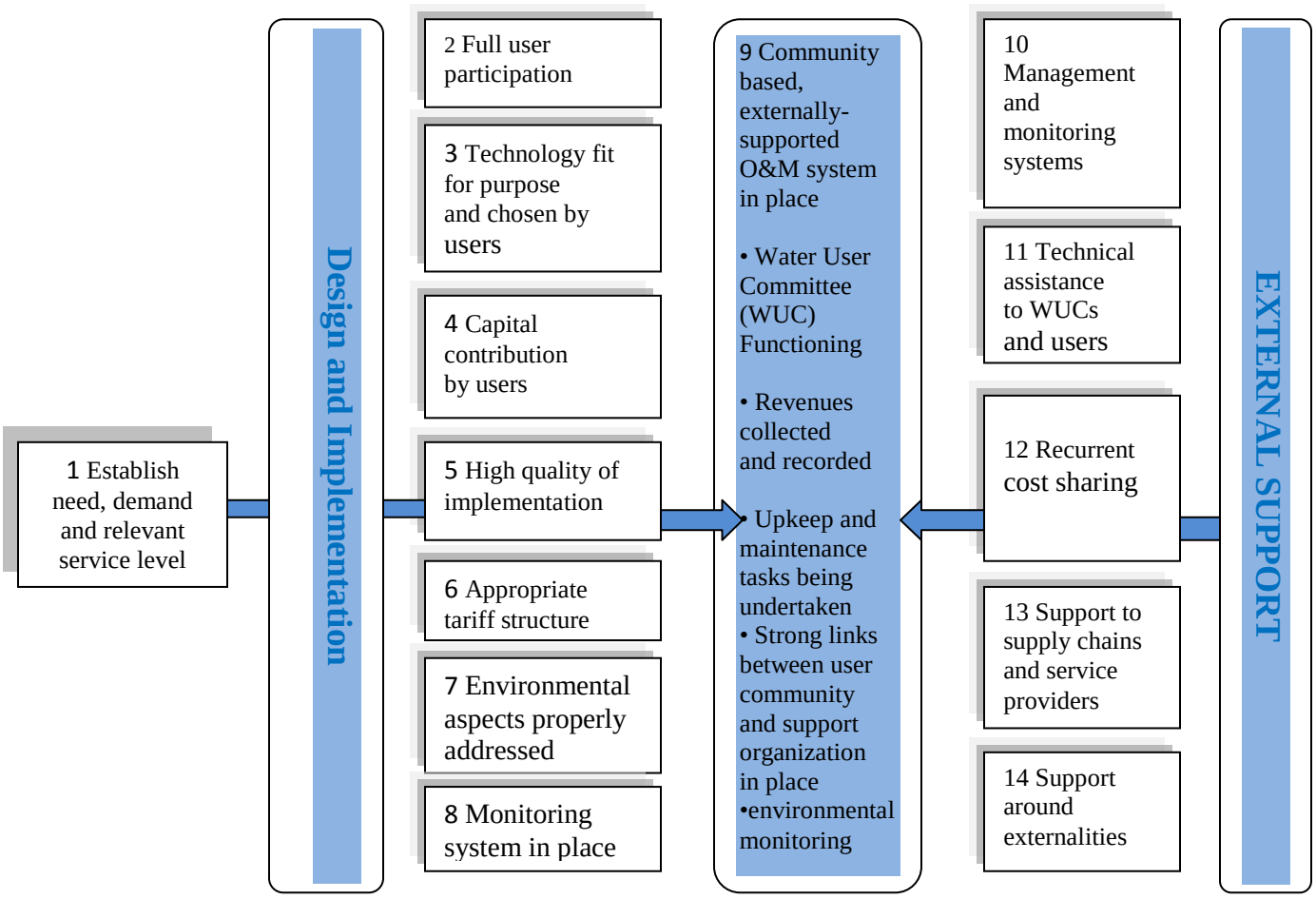


Figure 2. Conceptual framework for sustainable rural water supply services (Water Aid, 2011)

According to Carter, factors listed above are crucial for achieving lasting sustainable water services with a corresponding behavior changes over time (Carter, 2011). Going to the details of the factors stated above will give us further insight as to how interdependent and interactive they are:

- **Establish need, demand and relevant service level -** meant for demand responsive approach of rural water supply in place. In this case community members are called for to make informed choices regarding participation in the project, willingness to share project cost and commitment to bear associated contribution. Accordingly, relevant information is provided to the project community so as to enable them produce working course of action necessary to make possible for collective decisions and action within the community. (Misgina, 2006).

- **Full user participation**- This calls for community participation that implies a proactive process in which the beneficiaries influence the development and management of development projects rather than merely receiving a share of project benefits (Paul, 1987). Community participation creates an enabling environment for sustainability by allowing users, as a group, to select the level of services for which they are willing to pay, to guide key investment and management decisions, and also to make choices and commit resources in support of these choices (Sara and Katz, 1998).
- **Technology fit for purpose and chosen by users**- The kind of technology that cannot serve the best interest of the beneficiary in terms of the quality of installation and cause further problem for maintenance is supposed to be a challenge for sustainability (Carter, 2010).
- **Capital contribution by users**- Community willingness to contribute their share of capital costs is crucial to community participation because they act as an indicator of community commitment to the project (Breslin, 2003). In most cases project communities are expected to contribute their share of the capital cost in terms of labour, local material or cash. But there appears a tendency on the part of the community to evade such contributions and are partly fulfilled on most cases.
- **High quality of implementation**- This is all about meeting the construction quality standards set out in the national guideline. It strongly forbids the use of sub standard materials which entails poor construction with a corresponding effect of short service life (Cater, 2010).
- **Appropriate tariff structure** – This requires a working tariff structure in place that is reasonably framed in order to cope up the ever increasing operation and maintenance cost. In most cases, insufficient amount of finance are collected which trim down the life expectancy of water supply scheme in many instances (Bauman, 2006). The whole issue behind applying appropriate tariff structure is to create a sense of ownership in the community (Parry-Jones et al, 2001) and ensure sustained water supply service over time.
- **Environmental aspects properly addressed**- In this respect due consideration need to be given for two interrelated environmental aspects. This includes security of the water source in terms of quality and quantity and conceptualization of sanitation (Carter, 2010). The decline of source water quantity has become a serious issue in areas where rainfall is

very low and groundwater extraction is very high due to population growth. By-products or chemicals from production facilities and nearby agricultural enterprises could cause contamination that will affect water quality (Misgina, 2006).

- **Monitoring system in place** - Monitoring and evaluation of the water supply service itself should be undertaken in line with agreed upon time frame and provide beneficiaries and supporting partners with the necessary information for ensuring sustainability of services (Parry-Jones S. et al, 2001).
- **Community based, externally-supported O&M system in place** - Presently, there is a growing tendency to acknowledge the necessity for outsiders support so as to enable communities to undertake effective operation & maintenance of the water system for lasting services has become widely accepted (Jansz, 2011). Sustainability need to shift people from 'independence' of utilizing water from contaminated sources to 'interdependence' where they have opportunity to have access to improved water sources with increased collaboration and support from external agencies (Carter, 2006). A decisive pre-condition for efficient operation and maintenance of water supply services is a presence of a practical and reactive support organization that can readily make available the required technical and software support on time (Carter, 2009).
    - Water User Committee (WUC) functioning- must be elected by communities and actively involved in managing operation and resources.
    - Revenues collected and recorded- collect contributions for the creation of a fund for operation, maintenance, repair and replacement, as well as organizing its management (Jansz, 2011).
    - Upkeep and maintenance tasks being undertaken.
    - Strong links between user community and support organization in place.
- **Management and monitoring systems**- Conditions for conducting monitoring at household and community level has to be encouraged as it is found out to be one of the ingredient that greatly contribute towards the realization of sustainability, this is due to the fact that consideration remains purposeful on the required outcomes, and service beneficiaries have got an opportunity of being empowered to manipulate their management and performance (Carter, 2010).

- **Technical assistance to WUCs and users**- The presence of external support has to be in place once the water committee is formed and the provision of technical training and support for repairs has to be maintained in order to keep them encouraged and committed. In this case, the involvement of supporting and of implementing agencies that include local NGO and local government is something paramount.(Jansz,2011).
- **Recurrent cost sharing**- As it is well known that water users are not in a position to finance the total intermittent and substitute costs of their water and sanitation services, it is essential to think about cost sharing as one alternative alongside other new funding mechanism (Cater, 2010). For communities who are unable to contribute the required proceeds two possible alternatives are available involving downgrading of the service to a lower level (as happens frequently when hand pumps fail and users revert to rope –and-bucket) or inviting an outsider to share the current operation cost. (Carter, 2010).
- **Support to supply chains and service providers**- Ensuring the provision of spare parts supply is an area where the responsible government agencies need to take the lead as the supply chain lies beyond the control of the user. Concerted action has to be there in order to make sure the functionality of the supply chain. (Cater, 2010).
- **Support around externalities**- Due consideration need to be given to for communities in order to enable them to cope up with natural disasters and other forms of calamities that may occur in the future. In this case, government agencies and others concerned need to work closely in strengthening generic capabilities of communities and support organizations on how to come out of the shock, upgrade their skill on how to produce contingency plan to cope the hazard and minimize the degree of being exposed to such kind of shock. (Carter, 2010).

This delicate balance of interacting factors requires the involvement of a number of stakeholders working together. From communities to International Non-Governmental Organizations (INGOs), local Non-Governmental Organizations (NGOs), government at different levels and the private sector, sustainability will only be achieved if all stakeholders have sufficient capacity and incentive to do their role (Harvey and Reed, 2004). Harvey and Reed (2004) also suggest that if services are to be sustainable, national and local government institutions are the most important stakeholders, with a principal role in coordination, and need to have sufficient capacity

at all levels to deliver services. This research study capitalize on 'lasting beneficial changes in rural water services' as an interplay of factors stated above, and the status of these determinant factors is going to be assessed combined in to four interdependent categories. This involves, planning & implementation process; institutional & financial; external support; and social aspect which are considered major areas that best serve the interpretation, discussions and analysis of the research study. This comprises;

- Project planning and implementation process involve the practice of base line survey, demand responsiveness of water supply project, community participation and management involvement and others related.
- Institutional & financial aspects include financial & tariff management of water committee, Operation &Maintenance (O&M) management of the water supply system.
- Social aspects involves due participation of the community especially women in all aspects of project planning, implementation and management, and community commitment & willingness towards maintaining the water supply service.
- External support includes technical, financial, material & capacity building aspects.

1.4 Research Questions

The study has addressed and investigated the research questions using different survey instruments and methods that involve conventional house hold survey and participatory rural appraisal (PRA) tools and techniques. Accordingly, the following research questions were treated:

1. To what extent community participation and management influence sustainability of safe drinking water supply schemes?

2. How does the role of other external agencies influence the degree of community participation and sustainability in rural water supply governance and management?

3. What are the determinants of sustainability in rural water supply system?

1.5 Significance of the Study

The significance of this research is measured in terms of generating important information and lessons learned from the past and present water supply systems as per community participation in planning, implementation and management of water supply projects. It intends to provide stakeholders with possible indicators of sustainable safe drinking water scheme and associated factors that need to be given due emphasis in future planning. As per the consideration of social factors, it make aware sector partners to consider the importance of social dimension associated with community participation, management and attitude towards the essence and value of safe drinking water. Besides, the research is meant for contributing an input towards future planning, implementation and management of sustainable rural safe drinking water supply projects, and enriches the knowledge base to be used by other researchers who intend to conduct broad based research pertaining to water system sustainability and Community participation and management.

2. OBJECTIVE

2.1 Main Objective of the Study

The main objective of this study was to explore determinants of sustainability of rural water supply scheme, and contribute towards the knowledge base for future research and development in the area. This involves assessment of household water use practices and communities' attitudes towards water safety and benefits of safe water supply. The other point includes investigation of community contributions for water source protection and maintenance, and institutional approaches followed to enhance the sustainability of water supply system. Understanding these aspects of rural water supply systems can give an insight into developing a useful strategy that can potentially address water supply system with lasting benefits over time for the intended communities.

2.2 The specific objectives

1) To explore the extent of community participation in water supply system planning, implementation and management and its contribution to system sustainability

2) To assess community water use practices and level of awareness concerning the value of safe drinking water & their contribution to rural water supply sustainability

3) To investigate those factors at household and community level that can greatly influence water supply system sustainability.

2.3 Scope and Limitation of the Study

Concerning the scope and limitation of the study, it is worth mentioning that the extent of the research is limited to explore certain aspects of rural water supply services in terms of house hold water use practices, community participation/ management and system sustainability. As the purpose of the research is to focus on specific phenomenon surrounding rural water supply system/scheme, conducting a comprehensive research and providing data and findings pertaining to all aspects of water supply system sustainability and community participation is not the mandate of this study. To that effect, the study has focused on the following limited aspects:

1) Explore the essence and extent of community participation in accordance with water supply scheme planning, implementation and management.

2) Investigate those factors at household and community level that can greatly influence water supply scheme sustainability.

3) Assessing community awareness level concerning the essence and value of safe drinking water.

3. MATERIALS AND METHODS

3.1 The Study Area

Ethiopia is situated in the Horn of Africa covering a total area of 1.1 million sq. km. The terrain characteristic of the country involves high plateau lands, mountains and dry lowland plains. The climatic condition of the country is characterized by tropical torrential rain with geographic variation (USDS, 2011). It is the second most populated country in Africa with a population of more than 85 million as per 2010 estimates. The country is composed of nine national regional states and two chartered cities, namely Addis Ababa and Dire Dawa (EU, 2010). As for the

country's economic status, agriculture contributes about 45% of GDP and responsible for 85% of total employment (Ibid,).

Adama district is located in Eastern Shewa Zone of Oromia* Region in Ethiopia, where major water supply schemes were constructed and others under construction by partners that involve international and local NGOs, the government and the communities at large. **The district is covering a total of** 968.27 km2 and bordering with Lume and Boset districts, and Arsi zone. The topography of the district lies within 1500-2300m above sea level and is dominated by surging plains that involve extensive ridges all along its western boundaries. Significant proportion of the district is situated in a sub-tropical agro-climatic zone (Oromia, 2011).

Crop coverage of the district is estimated to be 30% of the total area. The proportion of grazing, woodlands and despoiled lands accounts for 6.5%, 5.2% and 4.2% respectively (Ibid,). It is highly populated district in eastern Shewa zone. According to 2007 CSA population and housing census, the total population of Adama district is 155,321as at 2007 (CSA, 2008). This data excludes the residents of Adama town as it has got its own separate administration. The urban population accounts for 16.9% (26,381), whereas the rural population accounts for 83.1% (129,003) of the total population in the same year. As per the proportion of female population in the district, about 51.6% of the urban and 48.6% of the rural population were females (Ibid,).

According to the latest data from Oromia regional state (2011), crude population density of the district is estimated to be 295 persons per km2. Concerning safe drinking water access of the district, it was reported that the level of coverage for rural area is 24% while that of the urban population is 100%. Access coverage for total the population is 69% (Ibid,). The major domestic energy source for household consumption is fire wood, dung from domestic animals, crop residue, charcoal, and kerosene. This is complemented by hydro-electric power for urban centres and some pockets in the rural communities (Ibid,).

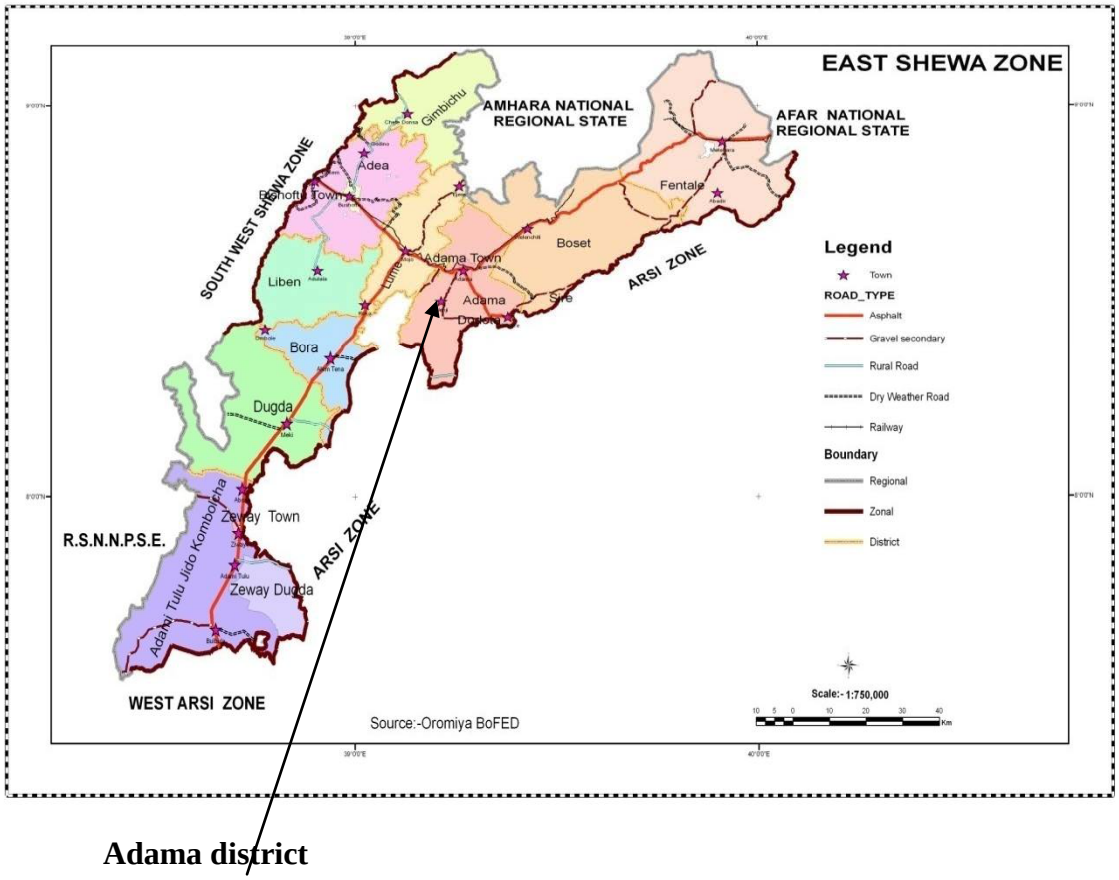
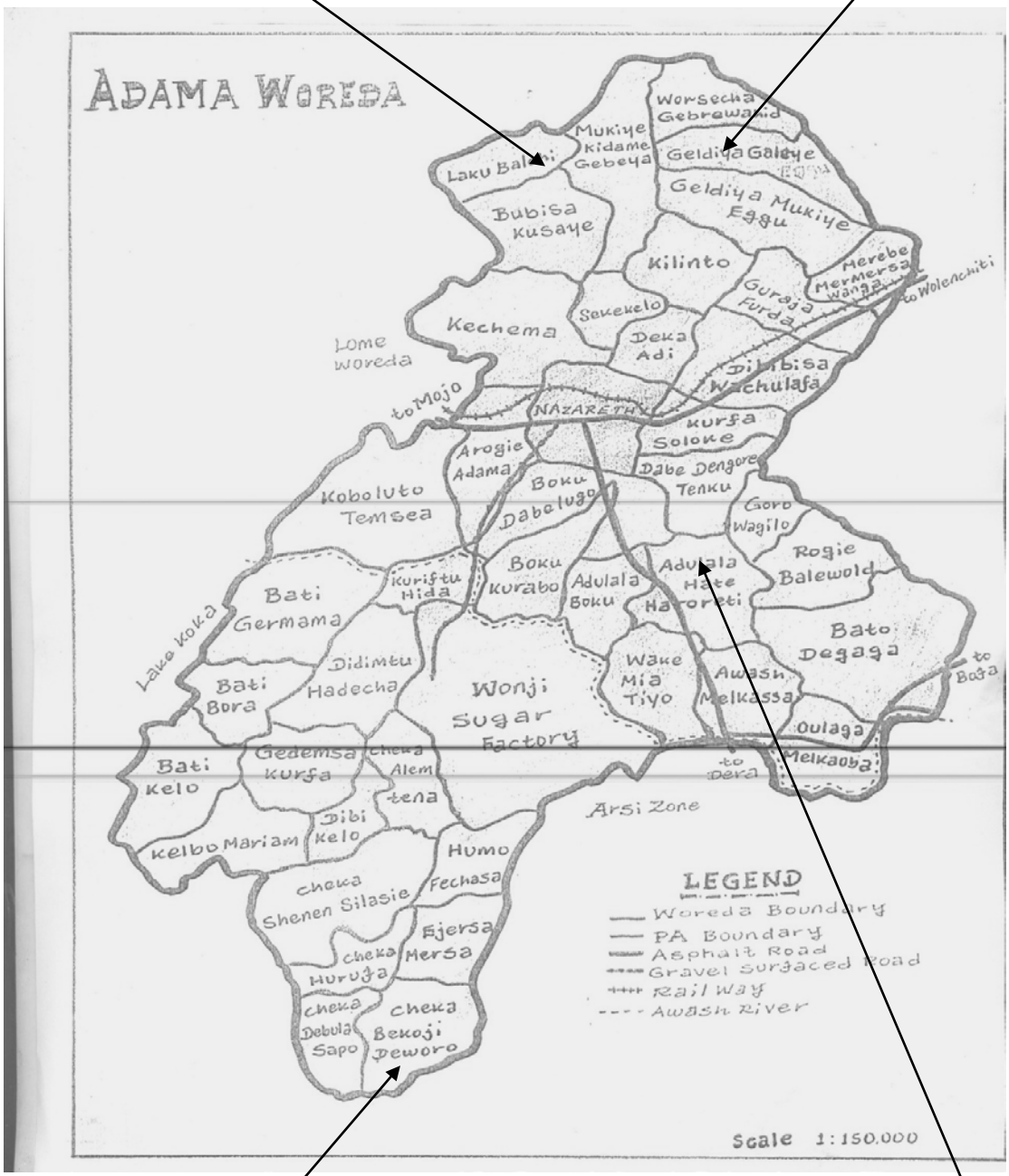


Figure 3. Administrative map of East Shewa Zone (Source: Oromia region BoFED)

Bubissa Kussaye KA

Geldia KA



Cheka Dewero KPA

Adullala Hatie KPA

Figure 4. Administrative Map of Adama District (Source: Adama district finance & economic development office)

3.2 Methodology of the Study

A combination of both quantitative and qualitative research methods are employed in this study. The research design, sampling procedures, method of data collection and their sources are discussed below. The study has thoroughly investigated selected rural safe drinking water supply schemes located at beneficiary communities of Adama district.

It was intended to conduct investigation of the selected water supply scheme in line with the issue of participation and system sustainability. Besides, practical exploration of factors affecting household level water consumption practices has been carried out, and the extent of its contribution towards the project sustainability has been measured. Characteristics of community participation were assessed in accordance with ensuring system sustainability. Factors associated with the interaction and degree of participation among the target community and other stakeholders in materializing water supply schemes under investigation have been assessed. The study has involved quantitative and qualitative methods of data collection and analysis. In order to ensure the validity of the quantitative data collected from the field, method of triangulation that involves focus group discussion, key informants interview, project report and document review has been administered consistently.

3.3 Research design and sampling procedures

The study design has involved case study quantitative & qualitative research method that best fit "to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods" (Soy, 1997). This method involves practical inquisition that examine a current occurrence within its existent framework, where the limits between incident and perspective are not noticeably apparent; and this calls for the use of compound data sources in order to establish the validity and reliability of the research finding (Yin, 1984).

Accordingly, the study has emphasized on characteristic feature of selected water supply scheme and provides appropriate investigative analysis of limited number of observed incidents factors as per their relationships to the context. To this effect, different data collection instruments and techniques have been employed at the field level in order to collect primary data. To make sure the validity of the field data, secondary data sources had been closely scrutinized and facts established. To that effect, selected cases were investigated contained by similar scheme that

provide tradeoffs for the assessment and generalization of the outcomes. The main advantage of the case study research design is that it gives an opportunity for the researcher to be in charge of salient features that differ as per the target community socio-economic factors, geo-physical features, system category, etc. that will influence various features of a rural water supply scheme (Zelalem, 2005).

Different methods of data collection that involve structured survey questionnaire; interviews and discussions with beneficiaries, members of different water committees, and technical staff members; and personal observations were employed to produce primary data. Moreover, secondary data were also collected from books, journals, project documents, reports from sectoral offices, and other concerned bureaus in and outside the district.

3.4 Sampling frame of the study

Out of the existing water supply schemes in Adama district, water schemes constructed with in the last 15 years were selected based on the type of technology used, management practices and system of operation. Accordingly, 4 water supply schemes with a total of 15 water distribution points/public water taps were identified as unit of analysis for this research. These water supply schemes are located at 4 sample kebeles namely, Adullala Hate Aroreti, Bubissa Kussaye, Cheka Dewero and Geldia Galiye. Adullala Hate Aroreti water supply scheme corresponds to those boreholes operated by diesel generator, while that of Geldia Galiye water supply scheme represents boreholes operated by hydropower.

The water supply schemes in Cheka Dewero and Bubissa Kussaye kebeles are selected in order to represent extension of piped water supply services from adjacent district, hand pumps and ponds used in the respective communities.

3.5 Sample population

As per the sampling design, the proposed design has involved random sampling techniques that need to be administered in order to select cases and respondents that constitute the representative sample population. Beneficiaries are the main primary data sources in this study. Therefore, the number of the sample population is selected based on the recently produced access and coverage summary that was compiled by Adama district water and energy office. Accordingly, the sample size for each kebele was extracted from list of beneficiaries who can access the water supply

points within the range of 1.5 kilometer radius and list of water supply schemes inventory of Adama district.

Respondents are picked systematically in a distance of every fifth person to save time and increase representativeness of the study. A total of 148 Households (HH) are included from 4 selected sample kebeles as a sample population for primary data collection. The same method has been applied in order to select participants of the focus group discussion that involve 40 men, women, boys and girls who are organized in to four groups. Accordingly, 4 focus group discussions (FGD) have been conducted in 4 sample communities involving 10 community members in each selected communities (community elders, men, women , boys and girls, women from WC and women groups) and pertinent information has been gathered in order to substantiate and validate the research findings.

Table 1. Inventory of Drinking Water Supply Schemes and related Information in Adama district

S/N	Name of the Scheme	Location (name of community)	Number of beneficiaries	Year commenced	Water Committee		Scheme Status	Powered by (diesel, hydro electric, wind and others)	Scheme Type	Depth in meter
					M	F				
1.	Dibbibissa-1	Dibbibissa Wacholalfa KA	3981	1981 EC	5	2	Functional	Hydro electric	Borehole	170
2.	Dibbibissa-2	Dibbibissa Wacholalfa KA	4740	1984 EC	5	2	"	Diesel generator	Borehole Used for cattle consumption due to its high fluoride content	180
3.	Guraja Furda	Guraja Furda KA	3203	1995	5	2	"	Diesel generator	Borehole	206
4.	Mermerssa	Merebe Mermerssa KA	2667	1971	5	2	Non functional	Hydro electric	Borehole Abandoned due to expansion from Gimbichu Fentale	156
5.	Mekuye Eggu	Geldia Mekuye Eggu KA	4165	1995	5	2	"	Diesel generator	Borehole	157
6.	Geldia*	Geldia Galiye KA	1833	1995	5	2	"	Hydro electric	Borehole	ND
7.	Worsecha	Worsecha G/Wahid KA	2109	1995	5	2	"	Diesel generator	Borehole	ND
8.	Sekekello	Sekekello KA	1554	1994	5	2	Non functional	Diesel generator	Borehole	229
	Sire Robe	Sire Robe KA	1628		5	2	Functional	Gravity	Expansion from Adama	-
9.	Qilinto	Qilinto	1844	1989	5	2	Functional	Diesel generator	Borehole	275
10.	Kechema	Kechema KA	3339	1973	5	2	"	Diesel generator	Borehole	252

11.	Diddimtu	Diddimtu KA	1800	2003	5	2	“	Hydro electric	Borehole	ND
	Cheka Alem Tena	Cheka Alem Tena KA	1030		5	2	“		Expansion from Adama	-
12.	Bati Kello	Bati Kello KA	2284	1996	5	2	“	Diesel generator	Borehole	145
13.	Shenen	Shenen Silassie KA	2839	1991	5	2	“	Diesel generator	Borehole	180
14.	Adullala Hatie*	Adullala Kochie Hate Aroreti KA	4154	1994	5	2	”	Diesel generator	Borehole	160
15.	Gorro Wagillo	Gorro Wagillo KA	2003	1981	5	2	Non functional	Diesel generator	*Borehole	ND
16.	Wake tiyo	Wake mia tiyo KA	4999	1982 EC	5	2	Functional		*Borehole	127
17.	Batu	Batu Degaga KA	5030	2003	5	2	”	Hydro electric	Borehole	71.2
18.	Wake Mia	Wake Mia tiyo KA	4260	1987	5	2	Non functional	Diesel generator	Borehole	132
19.	Dabula Sapoo	Dabula Sapoo KA	1718	1989	5	2	Functional	Gravity	Expansion from Arsi	-
20.	Cheka Hurufa	Cheka Hurufa KA	1656	1989	5	2	”	Gravity	Expansion from Arsi	-
21.	Cheka Dewero*	Cheka Dewero KA	3921	1989	5	2	”	Gravity	Expansion from Arsi	-
22.	Ejerssa Merssa	Ejerssa Messa KA	2464	1989	5	2	”	Gravity	Expansion from Arsi	-
23.	Bubissa Kussaye*[1]	Bubissa KussayeKA	3017	ND	5	2	”l	Manual	Hand pump	-
24.	Mekuyee Harro	Mekuyee Harro KA	2738	ND	5	2	”	Manual	Hand pump	-
25	Gadamssa Kurfa	Gadamssa Kurfa KA	2257		5	2	”	Gravity	Expansion from Arsi	-
26.	Wonji Kurfttu	Wonji Kurfttu	3663		5	2	”l	Gravity	Expansion from Adama	-

Source: Adama district Water, Mines and Energy Office

[1] * Study community

Participants pertaining to key informant (KI) interview of the water supply scheme have been selected from among the target community members who are in one form or another have participated in mobilizing the community towards the realization the water supply system under study. Accordingly, key informant interviews that involve 4 participants from each of the selected KPA (community influential, water committee chairman, representative of KPA women group, KPA health extension supervisor and KPA chairman) has been administered and relevant information has been extracted necessary for substantiating and validating the study finding. Besides, government officials, experts, and others stakeholders involved in the project Planning and implementation have been selected and participated in a separate key informants interview sessions so as to generate data pertinent to consolidate the study finding. To that effect, about 20 participants representing the study community, government offices and NGOs have taken part in separate key informants' interview sessions.

3.6 Data collection procedures, source and types of data collected

The priority task of the data collection process has involved gathering of general and specific information pertaining to the socio-economic, demographic and physical characteristics, settlement patterns, and water supply schemes of the communities under study. This information has been used as a base for planning the field data collection and determining the selection of the sample population. Based on these information, the researcher has conducted field test of the different data collection instruments (survey questionnaires, interview guides and guiding questions for focus group discussions) so as to determine their validity and reliability in line with extracting the relevant information necessary to measure the different variables stated in the study.

Feedbacks collected from the field test were analyzed and the necessary adjustment and corrections has been effected on the interview guides, survey questionnaires and guiding questions as per the comment given from experts and others involved. After due consideration has been given to the feed backs from field test, the actual data collection process was administered to selected household respondents, focus groups and key informants, using the tested data collection instruments (questionnaires, guiding questions and interview guidelines).

To this effect, household survey that involves sample respondents has been administered and relevant quantitative data was gathered from the field. By employing participatory rural appraisal

(PRA) techniques, pertinent qualitative data was gathered from focus group discussions (FGD) that involve men, women, girls and boys groups selected from the communities under study. Interview sessions that involve key informants (KI) has been conducted involving community influential's, elders, religious leaders and others who are active in community mobilization. In both cases, structured guiding questions have been prepared in order to conduct the proposed discussion sessions with selected community members. Structured and semi-structured interview guides were produced in order to administer interview with community water management committee members, district water & energy office, district council and other stakeholders, and thereby collect qualitative data that substantiate the study. As per the secondary data generation, relevant data were gathered from responsible government bodies, where the official statistics and other related reports concerning the water schemes under study is documented, and made available for this study.

Table 2. Adama district Sanitation and Hygiene Census

S/N	**Name of Kebele Association**	**Number of Household Head by sex**			**Number of HH by type of latrine services**						
		Male HHH	Female HHH	Total HHH	HH with no latrine facility	Traditional latrine		Improved latrine			
						communal	private	Improved &ventilated communal latrine	Improved &ventilated private latrine	Improved &ventilated communal latrine with water	Improved &ventilated private latrine with water
1.	Dibbibissa Wacholalfa KA	568	142	710	640	-	70				
2.	Guraja Furda KA	540	160	700	298	95	306	1			
3.	Merebe Mermerssa KA	429	108	537	406	13	117		1		
4.	Geldia Mekuye Eggu KA	797	200	997	798	47	152				
5.	Geldia Galiye KA*	287	83	370	165	65	140				
6.	Worsecha G/Wahid KA	350	72	422	292	127	3				
7.	Sekekello KA	124	27	151	149	-	2				
8.	Qilinto KA	259	90	349	242	-	107				
9.	Kechema KA	408	103	511	190	81	239	1	-		
10.	Diddimtu KA	436	194	630							
11.	Wake mia tiyo	590	200	790	559	25	86	18	102		
	Bati Kello KA	364	77	441	343	-	98	-	-		
12.	Shenen Silassie KA	438	120	558	266	2	290	-	-		
13.	Adullala Hate	640	193	833	549	91	117		74		

	Aroreti KA*										
	Gorro Wagillo KA	345	70	415	343	-	72				
14.											
15.	Rogie B/wold KA	615	144	759	450	81	226	2			
16.	Batu Degaga KA	882	271	1153	1126	-	-	27	-	-	
17.	Mekuye Harro	452	48	500	397	-	103	1			
18.	Bubissa Kussaye*	488	94	582	284	7	259				
19.	Luku Balche	280	30	310	201	-	109		1	8	23
20.	Kobo Lutto Tessa	385	120	505	415	17	68		5		
21.	Batti Germama	414	143	557	376	18	161		2		
22.	Batti Borra	326	61	387	198	-	189				
23.	Gedessa Kurffa	379	98	477	187	57	233				
24.	Cheka Dewerro*[2]	614	165	779	487	20	253		19		
25.	Ejerssa Merssa	411	106	517	348	36	133				
26.	Chekka Huruffa	254	98	352	288	20	44				
27.	Dabulla Sappo	300	90	390	253	45	92				
28.	Dibbi Kello	165	48	213	153	5	55				
29.	Kelbo Mariam	423	127	550	275	18	257				
31.	Chekka Alem Tena	153	87	240	79	13	111	20	17		
32	Hummo Fechassa	250	84	334	79	133	122				
33	Wonji Kuriftu	516	257	773	56	79	541	34	49	1	13
34	Adullala Boku	257	82	339	320	4	15				
35	Wonji Geferssa	1649	1122	2771	387	271	1298	247	567		
36	Wonji Kilill	1347	153	1500	585	-	-	-	38	672	105
37	Shewa Alemtena 01	984	582	1576	159	220	1069	87	41		
38	Shewa kilil	869	68	937	139	-	31	-	-	466	301
39	Tekil kifil	1779	273	2052	2052	?	?	?	?	?	
40	Sire Robe	262	153	415	68	80	237	4	2	4	20
41	Dabe dinku	219	48	267	266	1					
42	Oulaga melka oba	436	167	603	480	13	54	15	41		
43	Awash melkassa	239	76	315	182	32	76	12	13		

Source: Adama district Water, Mines and Energy Office

[2] * Study community

3.7 Data collection tools and techniques

The necessary discussion guidelines and guiding questions that involve structured and semi-structured group discussion guides and questions were produced to be administered for key informant (KI) and focus group discussions (FGD), and generate pertinent data for the study. Questionnaire that involves structured and semi-structured interview guides and questions has been developed and administered for collecting quantitative data from sample households representing the study area.

In anticipation of extracting relevant qualitative data pertaining to the study, different PRA techniques have been employed in order to enable the researcher to validate his study findings. It was widely believed that relevant information can be derived from the map drawn by members of the local community. Such maps provide valuable information concerning natural resources, local land use practices, population settlement patterns, household and demographic characteristics of the community under study (Bartle, 2007).

Community members are supposed to have a hoard of local knowledge, social experiences and wider views concerning their environment, and have the tendency to measure the sensitivity of certain issues before revealing the information to members of the community or an outsider. Conducting a focus group discussion is viable where such a situation is prevailing as it can possibly yield useful information for the study (Bartle, 2007). Accordingly, 4 focus group discussions (FGD) have been conducted in 4 sample communities involving 10 community members in each selected communities (community elders, men, women household heads, boys and girls, women from WC and women groups) and pertinent information has been gathered in order to substantiate and validate the research finding.

In order to have better understanding of the community, the researcher has conducted transect walk with in the study communities based on the check list produced by the researcher to carry out the observation, and have a close look at the water supply structure, water points, the way how community members fetch water, water utilization patterns and different aspect of the community under study (Ibid.,). To this effect, the researcher has taken detailed notes on points stated above and related objective realities that have been observed in those 4 sample communities selected for the study.

3.8 Method of data analysis and Interpretation

It was well noted that data analysis engages the task to discover models and tendencies in data sets; while data interpretation holds giving details regarding those observed patterns and trends in the data sets (E.Egger &Capri,2008). Accordingly, data collected using different instruments and techniques were analyzed and interpreted as per the stated study objectives and research questions. This involves descriptive analyses in order to find out life for the data collected (J. Schoenbach, 2004). Besides, the analysis and interpretation process involves practical inquisition that examine a current phenomenon within its existent framework.

Accordingly, the study has emphasised on characteristic feature of selected water supply schemes and provides appropriate investigative analysis of limited number of observed phenomenon features as per their relationships to the context. Prior to the actual data analysis and interpretation, preparatory works that involve data editing has been employed in order to minimize irregularities and maximize accuracy. To this effect, manual data editing has been conducted in order to spot problems that evade corrections (Ibid.,).

Data cleaning was the second task that the researcher has employed as data collected are subject to a series of check-ups in order to clean them from invalid values, unusable values and check the reasonableness of the distribution. The other preparatory task is data coding, where collected information are translated in to values appropriate for further data analysis (Ibid.,). Types of variables representing the factors to be studied have been identified, and given values/levels (Ibid.,). SPSS data analysis software that involve descriptive statistics has been administered in order to manage, interpret and analyze quantitative data collected from the field.

4. RESULTS

4.1. Demographic and Socio-economic situation

Table 3. Sex and Age range of the Respondents

Sex	Age range of the Respondents				
	15-30	31-45	46-60	above 60	Total
Male	20	36	23	6	85
Female	18	23	16	6	63
Total	38	59	39	12	148

As can be seen from the table above, 38 respondents constituting 25.7 % of the total respondents are in the age category of 15-30, 39.9% of the respondents fall in the age category of 31-45, respondents in the range of 46-60 constitute 26.4% and those whose age range is above 60 represent 8.1% of the total respondents.

Table 4. Educational status of the respondent

Educational status	Frequency	Percent	Cumulative Percent
illiterate	74	50	50.0
read and write	34	22.9	73.0
elementary	23	15.5	88.5
Junior	9	6.0	94.5
high school	5	3.4	97.9
preparatory	2	1.4	99.3
above 12	1	.7	100.0
Total	148	100.0	

The sample population which represents 49.3% (74) of the total respondents is illiterate. Those who can read and write constitute 22.9%. Respondents with elementary education represent 15.5% of the total respondents. Others with junior education status constitute 6.0%, while 3.4% of the respondents are with high school educational status.

Table 5. Gender and income of the respondent

Income range of the respondents (units in birr[3])	gender		
	male	female	Total
<2000 birr	1	1	2
2001- 4000	14	14	28
4001-6001	18	17	35
6001-8001	12	12	24
8001- 10000	14	7	21
>10000	26	12	38
Total	85	63	148

38 respondents constituting 25.7% of the total respondents are in the income category of above 10000 birr. 23.6% are within the income range of 4001-6000 birr, while 18.9% fall in the income range of 2001-4000 birr. Those respondents with income range of 6001-8000 birr constitute 16.2% of the total. Respondents with income range of 8001-10000 birr represent 14.1% of the sample population.

Table 6. Household status of the Respondents by Sex

Response	Gender		Total
	male	female	
Household head	75	8	83
Spouse	0	47	47
Others	10	8	18
Total	85	63	148

4.2 Access to safe drinking water and water use practices at house hold level

Table 7. person responsible for fetching water in the household

Response given	Frequency	Percent
adult woman	34	23.0
adult woman & man	30	20.3
adult woman & man, Female & male child (under15 yr) , boys & girls (above 15 yrs)	12	8.1
adult woman & man, male child (under15 yr) , boys & girls (above 15 yrs	9	6.1
adult woman & man, boys & girls (above 15 yrs)	7	4.7
adult woman , female &male child (under15 yr) & girls (above 15 yrs)	4	2.7

[3] Ethiopian currency unit, 18 Birr = 1USD, 2.5 Birr = 1kronor

adult woman, boys & girls (above 15 yrs)	11	7.4
adult man	12	8.1
female &male child (under15 yr)	5	3.4
Female & male child (under15 yr) , boys & girls (above 15 yrs)	12	8.1
boys & girls (above 15 yrs)	16	10.8
Others	5	3.4
Total	148	100.0

As indicated in the table above, 23% of the respondents have stated that adult women are responsible for fetching water for household use. 20.3% of cases have indicated adult women & men as responsible persons for fetching water for the family. 10.8% of the total respondents used to indicate that boys & girls (above 15 yrs) are responsible to fetch water for the household.

Figure 5. Children fetching water from communal water point, Adullala Hatie community (Photo: Researcher)

Table 8. Average household water collected per day

Responses	Frequency	Percent
<= 25lits	1	.7
26-40 lits	16	10.8
41-60lits	35	23.6
61-80 lits	35	23.6
81-100 lits	38	25.7
> 100 lits	22	14.9
others	1	.7
Total	148	100.0

25.7% of the respondents have stated that the amount of water they used for household cooking, drinking, sanitation and others constitutes 81-100 l per day, followed by 41-60 l (23.6%), 61-80 l (23.6%), more than 100 l per day (14.9%), and 26-40 l (10.1%).

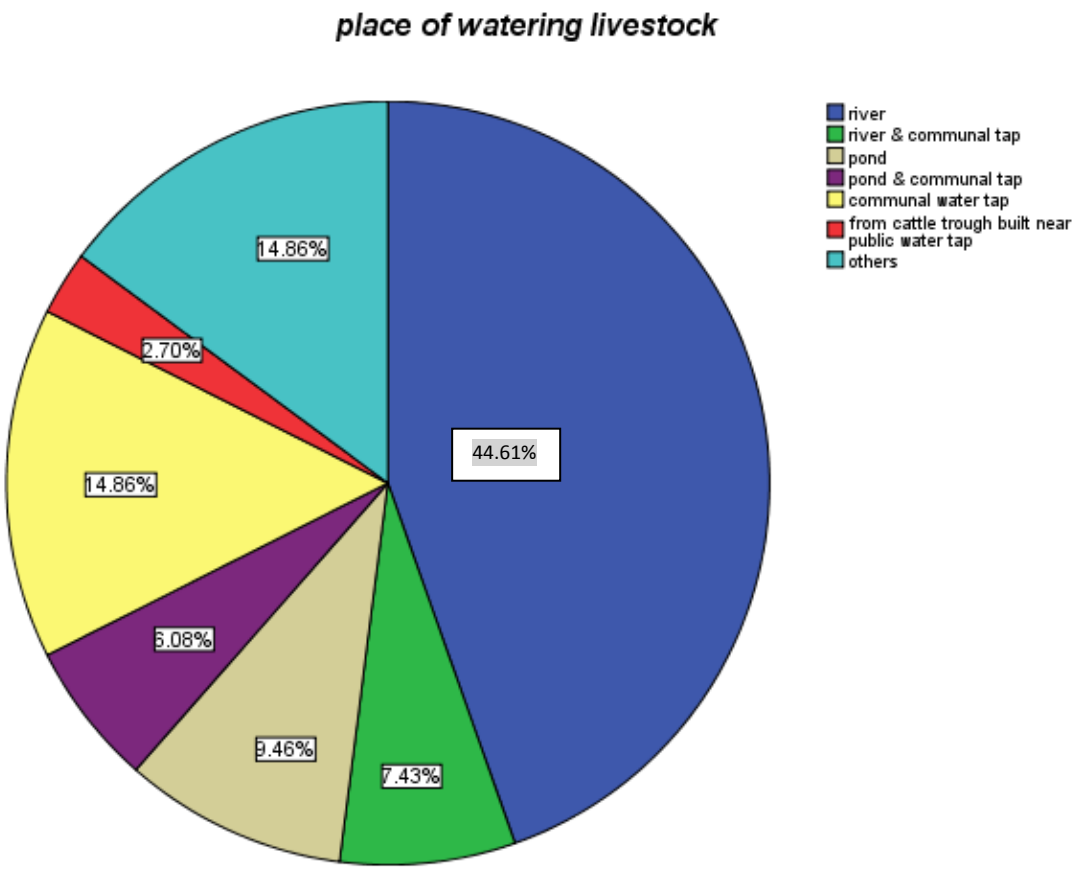


Figure 6. Place of Watering Livestock

44.61% of the sample population has indicated that they used to water their livestock from the river. Others representing 14.9% the sample cases depend on water from communal tap to water their livestock. A combination of pond and communal water tap to water their livestock constitute 6.1%. Those rely on community managed ponds to water their livestock constitute 9.5% of the total response. Responses stating river and communal tap to water their animals represent 7.4% of the total sample cases. 2.7% of the total responses used to on depend cattle trough to water their animals.

4.3 Community attitude toward safe drinking water, sanitation and hygiene

Table 9. Factors affecting the safety of the water supply scheme

Responses	Frequency	Percent
livestock contamination	8	5.4
Human feces , livestock ,Bird and wild life contamination	31	21.0
Algae development, flooding, Human feces , livestock ,Bird and wild life contamination	42	28.3
birds and wild life contamination	10	6.8
human feces contamination	11	7.4
algae development	18	12.2
contamination due to flooding	5	3.4
others	18	12.2
No response	5	3.4
Total	148	100.0

As indicated above, 28.3% of the total respondents have attributed human feces, livestock, birds, wild life, algae development and flooding as major factors affecting the safety of the water supply source. Likewise, contamination due to wild life, human feces and livestock has been indicated as a major factor by 21% of the respondents followed by algae development which constitutes 12.2% of the total respondent. Contamination due to human feces has been indicated by 7.4% (11) of cases as a factor affecting water safety. Livestock contamination was mentioned by 5.4% (8) of cases as one of the many factors affecting the safety water supply source.

Figure 7.Unprotected communal water tap, Adullala community (Photo: Researcher)

Table10. Respondents attitude towards current safety of water from the water supply scheme

Responses	Frequency	Percent
Safe	34	23.0
partially safe	44	29.7
somewhat unsafe	4	2.7
not safe at all	13	8.8
very safe	51	34.5
No response	2	1.4
Total	148	100.0

Concerning the water safety of the study community, 29.7% (44) of cases have indicated that the water from their water supply point is partially safe. 11.5% (17) of cases have responded that they consider unsafe of water collected from the water supply scheme in their community. Meanwhile, 34.5% (51) cases have disclosed that they consider water collected from water supply scheme is very safe, followed by 23% (34) of the respondents who stated that water collected from the water supply point is safe.

Table 11. Type of toilet facility usually used by the households

Responses	Frequency	Percent
ventilated improved pit latrine/VIP	5	3.4
Traditional pit latrine	67	45.3
pit latrine with slab	13	8.8
no facility or bush or field/open defecation	57	38.5
Others	6	4.1
Total	148	100.0

As per the result indicated in the table, 3.4% of the respondents used to have ventilated and improved pit latrine(VIP), followed by pit latrine with slab/open pit 45.3%, composting toilet 8.8%. No facility or field/open defecation accounts for 38.5% of the total respondent.

Table 12. Method of Child under 3 years feces disposal

Responses	Frequency	Percent
put in to drain or ditch	5	3.4
throw in to garbage	24	16.2
Buried	11	7.4
child use toilet/latrine	24	16.2
left in the open	65	43.9
Others	18	12.2
No response	1	.7
Total	148	100.0

As indicated above, 43.9% of the respondents used to have the practice of disposing child feces in the open, while 16.2% the respondents used to throw in to the garbage and 2.7% put in to drain or ditch. Only 16.2% of the respondents have stated that they used to practice child toilet/latrine in order to dispose feces.

Table 13.Respondents Participation in water, sanitation & hygiene (WASH)training

Responses	Frequency	Percent
Have never participated in water safety awareness raising sessions	54	36.5
Have participated in awareness raising sessions organised by the water use committees	16	10.8
Have participated in awareness raising sessions organised by the water use committee and health extension workers	3	2.0
Intensive teaching provided by local health extension workers	44	29.7
Intensive awareness raising session provided by the water use committees, health extension workers and other agencies	20	13.5
Others	9	6.1
No response	2	1.4
Total	148	100.0

It was indicated that 29.7% (44 cases) used to have taken an intensive awareness raising sessions provided by local health extension workers. 10.85% (16 cases) have mentioned that they have participated in awareness raising sessions organized by the water use committees. Other categories of respondents representing 13.5% have responded of taking intensive awareness raising session. Cases representing 36.5% of the sample population have stated that they have never participated in water safety awareness raising sessions.

4.4 Project planning and implementation

Table 14.Community participation in terms of initiating water project idea

Responses	Frequency	Percent
Community members and leaders	64	43.2
Community members ,NGOs & Governmental office	24	16.21
Government office community members	8	5.4
Community leaders	7	4.7
NGOs and governmental offices	17	11.48
Responsible government office	6	4.1
NGOs	10	6.8
Others	9	6.1
No response	3	2.0
Total	148	100.0

43.2% of the respondents have indicated community members and community leaders as initiators of the project idea followed by the combined response that involve NGOs, governmental offices ,community members representing 16.2% of the total response. Respondents which constitute 11.5% of the total sample used to have indicated NGOs and governmental offices as initiators of the water project.

Table 15.Community Participation in Water supply scheme Technology choice

Responses	Frequency	Percent
NGOs and governmental offices	88	59.5
community members/leaders, NGOs & governmental offices	8	5.4
community members & leaders	24	16.2
responsible government office	18	12.2
Others	8	5.4
No response	2	1.4
Total	148	100.0

16.2% of the sample population used to respond that community members & leaders are the once to choose the type of technology to be used in the construction of the water supply scheme. The participation of community members/leaders, NGOs & governmental offices in choice of technology holds 5.4% . 59.5% of the respondents have stated NGOs and governmental offices as responsible bodies to decide on the type of technology to be installed for the water supply scheme. 12.2% of the respondents have indicated the choice of technology as the responsibility of governmental offices.

Table 16. Responses regarding water as a major problem

Given responses	Frequency	Percent
No	45	30.3
Yes	103	69.6
Total	148	100.0

As can be seen from the table above, 69.6% of the respondents have regarded water as a problem that need to be well addressed in terms of sufficiency and effective service delivery. This being the case, in 30.4% of cases it was revealed that water is not a major problem of the respective community.

Table 17. Distance from the household to the water source

Responses	Frequency	Percent
<= 500mts	75	50.7
501-1000mts	27	18.2
1001-1500mts	12	8.1
1501-2000mts	24	16.2
>2kms	7	4.7
No response	3	2.0
Total	148	100.0

50.7% of the respondents have responded that the improved water source at their community is located at less than or equal to 500 mts, while 18.2% and 16.2% are within 501-1000 mts and 1501-2000mts distance range respectively. Respondents covered with in 1001-1500mts accounts for 8.1% followed by those who are within more than 2kms distance range.

Table 18.Stated Response whether technical & capacity building training was given to water committee

Responses	Frequency	Percent
Yes	121	81.7
No	22	14.9
No response	5	3.4
Total	148	100.0

Most of the respondents constituting 81.7% have confirmed that technical training was given to water committee. 22 cases representing 14.9% have responded that they know nothing about technical training given to the water committee.

4.5 Institutional and Financial aspect

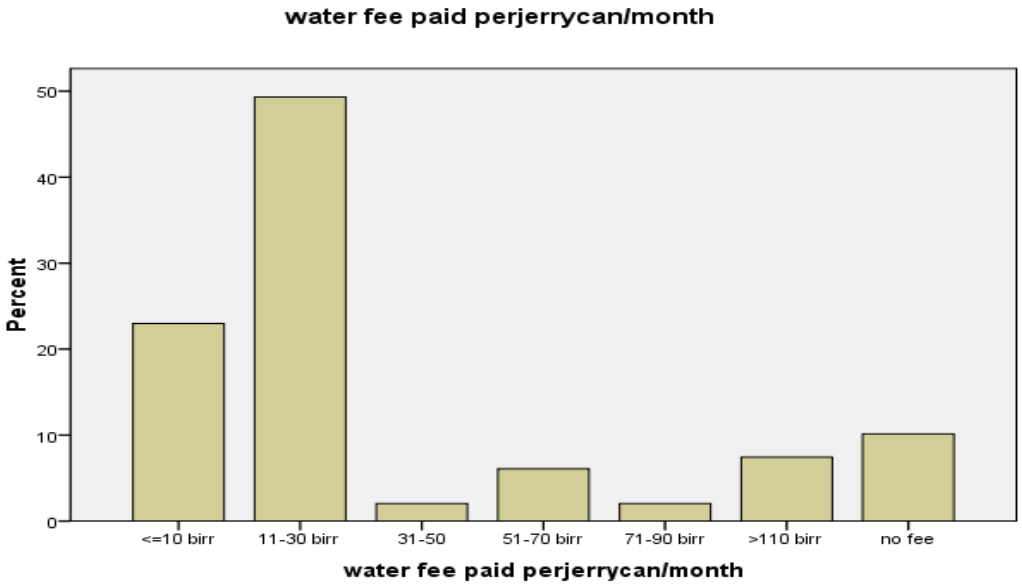


Figure18. Payment of monthly water fee

Payment category of '11-30 birr', which represents 49.3% of the sample population. Payment range less than or equal to10 birr*, constitute 23% of the total respondents. Those paying more than 110 birr per month represent 7.4% of the total sample. Respondents who are in the payment range of '51-70 birr' constitutes 6.1%. Payments represented in '31-50birr' and '71-90 birr' category constitutes 4% of the total responses respectively.

Table 19. Stated reasons why respondents pay water fee

Response	Frequency	Percent
It could enable them build new water scheme	42	28.4
It will cover operation and maintenance cost & enable them build new water scheme	28	18.9
It will cover operation and maintenance cost	50	33.8
No fee	15	10.1
Others	2	1.4
No response	11	7.4
Total	148	100.0

33.8 % of the respondents have stated payment of water fee in line with covering operation and maintenance cost. Others constituting 18.9% have indicated water fee payment in terms of covering operation and maintenance cost build new water scheme. 28.4% of the total

sample used to understand their payment of water fee in association with building new water scheme.

Table 20. Response concerning the practice of cost sharing fox operation & maintenance of the water supply scheme

Responses	Frequency	Percent
users pay as per water supplied	96	64.9
monthly contribution	16	10.8
users pay as per water supplied and annual contribution	7	4.7
annual contribution	11	7.4
Others	9	6.1
No response	9	6.1
Total	148	100.0

96 cases representing 64.9% of the total response have strongly agree towards the application of this rule. 10.8% of the sample population have indicated monthly contribution so as to ensure the water supply scheme operation and maintenance. 7.4% have indicated annual contribution as a means to upkeep operation and maintenance of the water supply scheme. 4.7% of the total respondents have indicated users pay as per water supplied and annual contribution as a way to ensure the operation and maintenance of the water supply scheme.

Table 21.Financial Management and Audit status of selected Water Supply Schemes of Adama district in 2011 (in birr)

S/N	Name of the Scheme	Average Monthly		Cash Balance			Audit Year Audited	Shortage	Amount returned
		Revenue	Expendi.	At Bank	On hand	Total			
1.	Mekuye Egu	2,500	2,000	21,000	300	18,300	2011	-	-
2.	Mermerssa	4,000	2,000	150,000	300	150,300	2009	7,000	-
3.	Guraja Furda	2352	2520	91	300	8,300	2011	9971.25	4961
4.	Kechema	3906	2902	10,000	300	4,300	2007	-	-
5.	Sekekello	-	-	23,000	-	23,000	2009	-	-
6.	Dibibissa	-	-	15,000	-	11,000	2009	-	-
7.	Qilintto	2400	1800	5,000	-	15,460	2009	-	-
8	Adullala Hatie*	3,000	2,000	34,285.75	1263.4	17,719	2011	9500	-
9	Wacho Laffa	4000	1900	200,000	-	200,000	2009	-	-
10.	Goro	2000	1600	8,000	-	15,711	2011	1300	-

11.	Wagillo Worsecha	1600	1400	7729.65	-	4900	2011	3448.30	600
12.	Wake Mia	-	-	-	-	1500	-	-	-
13.	Geldiya*[4] Galiye	4000	2500	98947.18	5756.10	180,000	2011	3266.30	-
14.	Cheka Shenen	3000	1800	29,000	-	28,000	-	-	-
15.	Wake Tiyo	3092	541	20,000	-	3000	-	-	-
16.	Batti Kello	2000	1200	1000	100	1000	-	-	-

Source: Adama District Water & Energy Office

4.6 Community Participation in Rural Water Supplies planning and Implementation

Table 22. Community participation in water project implementation

Given responses	Frequency	Percent
Yes	130	87.8
No	16	10.8
No response	2	1.4
Total	148	100.0

87.8% of the respondents have stated the existence and practice of community participation in their respective community. 10.8% of the respondents couldn't indicate existence of community participation in their community.

[4]*study community

Table 23. Types of Community participation in Project implementation

Given responses	Frequency	Percent
providing labour	11	7.4
Providing cash & labour	23	15.5
providing local materials, labour &cash	43	29.0
providing labour and local materials	28	19.0
providing local materials (wood, stone and sand)	36	24.3
others	7	4.7
Total	148	100.0

Community participation in terms of providing local materials accounts for 24.3% of the total respondents. 29.0% participate by providing labor, cash and local materials to community projects. Providing labor and local materials represent 19%, while 15.5% of the sample respondents indicated their participation in community projects by providing labor and cash. Providing labor as participation has been indicated by 7.4%. Others representing 4.7% of the total response have indicated their participation in community consultation.

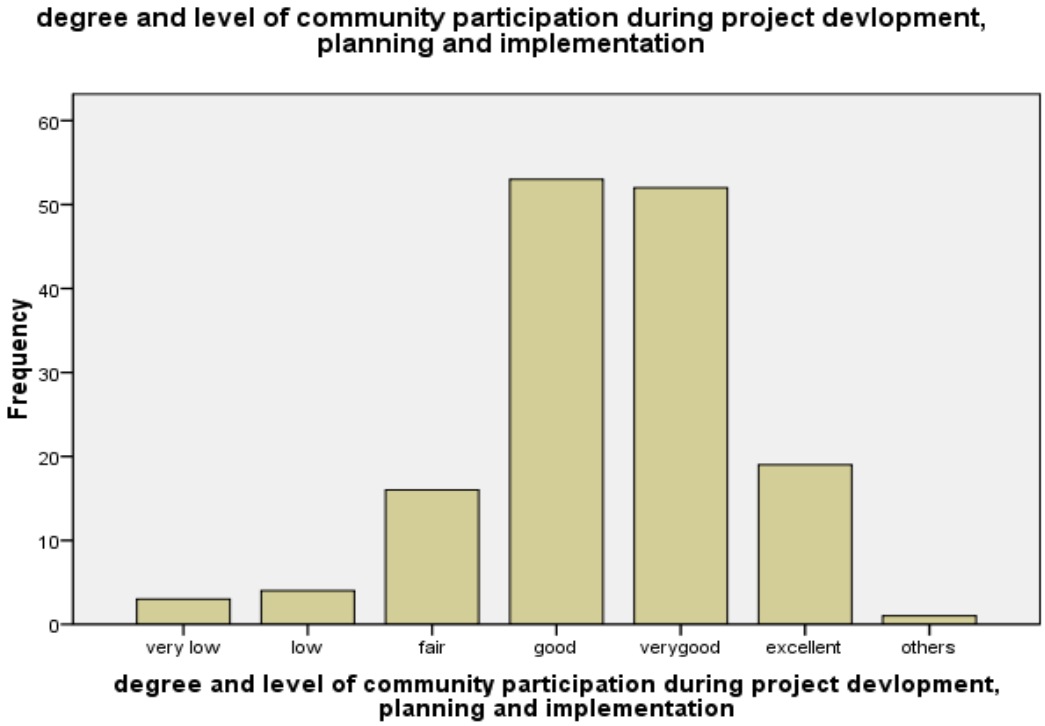


Figure 9. Degree of community participation in project planning and implementation

10.8% of the total respondents said community participation during project implement was fair. Responses which constitute 4.7% of the total consider the rate of participation very low. The respondents who said the rate of community participation is good and very good constitute 35.8% and 35.1% respectively.

Table 24. Responsible body to make major decision regarding the water supply scheme

Given responses	Frequency	Percent
government bodies ,donor agencies and beneficiary community	9	6.1
water committee donor agencies, government bodies, and beneficiary community	10	6.7
government bodies	20	13.5
beneficiary community	34	23.0
beneficiary community and water committee	19	12.9
water committee	52	35.1
others	4	2.7
Total	148	100.0

Water committee as mandated body to make major decision was cited by 35.1% of the respondents. The beneficiary community as major decision maker has got 23% of the total response. The government as major decision maker was cited by 13.5%, beneficiary community and water committee 12.9%, water committee donor agencies, government bodies, and beneficiary community 6.7%, government bodies ,donor agencies and beneficiary community 6.1% and others category constitutes 2.7% of the total case.

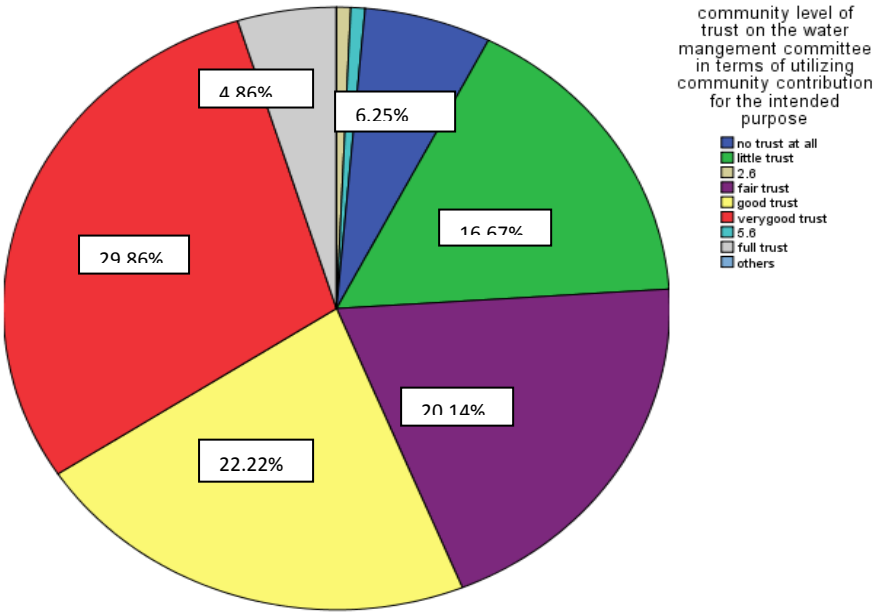


Figure 10. Community level of trust towards water committee

29.86% of the respondents have indicated very good level of trust towards their water committee. Those stated good trust regarding the water committee constitute 22.2% of the respondents. Fair terms rating constitute 20.1% . In cases that constitute 16.7% the degree of trust given for the water committee was little. 6.25% of the total respondents used to have said don't trust at all, while the remaining 4.9% endorse full trust to the water committees.

Table 25. Response given whether women participate in the management of water supply scheme

Responses	Frequency	Percent
Yes	125	84.5
No	17	11.5
No response	6	4.0
Total	148	100.0

84.5% of the total respondents have disclosed the involvement of women in the management of the community water supply system. Those indicated no participation constitute 11.5% of the total.

Table 26. Expressed benefits gained from access to safe drinking water

Given responses	Frequency	Percent
Health of family members improved	45	30.4
House hold income & health improved	5	3.4
Relieved exhausting work for women and children, House hold income & health improved	11	7.4
More time is available for productive activities, Relieved exhausting work for women and children, House hold income & health improved	9	6.1
More social and domestic activities, Productivity of livestock has improved, house hold income & health improved, Relieved exhausting work for women and children & More time is available for productive activities	34	23.0
Health status of family members improved & relieved exhausting work for women and children	6	4.1
Productivity of livestock & Health status of family members improved, Relieved hard work for women and children & More time is available for productive activities,	8	5.4
Health status of family members improved, more time is available for productive activities & more time for social and domestic activities	5	3.4
household income has improved, Relieved hard work for women and children, More time is available for productive, social and domestic activities	5	3.4
relieved drudgery for women and children	6	4.1
more time is available for productive, social and domestic activities	5	3.4
Others	2	1.4
No response	6	4.1
Total	148	100.0

Improved health status of family members due to access to safe drinking water constitutes 45 cases that represent 30.4% of the total sample. 23.0% (34 cases) of the sample disclosed relief of women and children from exhausting work, more time for productive, social and domestic activities & livestock productivity. Improvements in the house hold income& health, relief of exhausting work for women and children which constitutes for 11 cases and 7.4%.

Table 27. Response given regarding time taken to fetch water & come back

Responses	Frequency	Percent
<= 15 minutes	34	23.0
16-30 minutes	60	40.5
31-45min	25	16.9
46-60min	21	14.2
> 1hr	7	4.7
No response	1	.7
Total	148	100.0

23% of the respondents have responded that it take them less than or equal to 15 minutes to fetch water from the source and come back. Others representing 40.5% have responded that it take them 16-30 minutes to fetch water from the source. 16.9% have stated 31-45 minutes travel to fetch water from the source and come back. Those who respond 46-60 minutes travel constitutes 14.2% of the total response.

Table 28. Average waiting time/queuing time at the water point

Responses	Frequency	Percent
<=15 minutes	47	31.8
16-30 minutes	9	6.0
31-45 minutes	14	9.5
46-60 minutes	8	5.4
More than60 minutes	65	43.9
No response	5	3.4
Total	148	100.0

43.9% of the respondent have confirmed that queuing time takes more than 60 minutes of household productive activities. The number of responses that fall between queuing time of 31-60 minutes accounts for 14.9%. 37.9% of the total responses whose queuing time is between less than or equal 15-30 minutes.

Figure 11. Children queuing for fetching water from communal water point, Adullala Hatie community (Photo: Researcher)

Table 29. Convenience of water source location to the household

Responses	Frequency	Percent
convenient	82	55.4
inconvenient	16	10.8
very convenient	21	14.2
very inconvenient	10	6.8
Fair	19	12.8
Total	148	100.0

Convenient and very convenient responses constitute 103 case and 69.6% of the total. Inconvenient & very inconvenient represent 17.6% of the total responses. Respondents who stated fair represent 19 cases and 12.8% of the total sample population.

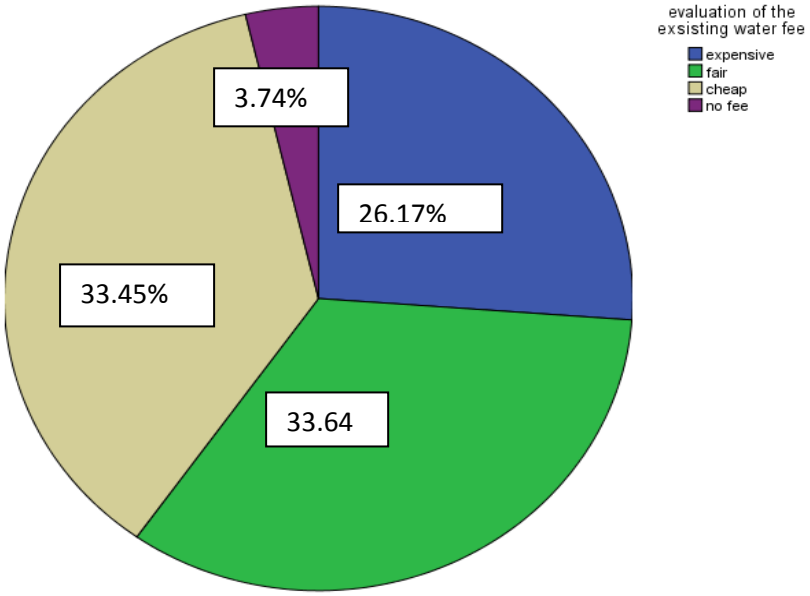


Figure 12. Evaluation of the existing water supply service fee

26.17% of the respondents indicated that the amount paid for water supplied is expensive. 33.45% of the respondents have stated that fee paid is cheap. 33.64% of the respondents said fair, and 3.74% of cases have indicated that they paid none for water supplied.

Table 30. Responses given concerning sufficiency of improved water supply

Responses	Frequency	Percent
yes	66	44.6
no	82	55.4
Total	148	100.0

55.4% of the sample population have stated water supplied is not sufficient. Others constituting 44.6% of the respondents have state that they have sufficient water supply.

Table 31. Responses given regarding the functionality of the water supply system

Given responses	Frequency	Percent
well-functioning without any damage or technical problems	17	11.5
Functioning with some breakage/technical problem	57	38.5
Partly functioning	44	29.1
Partly functioning with some technical problem	10	6.8
Not functional at all	15	8.8
No response	5	3.4
Total	148	100.0

11.5% of the total respondents have indicated their water supply scheme is well functioning. 38.5% of the total respondents have disclosed that the water supply functioning with some technical problem. 29.1% of the sample respondents have indicated their water supply scheme is partly functioning. 6.8% have disclosed partly functioning with some technical problem. 8.8% of the sample respondents have stated not functional.

Figure 13. Water committee member explaining about the functionality of hand pumps installed in Bubissa Kussaye community, (Photo: Researcher)

Table 32. Stated responses to ensure functionality of the water supply scheme

Given responses	Frequency	Percent
Availability of spare parts needs to be in ensured for the system remains functional	4	2.7
Local skills should be in place in order to operate and maintain water system	14	9.5
Availability of spare parts needs to be ensured for the system remains functional, Local skills should be in place in order to operate and maintain water system and Technical and capacity building training need to be in place for those community members who manage the water system	31	20.9
technical and capacity building training need to be in place for those community members who manage the water system	30	20.3
Availability of spare parts needs to be ensured for the system remains functional, Local skills should be in place in order to operate and maintain water system, Technical and capacity building training need to be in place for those community members who manage the water system and Scale up community members participation in the management and governance of the	33	22.3

water supply scheme		
Local skills should be in place in order to operate and maintain water system, Technical and capacity building training need to be in place for those community members who manage the water system	18	12.2
Scale up community members participation in the management and governance of the water supply scheme	6	4.0
Local skills should be in place in order to operate and maintain water system, Technical and capacity building training need to be in place for those community members who manage the water system and Scale up community members participation in the management and governance of the water supply scheme	5	3.4
No response	7	4.7
Total	148	100.0

22.3% of the total response have stated the availability of spare parts, upgraded local skills, technical and capacity building training. 20.9% the provision of technical and capacity building training, availability of spare parts and local skills. 12.2% of the sample population stated up graded local skills, provision of technical and capacity building training. 9.5% of the total response have suggested the need for upgraded local skills.

Table 33. Responses given towards ensuring the water supply system sustainability

Response given	Frequency	Percent
labor contribution during maintenance	26	17.6
paying service fee in time and cash contribution, labor contribution during maintenance	7	4.7
Actively participate in discussions concerning the management & administration of the water supply scheme, labor contribution during maintenance and paying service fee in time and cash contribution	46	31.1
labor contribution during maintenance and actively participate in discussion on the management of the water supply scheme	30	20.3
paying service fee in time and cash contribution	7	4.7
actively participate in discussion on water scheme issues	23	15.5
Others	7	4.7
No response	2	1.4
Total	148	100.0

31.1% of the total response used to have due consideration of the water supply system sustainability. Respondents representing 20.3% of the sample population have strongly

indicated participation in labor contribution and active participation in discussion. Labor contribution during maintenance was stated by 17.6% of the total respondents. 15.5% of the total respondents, are those who capitalize on greater participation of the community in consultation.

4.7 External Support

Table 34. Stated response regarding collaboration with external agencies in planning, management of the water supply scheme

Response given	Frequency	Percent
Government offices	67	45.3
NGOs & government offices	35	23.6
GOs, NGOs, Private sector, Education and Research institutes	7	4.7
NGOs	10	6.8
Others	3	2.0
No response	26	17.6
Total	148	100.0

Communication and collaboration with government offices has been emphasized by 45.3% of the sample population. Collaboration with NGOs & government has been indicated by 23.6% of the respondents.

Table 35. Response given whether they received any kind of support for their water supply scheme from district or zonal water office

Responses	Frequency	Percent
Yes	117	79.0
No	28	18.9
No response	3	2.0
Total	145	98.0

79.1% of the sample population has confirmed support given to their water supply scheme. 18.9% of the respondents have responded the absence of any form of support given.

Table 36. Responses regarding the kind of support given to their water supply system

Responses	Frequency	Percent
Training	16	10.1
Training & spare parts	7	4.7
Training, spare parts financial & technical assistance	9	6.1
Training, financial & technical assistance	5	3.4
Training & technical assistance	23	15.5
Spare parts financial support &technical assistance	4	2.7
Financial support for maintenance	7	4.7
Maintenance and other technical assistance	44	29.7
No response	33	18.2
Total	148	100.0

Maintenance and technical assistance constitute 29.7%, training & technical assistance represent 15.5%, provision of training 10.1%, spare parts financial & technical assistance 6.1%.

Table 37. Responses regarding donors & government agencies role in maintaining the water supply scheme

Given responses	Frequency	Percent
provide maintenance services	20	13.5
Monitoring and evaluation, maintenance, financial support, technical, & capacity building training	55	37.1
financial support	18	12.2
provide maintenance and financial support	11	7.4
provide technical and capacity building training	30	20.3
Others	6	4.1
System	8	5.4
Total	148	100.0

37.1% of the respondents indicated financial support, maintenance, technical & capacity building training, monitoring and evaluation. Technical and capacity building training constitute 20.3% of the total response. Maintenance & financial support represent 19.6% of the respondents.

Table 38. Responses given concerning the intervention of external agencies in the management of the water supply scheme

Responses given	Frequency	Percent
When requested by the community	54	36.5
When requested by the community, GOs/NGOs intervention deemed necessary, there appears misunderstanding among members of the beneficiary community & when the water committee fails to properly manage the water supply scheme	23	15.5
When requested by the community& there appears misunderstanding among members of the beneficiary community	16	10.8
When requested by the community, there appears misunderstanding among members of the beneficiary community, when the water committee fails to properly manage the water supply scheme	14	9.5
When GOs and NGOs intervention deemed necessary	31	20.9
When there appears misunderstanding among members of the beneficiary community	5	3.4
When the water committee fails to properly manage the water supply scheme	5	3.4
Total	148	100.0

36.5% of the sample population have stated intervention in the best interest of the community. Combined responses constitute 15.5% of the respondents. The third category represents 20.3% of the sample population. 20.9% of the total sample and replied GOs/NGOs intervention deemed necessary.

Table 39. Respondents response concerning monitoring & evaluation of the water supply scheme

Response given	Frequency	Percent
Yes	58	39.2
No	68	45.9
No response	22	14.9
Total	148	100.0

39.2% of the sample respondents have indicated that they have some kind in place. Respondents representing 45.9% of the total have stated the absence of follow up and monitoring mechanism.

Table 40. Frequency of travel to the water source to collect water

Responses given	Frequency	Percent
Once a day	31	21
2 times a day	69	48
3 times a day	23	15.5
More than 3 times a day	17	11.5
Others	5	3.4
No response	1	0.7
Total	148	100.0

As noted from the table above, 48% of the total sample used to have replied that they commit two times a day to fetch water from the source. Those who have stated the commitment of once a day constitute 21% of the total respondents. Others constituting 15.5% have stated that they devote 3 times a day to fetch water from the source. The remaining 11.5% have disclosed that they travel more than 3 times a day to fetch water from the source.

Table 41. Method of transporting water from the source

Response given	Frequency	Percent
Human power	21	14.2
Human power and domestic animals	46	31.1
Domestic animals	60	40.5
Others	18	12.2
No response	3	2.0
Total	148	100.0

Regarding methods of transporting water, 40.5% the total respondents have confirmed the use of animal power for transporting water from the source. The combined use of human and animal power for transporting water from the sources constitutes 31.1% of the total sample. The use of human power alone for transporting water from the source has been stated by 14.2% of the respondents.

Table 42. Findings of the Focus Group Discussions Sessions conducted at 4 study communities

Issues of group discussion	Summary of collective responses of 4 Focus Group Discussions participants on issues under discussion[5]					
The rate of community participation in planning and implementation of the water supply project.	0 No participation	1 Very limited participation	2 participation rate was fair	3 participation was good	4 Rate of participation was very good	scoring 4,4,3,4
Community participation on choice of technology used for the water supply scheme.	Not at all	Participation was very limited	Participation rate was fair	Participation rate was good	Rate of participation was very good	0,0,1,0
Technical and capacity building training given to water committee members.	Not at all	Yes once	Yes twice	Yes three times	More than three times	1,1,1,1
Do water committee have a regular basis of reporting systems to the concerned body?	Not at all	Yes, to the community, KPA, district when there is a problem not continuously	Yes, to the district water office	Yes, to the KPA administration	Yes, to the district water office and KPA administration but not to the community	4,1,1,1
Obtaining drinking water from your present source with less effort than the former water source.	Not at all	Very limited advantage gained	Yes, relatively speaking	Yes, in many aspect	Yes, in very many aspect	4,4,0,3
Collection and management of water fee, and control mechanism. Community regularly informed on how the money is kept and spent.	No collection & management of water fee	Water fee is collected by the vendor but mismanaged by the water committee	Water fee is collected by the vendor but water committee reported to district water office only not to the community	Water fee is collected by the vendor but not reported to district water office & KPA administration	Water fee is collected by the vendor & reported to the district water office & KPA administration but not to the community	4,2,0,4
Benefits of the improved water source	No visible improvement and benefit to the community	Very limited improvement and benefit to the community	Improvement in household health and increase in productivity	Improvement in household income and	Improvement in household health , income, labour productivity , live stock &long distance travel to fetch water	4,4,0,4
What are the major problems of your water supply scheme?	there is no significant problem at present	No access to safe drinking water & rely on unsafe sources. Hand pumps are not	Limited water taps to address the ever increasing population	Pipe line breakage, seasonal fluctuation and	pipe lines stolen, limited pumping power ever increasing fuel cost, limited water	4,0,1,3

[5]summary of collective responses represent consolidated responses given as per each issues of group discussion. Accordingly, ratings & scorings 0,1,2,3,4 represent given consolidated responses consented by each discussion group.

		working throughout the year	growth	decreased flow during dry season	taps for ever-growing population, investors competing for consumption from the same water supply system	
Suggested solution to improve and sustain the operation of the existing water supply scheme	No solution for the moment	Ensure access to safe drinking water & maintain the existing hand pumps	To change the diesel generator to hydro power. the existing source should be complemented by additional source	Ensure the safety of pipelines extended from adjacent district facilitate maintenance	But we need to have additional water taps to cope up with population growth and income generating activities at household level	2,4,1,3
Follow up and monitoring mechanism of operation and management of the water supply scheme	No monitoring mechanism in place	Very little practice of monitoring and follow up	There is some level of monitoring	There is good monitoring and follow up mechanism	There is very good monitoring and follow up mechanism	0,0,1,1
The role KPA administration concerning the water supply	They should not involve	They should involve in the management of the water supply system	KPA administration has to work closely with the water committee	KPA administration take the lead in the management	Coordinate & facilitate operation and maintenance of water supply	1,2,2,2

Source: Researcher's field notes taken during focus group discussion sessions at 4 communities

Figure 14. Focus group discussion session at Adullala Hatie community (Photo: Researcher)

Figure 15. Focus group discussion session at Bubissa Kussaye community (Photo: Researcher)

Figure 16. Key informant interview session with women representative (Photo: Researcher)

Table 43. Findings of the Key Informants Interview Sessions undertaken at 4 study communities

Issues of Interview session	KI Participants collective responses of the interview session[6]					
Community members make payments timely and it is sufficient to cover operation and maintenance cost of the water supply schemes	0 No, we have not yet accessed with safe drinking	1 Yes, but fee is not sufficient for operation &maintenance	2 Yes, relatively sufficient for operation and maintenance	3 Yes, fee is sufficient for operation and maintenance	4 Yes, fee is very sufficient for operation and maintenance	Scoring 4,4,0,4
Benefits of the improved water source	No benefit as we don't have access to safe drinking water	Very limited improvement and benefit to the community	Improvement in household health and increase in productivity	Improvement in household income and health	Improvement in household health , income, labour productivity , live stock &long distance travel to fetch water	4,4,0,4
Efforts made by NGOs to strengthen Water committee	Not all	Very limited	Satisfactory	Encouraging	Very encouraging	0,1,1,4
Collection and management of water fee, and control mechanism. Community regularly informed on how the money is kept and spent.	No collection & management of water fee as we have not accessed with safe drinking water	Water fee is collected by the vendor and everything is managed by the water committee and community is not informed	Water fee is collected by the vendor and water committee reported financial status to district water office only	Water fee is collected by the vendor but not reported to district water office & KPA administration	Water fee is collected by the vendor & reported to the district water office & KPA administration only	1,1,0,2
Obtaining drinking water from your present source with less effort than the former water source	Not at all	Very limited advantage gained	Yes, relatively speaking	Yes, in many aspect	Yes, in very many aspect	4,4,0,4
Community participation in water supply scheme planning and implementation	No participation	Very limited participation	participation rate was fair	participation was good	Rate of participation was very good	4,4,3,4
Responsible body for maintenance of the water supply schemes	No one is assigned	Someone from water committee	Water committee	KPA and Water committee	District water & energy office	1,2,0,4
Women participation in planning and management of water supply scheme	Not at all	Participation is very limited	Participation is satisfactory	Participation rate is good	Participation rate is V. good	2,1,1,2
Major problems of your water supply scheme	there is no significant problem at present	No access to safe drinking water & rely on unsafe sources. Hand pumps are	Power blackout ,pipeline breakage by flooding	Pipe line breakage, seasonal fluctuation and decreased flow during dry season	pipe lines stolen, limited pumping power, ever increasing fuel cost, limited water taps, water consumption rate of	2,4,1,3

		not working throughout the year			investors	
Suggest solution to improve and sustain the operation of the existing water supply scheme	No solution for the moment	Ensure access to safe drinking water & maintain the existing hand pumps	To change the diesel generator to hydro power. be complemented by additional source	Ensure the safety of pipelines facilitate actual and preventive maintenance, additional tanker and changing PVC pipes with iron pipes	Diesel generator replaced by hydro, additional taps to cope up with population growth, additional tanker, investors need to have their own water supply	3,4,1,3
Follow up and monitoring mechanism of operation and management of the water supply scheme	No monitoring mechanism in place	Very little practice of monitoring and follow up	There is some level of monitoring	There is good monitoring and follow up mechanism	There is very good monitoring and follow up mechanism	1,1,0,3
the role of KPA administration in the operation and management of the water supply scheme	They should not involve	They should involve in the management of the water supply system	KPA administration has to work closely with the water committee	KPA administration take the lead in the management of the water supply scheme	Coordinate & facilitate operation and maintenance of water supply	4,2,2,3

Source: Researcher's field notes taken during key informants' interview sessions at study area[6]s

[6] summary of collective responses represent consolidated responses given as per each issues of group discussion. Accordingly, ratings & scorings 0,1,2,3,4 represent given consolidated responses consented by each discussion group.

5. DISCUSSION

Out of 37 Kebele Associations (KA) that makeup Adama district, four kebeles were selected/covered and studied in this research work. These study kebele associations involve Adullala Hate, Bubissa Kussaye, Cheka Dewero and Geldia Galiye. Adullala Hate is situated in the middle of the district and is relatively close to Adama town on the way to Assela[7] , Cheka Dewero located at south east edge of Adama district bordering Arsi zone, whereas Geldia galiye and Bubissa Kussaye are located at north east and north west end of Adama district.

In accordance with the sampling procedure stated in the research methodology section, the sample population representing each Kebele Association was selected based on access and coverage the data summary obtained from Adama district water and energy office. Accordingly, 49, 15, 54 and 30 households representing the four sample Kebeles (Adullala Hate, Bubissa Kussaye, Cheka Dewero and Geldia Galiye Kebele Associations) were selected using simple random sampling techniques. To that effect, a total of 148 households were covered as a primary data source in order to serve the purpose of this study.

5.1 Demographic & Socio-economic characteristics of the sample population

As per the study result presented in table 3, the vast majority of the respondents fall within the age range of 15 - 60. Accordingly, 91.9% of respondents were considered to be in the economically productive age group and are the sole provider of the data gathered from the sample Kebele Peasant Associations[8] (KPA). As per the country socio-economic context, the respondents in this category are considered to be the prime movers of country development initiatives pertaining to their livelihoods in general and rural water supply development in particular. The average age of respondents was about 37.8%.

As can be seen from table 4, majority of the sample population which represents 49.3% (74) of the total respondents are used to be illiterate. This conveys the message that household level water consumption practices and attitude towards drinking water safety greatly depends on the educational status of the respondent. The higher the literacy rate of the respondent is assumed to be associated with the lower the possibility of being exposed to water born disease. In the case of this study, the status of those literate and illiterate represents 50% each and the likelihood of households being exposed to water contamination and water borne

[7] *Administrative town of Arsi Zone*
[8] *The smallest administrative unit in the Ethiopian context*

disease is still very high even though safe drinking water is made available for community members under study. This being the case, there appears a steady improvement in the health status of the target community under investigation. Issues pertaining to water, sanitation and hygiene are given due emphasis in the country health sector development program. This includes a strategy that involves training and placement of health extension agents within the rural community and is supposed to address and give awareness raising sessions concerning WASH and related cases (NHSSAP, 2011).

As for the annual income of the respondents, results presented at table 5 indicates that male respondents have dominated the income margins s and it is only on three accounts that the female respondents have found themselves in equal footing with their male counterparts. This does not imply that the female respondents as per each income category are all household heads. Accordingly, the number of female household heads accounts for 8 out of the total sample population as stated in the table below. This is further substantiated as 47 spouses have responded to our survey questionnaire representing the male household head that is not available during the household interview session. We were told that male household heads are out for their farm land or went away engaged in other business.

5.2 Safe drinking water access and water use practices in the study communities

Access to safe drinking water and improved sanitation is fundamental and placed at the very center of concerted action towards poverty reduction. An enhanced access to safe drinking water provides the deprived, especially women, an opportunity to be in command of vital aspects of their livelihood and maximize their sense of confidence/self-esteem (Mukherjee & Wijk, 2003). Access to safe drinking water and water use practices at house hold level are determined by a combination of factors associated and intermingled to each other. The presence and absence of which greatly influence the level of access to safe drinking and the water utilization practices. As for this study, 65% of the total respondents have stated that improved water supply point as the main source of water for drinking, cooking and sanitation. This was followed by 8%, 7%, 6% of the respondents who stated unprotected ponds, unprotected spring and hand dug wells, rain water and river as the main source of water for drinking, cooking and sanitation purposes.

Families who don't have pipe born water connected to their premises used to have assign women in the household to go to the water source and collect drinking-water for house hold consumption. Besides, children share this responsibility in meaningful terms as girls under 15 years of age being twice as likely to carry this responsibility compared to boys in the same age category. Accordingly, the burden upon children is higher as they share this burden even though children are not the main responsible person to shoulder this responsibility (WHO/UNICEF, 2010). According to the Ethiopian rural context, women, young girls and boys are supposed to assume the responsibility of fetching water for the household use. The traditional house hold division of labor is meant to address water fetching in such a way that make these household members responsible to fulfill this task daily. Concerning this study, the same holds true as results indicated that (table 7) 23% of the respondents have confirmed women as sole supplier of household water requirements.

Concerning the mode of transporting water, 40.5% the total respondents have confirmed the use of domestic animal (donkeys and camels) power for transporting water from the source. The combined use of human and domestic animal power for transporting water from the sources constitutes 31.1% of the total sample. The use of human power alone for transporting water from the source has been stated by 14.2% of the respondents. The possible explanation of increased use of domestic animals for transporting water is closely linked to the study communities' rift valley location where the climatic is characterized by high temperature not conducive to perform physical activities for hours.

The average house hold water consumption pattern depends on the family size, the level of income, economic activity, the degree of engagement in productive activity and consumption behavior. The household level economic and productive activity determines the amount of water used per day for the different purposes. As per the result indicated in table 8, 26% of the respondents have stated that the amount of water they used for household cooking, drinking, sanitation and others constitutes 81-100 liters per day, followed by 41-60 liters (24%), 61-80 liters (24%), more than 100 liters per day (15%), and 26-40 liters (10%).

Figure 17. Donkeys and camels are widely used for transporting water from the public water tap (Photo: Researcher)

According to the definition of Ministry of Water Resources (1996),"adequate water supply to mean 20 litres of water per person per day and accessible within a range of 0.5 to 1.0 km from a dwelling place". Any improvement made in safe water access has to be measure as per this definition. Taking this definition in to account, Dessalegn (1999) has stated that significant proportion of rural households with safe drinking water access will have greater chance of not securing adequate amount of water that is quite necessary for their wellbeing.

5.3 Community attitude toward safe drinking water, sanitation and hygiene (WASH)

Respondents' perception of qualities of safe drinking water has got an interesting dimension in terms of understanding their level awareness concerning WASH related issues which they encounter in their

daily life. It is also an indication of planning and implementation of WASH activities where issues pertaining to water and sanitation are well addressed (Tear fund WASH, 2005). Water sources need to be protected and safe guarded from possible agents of contamination. There are possible health hazards which are associated with exposure of the water supply source to human waste, wild life, livestock and flooding (NHSSAP, 2011). As for the study areas under investigation, there appears a condition where some water supply sources were exposed without any protective fence and the like thing. The safety and quality of drinking water is further in jeopardy as the culture of open defecation has been socially accepted and widely practiced in most of the rural settings and partly in urban areas as well (Aschalew, 2009).

Being exposed to human contact, let alone that of livestock or wild life can create a favorable condition for water born disease to prevail. As indicated in table 9, major factors affecting the safety of the water supply sources are highly associated to exposure to human feces, livestock,

Birds and wild life's, algae development and uncontrolled flooding which constitute 28.3% of the total respondents. Above all, the Awash River basin has got complicated water quality problems that calls for special attention to be given by stakeholders involved in various agro-industrial activities. This is due to the fact that Awash River is highly exposed to pollution caused by untreated wastewater discharges from domestic and industrial activities undertaken in Addis Ababa and surrounding areas (Taddese G. et al, 2003).

As the population in the downstream extensively uses the water from the river for drinking, irrigation and other socio-economic activities, associated public health risks is significant (Ibid,). The occurrence of high fluoride concentration in groundwater in and around the Awash river basin is another public health concern that requires due consideration of development stakeholders in the area (Ibid,.). The indiscriminate use of different kinds of pesticides by small and large scale irrigation schemes, and chemical discharges from agro-industrial facilities and smallholders have contributed a lot for surface and ground water contamination of the area under investigation.

As issues pertaining to water safety are closely related to focused program activities on WASH, responses given in the table above indicate community members' level of awareness regarding water safety and what need to be done in the future. It was well noted that maximizing the safe drinking water coverage in rural area is highly associated with the reduction of water born disease with a corresponding effect of improved health status that resulted an increase in household productivity. This can only be ensured having increased awareness of household sanitary situation and working towards improving the sanitary facilities at the household level.

Attitudinal change and practicing improved method of waste disposal can greatly maximize the benefits of accessing safe drinking water and thereby maximize productivity (NHSSAP, 2011). To this effect, the study result stated in table 11 has revealed that much has to be done with respect to improving the sanitary facilities at the house hold level. This situation need to be reversed as only 3.4% of the respondents used to have ventilated and improved pit latrine (VIP), followed by traditional pit latrine 45%, pit latrine with slab 9%. This being the case, no facility or bush or field/open defecation accounts for 39% respondents that calls for immediate intervention in order to reverse this situation. As for access and utilization levels in Ethiopia,12 % of the total population used to have improved toilets, 7 % shared toilets, 21 % traditional toilets and the remaining 60 % practice open defecation (8 % urban and 71 %

rural) (AMCOW, 2010). In Sub-Saharan Africa, the rate of practicing open defecation has increased from what has been 188 million in 1990 to 224 million in 2008. 81% of 1.1 billion people who defecate in the open worldwide live in 10 countries. This include, India (638 million), Indonesia (58 million), China (50 million), Ethiopia (49 million), Pakistan (48m), Nigeria (33 million), Sudan (17 million), Nepal (15 million), Brazil (13 million), Niger (12 million) and the rest of the world (215 million) (WHO/UNICEF, 2010).

As children's feces' is the most likely cause of fecal contamination to the immediate household environment, the method of feces disposal for children less than 3 years of age need to be taken in to account (NHSSAP, 2011). Data collected in this respect indicate that 44% of the respondents used to have the practice of disposing child feces in the open, while 16% the respondents used to throw in to the garbage and 3% put in to drain or ditch. Only 16% of the respondents have stated that they used to practice child toilet/latrine in order to dispose feces.

Table 44. Components of the water and sanitation problem

ASPECTS	IMMEDIATE PROBLEM	CONSEQUENCES
Water Supply	• Distance sources	• Much expenditure and energy (especially by women) • Low levels of water consumption, resulting in water-washed disease*
	• Unreliable sources (drought-prone, or poorly engineered or managed)	• Time spent queuing or seeking alternative sources
	• Poor quality (faecally contaminated) sources	• Water-borne disease**
Excreta disposal	• Lack of safe facilities for disposal of human faeces	• contamination of soil, surface water and ground water
	• little privacy for defecation, and lack of water for anal cleansing and hand-washing	• defecation (by men) in open, often near water (eg canal side or river banks);

		hardship for women for whom public defecation is unacceptable
Waste water disposal	• engineered facilities for treatment or safe disposal rarely exist	• indiscriminate disposal leads to environmental contamination, insect habitat creation, and/or unsafe re-use downstream

Source: Carter et al, 1999

Communities in the study area used to have the agricultural practice of undertaking mixed farming that involve farming & animal rearing as their means of livelihood. This being the case, the area is known for water scarcity due to its location in the rift valley area where the rain fall pattern is sporadic characterized by flooding from the adjacent highland districts (Oromia, 2011). It is an area with very limited water supply options that rely on ground water extraction from drilled boreholes and Awash river[9] for sustaining their livelihoods. Awash river is still providing vital economic service to the beneficiary communities in terms of watering their livestock and undertaking small scale irrigation at household level.

All of the communities in the study area are not at the easy reach of this crucial river and used to travel for an hour or more to water their livestock. The provision of watering community livestock from improved water supply sources and associated infrastructures like cattle troughs (EWRMP, 2001) are not in place in the sample communities. The case of Geldia Galiye is the only exception where communal livestock watering structures (cattle troughs) are in place adjacent to the communal water tap with very limited supply from Tebbo river[10] Out of the four sample communities, Adullala Hate Aroreti and Cheka Dewero communities are in a relatively easy access to Awash river so as to water their livestock, while communities in Bubissa Kussaye used to rely on their established ponds and seasonal springs.

[9]Economically vital river widely used for irrigation and agro-industrial activities
[10] Small river bordering Adama & Boset districts

Figure 18. Cattle being watered from the nearby community pond, Bubissa Kussaye community (Photo: Researcher)

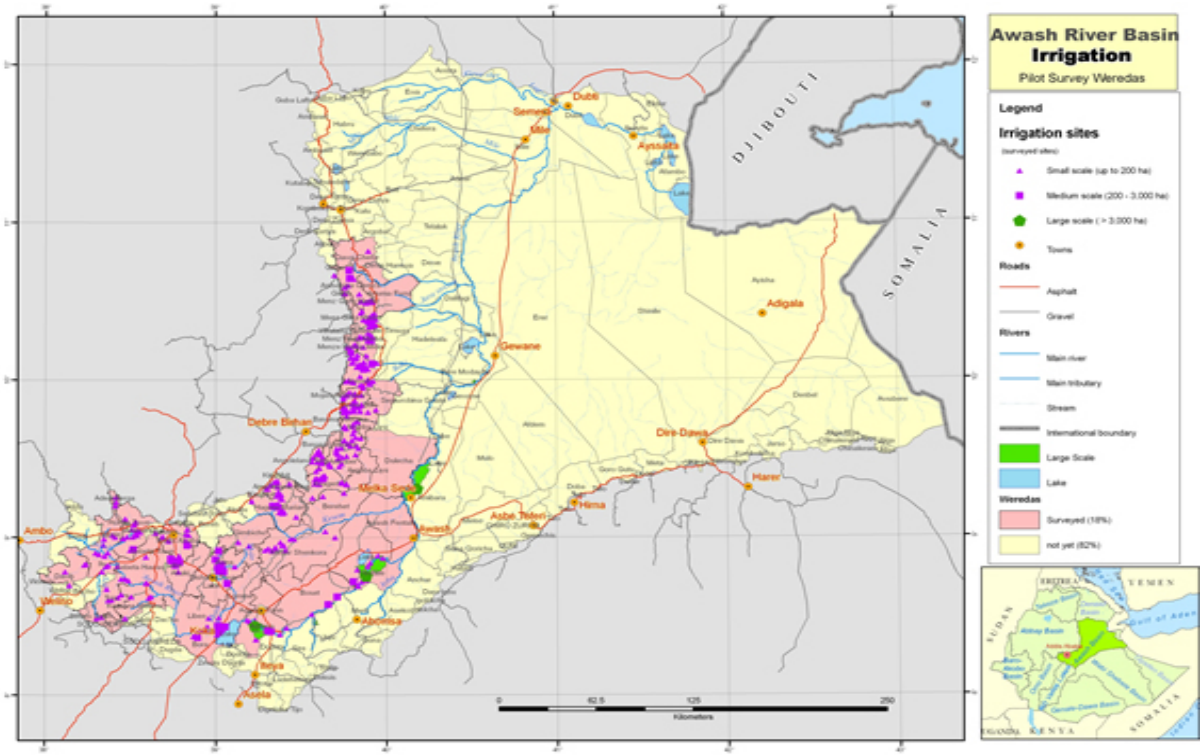


Figure 19. Awash River Basin Irrigation Map (Source: Ethiopian Ministry of Water Resources –AWMISET)

In line with the stated objective realities, result in figure 4 has indicated that significant proportion of the respondents that constitute 45% (figure 5) of the sample population have indicated that they used to water their livestock from the river. Other categories of respondents which account for 15% the sample cases have disclosed that they utilize water from their respective communal tap to water their livestock.

5.4 Planning and implementation of the water supply projects-Technical aspect

In most cases, conducting a baseline survey is not the kind of task expected to be done at the district level. Undertaking a baseline survey is a task that is mandated to zonal water and energy office where the professional capacity capable of conducting a comprehensive baseline survey is in place. In this case, the role of the district office is to facilitate and organize the preparatory work at the district and community level involving the mobilization of stakeholders to take part in undertaking the baseline survey. Otherwise, things are worked out and get prioritized at the office and district level consultations without going to the detailed process of the field level baseline survey.

Currently, Demand Responsive Approach (DRA) has turn out to be the basis of governmental and NGOs water supply guiding principles all over the world. The shift of emphasis from supply-driven water supply interventions to Demand Responsive Approach (DRA) is due to the fact that the preceding interventions have failed to provide poor communities with sustainable water supplies. In the case of supply-driven interventions, it was found out that beneficiary communities merely take water supply service delivery but failed to play an active role during project implementation and lack a sense of project ownership (Breslin, 2003).

Demand responsive approach calls for well-defined working directives that articulates about the process steps that need to be adhere while enabling the user community to prioritize their needs, initiate project ideas and entrust informed choices, decide on technology type, and location of facilities that best fit their needs including costs and commitment to bear upcoming responsibilities attached to the project (Sara et al, 1997).

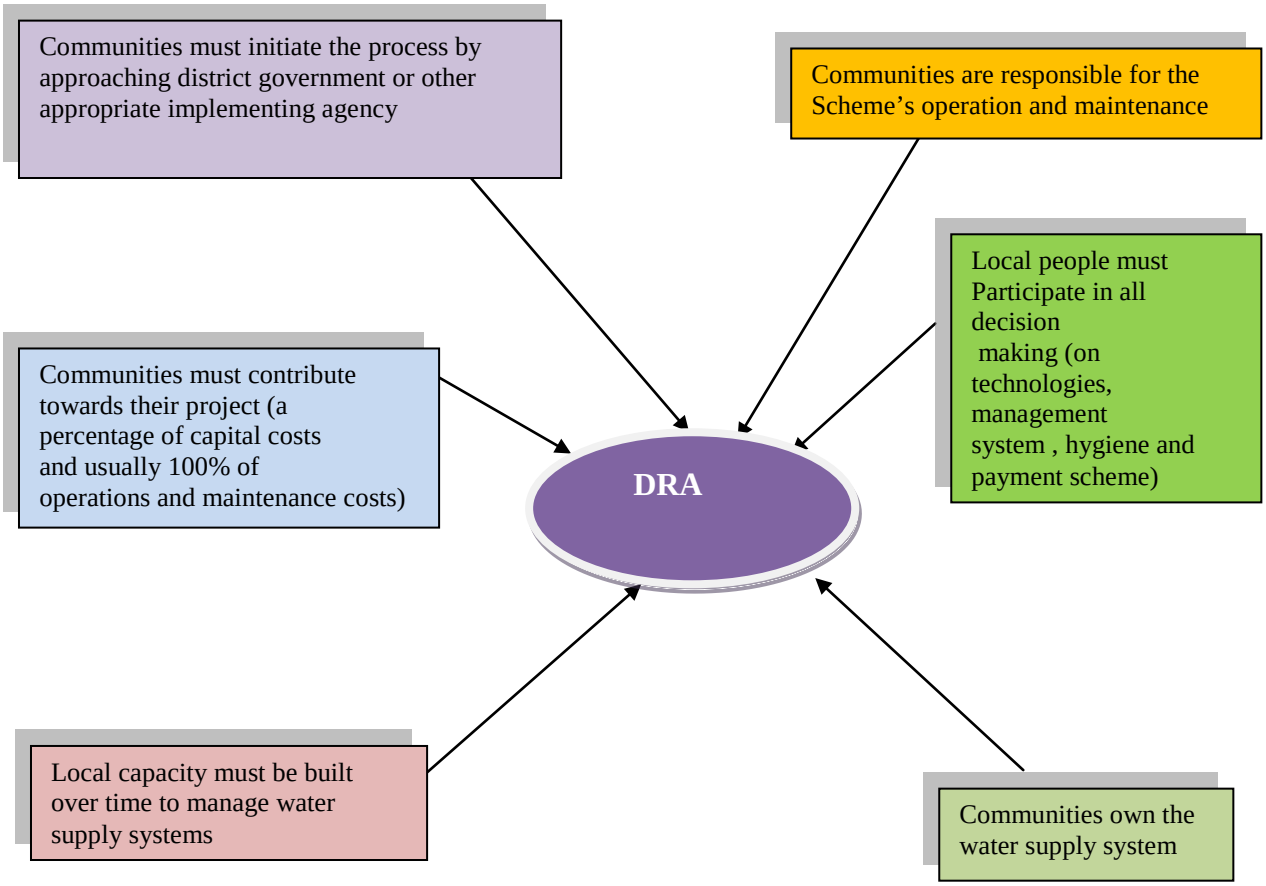


Figure 20 Characteristics of Demand Responsive Approaches (DRA) (Source: Breslin, E.D., 2003)

Concerning this study, responses associated to water supply project initiators was shared among the different stakeholders involved in the project inception. Accordingly, results compiled in table 14 have indicated how the target [9] community members react to this issue. As the project community members are well aware of their felt needs, 43%, respondents have confirmed community members as initiators of the project followed by NGOs, governmental offices and community members representing 16% of the total response. Respondents which constitute 12% of the total sample used to have indicated NGOs and governmental offices as initiators of the water project.

Community members participation in determining the type of technology to be used by the water supply project is not encouraging as 24 cases representing 16% of the sample population used to have responded that community members & leaders are the once to choose the type of technology to be installed for the water supply scheme. The other response category that involve the participation of community members/leaders, NGOs &

governmental offices holds 5% of the total respondents. Whereas NGOs and governmental offices which constitute 60% of the sample population used to have the line share in deciding the type of technology that need to be installed for the water supply scheme. The remaining 12% of the respondents have assigned the choice of technology to the responsible governmental offices.

As can be observed from table 15, the place given for community members in decision making on matters related to choice of technology is very limited. Stakeholders involved in the water project need to give due emphasis to the beneficiary community and participation has to be enhanced so as to give them a greater chance to air out their voice. The kind of technology that cannot serve the best interest of the beneficiary in terms of the quality and durability can cause further problem for maintenance and is supposed to be a challenge for sustainability (Carter, 2010). In this case, capacity building training aimed at scaling up technical knowhow and capacities to manage/operate the technology employed and carry out simple maintenance need to be given for water committee member.

Asked whether they still regard water as a major problem in their community (table 16), 70% of the respondents have regarded water as a problem that need to be well addressed in terms of sufficiency and effective service delivery. Respondents suggested solution to the problem include develop new sources 24% , improve storage 4%, treat water 7% , protect and improve the existing sources 3% , develop new source, protect and improve the existing sources 11%. Concerning the hardships and problems that forced them to demand for the current improved water supply, 10% of the total responses have stated more time spent to fetch water as a problem, 12% mentioned problems related to water born diseases, drudgery for women and children to fetch water accounts for 12% of the total response followed by lack of water source during the dry season which accounts for 16% of the total respondents.

Distance from the household to improved water source determines time and labor allotted for production and the level of productivity at the household level. To that effect, 51% of the respondents (table 17) have responded that the improved water source at their community is located at the easy reach of their respective household. In this regard what matters most is the level of safe drinking water accessibility in terms of acceptable radius of coverage. The question that needs to be answered is % of the target community members who resides within a reasonable distance and covered by the water supply service.

Respondents constituting 82% (table18) have confirmed that technical training was given to water committee members. The same kind of response has been cited during the focus group discussion session. But when questioned about the frequency of the training, they used to state a onetime training dose that was given to the water committee right before the water supply scheme commences to deliver service to the beneficiary community. The possibility for refresher training is unthinkable in most cases due to the budget constraint of the district water & energy office.

This is one of the growth area where the district water & energy office need to work hard mobilizing partners in line with ensuring the technical capacity of the water committees and water supply scheme sustainability. This being the case, there are limited refresher training opportunities created by partner NGOs who are closely working with the district water office in the area of rural water development. In this regard, World vision Ethiopia Adama area development programme is considered to be a viable development partner credited for drilling most of the boreholes in Adama district and providing refresher training in collaboration with the district water & energy office.

The presence of external support has to be in place once the water committee is formed and the provision of technical training and support for repairs has to be maintained in order to keep them encouraged and committed. In this case, the involvement of stakeholders and other concerned is highly encouraged (Jansz, 2011). Besides, this is a very crucial area to act upon as the water committee capacity for operation & maintenance of the water supply scheme and financial management has becoming a growing concern in line with sustained water supply services and benefits over time.

5.5 Tariff Collection and Financial Management

Water tariff management is one of the many areas where issues pertaining to community participation and water supply system sustainability highly linked. The mechanism employed to administer the water supply tariff in terms of cost sharing practices to cover the ever increasing operation and maintenance cost is crucial for sustained water supply service delivery and benefit over time. This requires a working tariff structure in place that is reasonably framed in order to cope up the ever increasing operation and maintenance cost (Bauman, 2006). In most cases, insufficient amount of finance are collected which trim down the life expectancy of water supply scheme in many instances (Ibid,). The whole issue behind

applying appropriate tariff structure is to create a sense of ownership in the community (Parry-Jones et al, 2001) and ensure sustained water supply service over time.

The starting point for tariff management counts on collecting water supply service fee as per the amount of water collected by households in the target community. According to the data collected from the field, there is no standard water tariff structure in place in the study area or elsewhere in other rural areas of the district. As per the sample communities selected for the study, the amount paid for water supplied varies in accordance with the type of technology used for operating the water supply scheme.

Consequently, the water supply scheme in Adullala Hate peasant association used to have operated using power generated from diesel generator and the amount of money paid per pair of jerrycan (50 liters) is very expensive (1 birr) as compared to other water supply structures. This is due to the ever increasing cost of fuel used for operating the diesel generator, and this has to be covered by the beneficiaries in order to maintain the service. In the case of Geldia Galiye, where their water supply used to be operated by hydro power the amount paid per pair of jeerycan (50 liters) is quite cheap (0.25 birr).

The amount paid for hydro power generated to operate the Geldia scheme is relatively low as compared to fuel expenses covered to operate the diesel generator of Adullala water supply scheme. In the case of Cheka Dewero, the amount paid per pair of jerrycan (50 liters) is 0.30birr that is quite cheap as per the area context. They have no expense to be paid for power generation as they used to have accessed to gravity flown pipe water extended from adjacent highland district. In the case of Bubissa Kussaye, the water supply system is somewhat different from those mentioned as the beneficiary community is highly dependent on traditionally protected ponds complemented by hand pumps.

In this case, the community is not expected to pay for water fetched from ponds, rather they provide labor contribution/cash in order to maintain their ponds and fetch water for free from the hand pumps installed in their community. One of the many factors contributing for sustainable rural water supply system is attributed to the practice of cost sharing associated with consumers' payment for water service delivered. It was assumed that users should pay as per the water delivered for their house hold consumption.

This is a working principle that needs to be practiced by the benefiting community in line with sustaining the operation and maintenance of the water supply scheme. In this respect, the

user community is expected to assess the prevailing costs associated with the operation and maintenance of the scheme and thereby revising the existing water service fee as per the ever increasing cost of operation. It is well understood that water users are not in a position to finance the entire replacement costs of their water and sanitation services, it is essential to think about cost sharing as one alternative alongside other new funding mechanism (Cater, 2010).

As per this study, it was discovered (figure 6) that most of the beneficiaries used to be in the payment category of '11-30 birr' which represents 49% of the sample population. The second in line are those who have responded that their water fee payment range is less than or equal to10 birr, and they constitute 23% of the total respondents. Those with the highest amount of water fee i.e. more than 110 birr per month represents 7% of the total sample. Respondents who are in the payment range of '51-70 birr' constitutes 6%. Others with smaller proportions are those in '31-50birr' and '71-90 birr' category representing 6 4% each of the total responses.

The last category of response i.e. 'no fee' is attributable to those respondents from Bubissa Kussaye KA , where the beneficiary community is highly dependent on traditionally protected ponds complemented by hand pumps. In this case, the community is not expected to pay for water fetched rather they provide labor contribution/cash in order to maintain their ponds and fetch water for free from the hand pumps installed.

There is growing awareness in the part of the respondents why they commit themselves to pay the water fee. They tend to be well aware of the essence of operation and maintenance cost and what need to be in place so as to maintain the water supply services and benefits over time. The principle of users pay has been widely practiced in Adama district and the beneficiary communities are willing to pay as per the water supply service provided. Accordingly, 34% of the respondents (table 19) have reasoned out the payment of water fee in line with covering operation and maintenance cost. Other category of respondents constituting 19% of the total have associated their payment of water fee in terms of covering operation and maintenance cost and building new water scheme. While those respondents which represent 28% of the total sample used to have understood their payment of water fee in association to building new water scheme.

As combination of factors are contributing towards water system sustainability, the practice of cost sharing for operation and maintenance of the water supply scheme is one of the area

where the benefiting community is expected to commit itself and act responsibly for the water supply system extend its services over time. In this regard, the first ground rule that need to be practiced by the beneficiary community is to pay the water service fee as per the water supplied. This was further confirmed by the sample respondents (table 20) as 96 cases representing 64.9% of the total response have strongly agree towards the application of this rule. The second group of respondents involving 10.8% of the sample population insists on the application of monthly contribution so as to ensure the water supply scheme operation and maintenance.

Others 7% of the sample total have indicated annual contribution as a means of cost sharing in order to upkeep operation and maintenance of the water supply scheme. A combination of response that represent 4% of the total respondents have indicated users pay as per water supplied and annual contribution as a way out in order to ensure the operation and maintenance of the water supply scheme.The issue of functionality of the water supply system and seasonal fluctuations is an area that needs to be given greater emphasis. This is due to the fact that Adama district is geographically located in the rift valley area where the rain fall pattern is sporadic with a corresponding effect of very low ground water recharge rate compared to the amount extracted for use. What has been done so far in terms of providing safe drinking water to the rural community mainly depends on exploiting the ground water potential employing borehole drilling. Accordingly, this study involves two water supply schemes (Adullala Hate Aroreti & Geldia Galiye) which generate the water for drinking from boreholes drilled between 150-200 meters deep. The water supply scheme in Adullala (represents 12 water supply schemes operated by diesel generator) community has served for over 10 years and failed to cover the consumption rate of the ever increasing population. Besides, it has got technical problems related to the capacity of the pump and fuel consumption rate of the diesel generator used for pumping the water.

In the cases of Geldia Galiye (represents 5 water supply schemes operated by hydro power), the situation is quite Ok as the water supply scheme used to have the capacity to satisfy the consumers demand at its present status. Cheka Dewero (represents 8 water supply schemes operated by gravity) used to depend on gravity flown pipe water extended from capped spring located at adjacent high land district (Iteya district). Besides, the users at Cheka Dewero community used to have faced the problem of recurrent pipe line breakage and a corresponding effect of water shortage. That of Bubissa Kussaye (represents 10 manually operated hand pumps existing in 2 communities) depends on traditionally protected ponds

complemented by 5 hand pumps installed at different sites. These hand pumps are partly functioning and in short supply of water during the dry season due to low recharge rate of the ground water.

5.6 Community Participation

The issue of community participation has become a debatable and contested case as there appears an on-going argument concerning the parameters that determines its existence. Development Practitioners working with communities used have argued that communities need to be given greater opportunity to manage and decide on issues affecting their livelihoods (Narayan D., 1995). This calls for community participation that implies a proactive process in which the beneficiaries influence the development and management of development projects rather than merely receiving a share of project benefits (Paul, 1987). Having this in mind, the researcher has assessed how members of the community under study perceive, interpret and practice community participation in their local context.

To that effect, the following results were obtained from the field. As indicated in the table 22, significant proportion 88% of the respondents have stated the existence and practice of community participation in their respective communities. The remaining 11% of the respondents used to disclose that much of the work has been done by project implementing agencies, government and representative of water committee members and the room for wider community representation is not in place. Even in the case of those with significant “yes” responses, the community understanding of participation goes to the point of contributing cash and labor during the prime time of project construction. Once the water supply scheme is in place, stated the respondents, as well as participants of the focus group discussion, the degree of participation diminish living aside all the responsibilities on the shoulder of the water committee members.

The water committee in turn, assumes all the responsibilities ranging from collecting water fee to operation and maintenance of the water supply scheme without adequate backup from the KPA administration as well as the beneficiary communities. The practice of community follow up and monitoring of the water supply system is very limited. In most cases, the water committee has no reporting mechanism to the community other than the one they communicate to district water and energy office.

Concerning the widely practiced types of community participation (table 23), providing local materials (wood, stone and sand) constitutes 24% of the total respondents. Participation in terms of providing labour, cash and local materials has been indicated by 29% of the total respondents. Those respondents who have replied providing labour and local materials represent 19%. While 16% of the sample respondents have indicated their participation in terms of providing labour and cash. Providing labour in the form of community participation has been indicated by 7%. Other category that constitutes 4% of the total responses have stated their participation in terms of active involvement in community consultation, community mobilization and acting as a focal person in those dealings with stakeholders.

The kind and forms of community participations indicated in the table above are not something special in Ethiopian context in particular and developing countries context in general. In general, community willingness to contribute their share of capital costs is crucial to community participation because they act as an indicator of community commitment to the project (Breslin, 2003). These are the usually practiced types of community participation where community members are mobilized in order to take part in community projects that affect their livelihoods. In most cases such kinds of community participation are characterized by one time package of engagement that involve labour, cash, local materials and other forms of contributions. Besides, the rate of community participation are influenced by combined factors that involve the kind of community project initiated, possible benefits to be generated from the project at household and community level, identity of project initiators and possible project partners and stakeholders. Further unpacking the degree and level of community participation during project planning and implementation (figure 7), it can be well observed from the chart above that 11% of the total respondents have stated fair. Responses which account for 5% of the total sample have considered the rate of participation as low and very low. The highest ratings are those representing good and very good responses which account for 36% and 35% cases respectively. These are indications of respondent's own perception and critical assessment of community participation in their local context and need to be looked at closely in order to better understand the determinants of community participation.

In the context of the beneficiary community, the essence of community participation is understood as a onetime social mobilization focused at pulling the required community inputs towards materializing the intended water supply scheme. Right after the completion and operation of the water supply scheme, the whole responsibility tend to rest at the hands of the elected water committee without leaving a room for accountability factor. By then, all issues

surrounding the water supply scheme become the business of the water committee with no backup from the KPA administration and the community at large.

5.7 Community Management

If water projects are to be managed efficiently and are to be sustainable, it is important to promote beneficiary participation in the sense that the main stakeholders should be actively involved in the management of water projects (Dessalegn, 1999). As for responsible body to make major decision (table 24) regarding issues related to the water supply scheme, 35% of the sample respondents have stated the water committee as a mandated body to make major decisions.

The second response inline is the beneficiary community which has got 23% of the total response. The remaining responses are represented by government 14%, beneficiary community and water committee 13%, water committee donor agencies, government bodies, and beneficiary community 7%, government bodies ,donor agencies and beneficiary community 6% and others category constitutes 3% of the total sample.

What one can derive from this percentage distribution is that a third of the total respondents used to acknowledge the mandate given to the water committee to manage the water supply scheme in terms of operation & maintenance, collecting water fee, up keep financial records. The other significant percentage of response concerning the issue of making major decision insist on the greater involve of the beneficiary community. In this case, the respondents felt that major decision concerning the water supply scheme should not be left for the water committee alone as such major decisions may have far reaching effect in the livelihoods of the beneficiary community.

Regarding the level of trust to the water committee (figure 8), 30% of the respondents used to have indicated that they have very good level of trust towards their water committee. Others constituting 22% of the total respondents have disclosed good trust concerning their water committee. Those respondents who have evaluated their respective water committee in fair terms constitute 20%. This being the case, 17% of the respondents have stated very little trust to their respective water committee. Still others which represent 6% of the total respondents used to have said we don’t trust at all, while the remaining 5% endorse full trust to their water committees.

Communities are very curious about issues affecting the households in particular and community in general. This is quite evident with regards to the management of the improved water supply scheme at their disposal. To this effect, there appears misunderstandings and grievances towards the water committees as stated by some respondents, and this tendency has also been manifested by some participants of the focus group discussions and key informant interviews.

Percentages indicated in the slices of the pie chart (figure 8) show us how the respondents consider the water committee in their respective communities in line with the level of service given, financial management, operation and maintenance of the water supply scheme. The overall evaluation given by respondents to the water committees is not that bad but there are also indications that water committees need to scale up their capacity in providing better services, improving financial management standards, handling operation & maintenance and discharging responsibilities as per the mandate given by the community and thereby win the trust from their respective communities.

5.8 Women Participation

In many rural settings the task of collecting and transporting water is mainly assigned to women as they are also the prime water users at house hold level. They are the once who spent most of their time fetching water each day. In most cases, they collect water from unsafe sources that involve rivers, unprotected springs, or polluted streams or ponds. They use to be exposed to these unsafe water sources and this in turn increases the risk of being exposed to water born diseases. Accordingly, increased access to safe drinking water would mean much for women and their children in terms of health, productivity and income. To this effect, the involvement of women has to be maximized in terms of water supply scheme planning, implementation and management (Dessalegn, 1999).

As indicated in table 25, most of the respondents have confirmed the presence of women participation in the management of the water supply scheme. Accordingly, 85% of the total respondents have disclosed the involvement of women in the management of the community water supply system. But much has to be done in this respect as the level of their participation has not been very satisfactory. It was widely believed that this is attributable to social, economic and cultural reasons, which limit their participation in water committee, and make them more reluctant to get involved in such activities (Ibid.,).

Besides, women in Ethiopian rural context are burdened with numerous household responsibilities that demand specific attention and consume most of their time, and living them with very limited time to spare in water supply scheme management. According to the directive given concerning the formation and composition of the water committees in Oromia region, the number of water committee members for water supply scheme is 7 out of which the women representation constitutes only two members (OWMERDB, 2000).

5.9 Consumers' Satisfaction

As an interplay of factors are contributing towards water system sustainability, the issue of consumer satisfaction with regards to the service delivery of the water supply scheme is one of the area that need to be closely assessed using different indicators (Parry-Jones S. et al, 2001). As Adama district is located in the rift valley region, the climatic condition is characterized erratic rain fall pattern and the community members tend to rely on ground water ponds and earth dams as well. The possibility of being exposed to water born disease is quite evident as there are still communities who are not yet accessed with safe drinking water in their vicinity (HSDP, 1997). One of the selected communities for this study i.e. Bubissa Kussaye can be cited as the best example of those communities who are still suffering from water born diseases due to lack of access to safe drinking water.

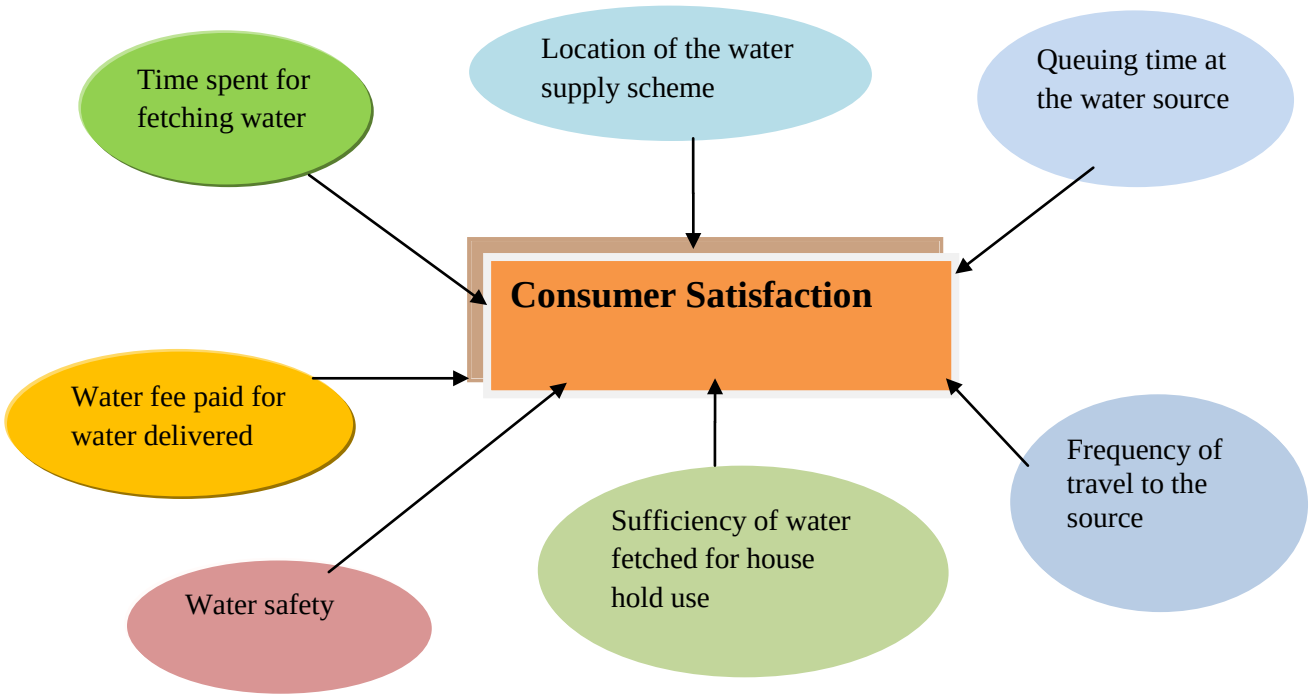


Figure 21. Major contributing factors for consumer satisfaction (Source: Researcher)

This was further confirmed by community health extension workers and community members who take part in focus group discussion. In this case, the community members in Bubissa Kussaye used to have the practice of drinking water from the pond without added value i.e. using water filtration methods & medication agents (aqua tab & aqua safe). They heavily depend on traditionally protected pond for their house hold consumption although there are some attempts made to reach parts of community installing hand pumps.

Figure 22.Community members fetching water from unsafe source, Bubissa Kussaye community (Photo:Researcher)

As can be observed from the responses given in table 26, those respondents who stated improved health status of family members due to access to safe drinking water represent 30% of the total sample. Other category of respondents that constitute 23% of the sample have disclosed relief of women and children from exhausting work, more time for productive, social and domestic activities, improvement of livestock productivity, household income & health as a benefit gained from access to safe drinking water.

Responses pertaining to improved house hold income and health, relief of exhausting work for women and children constitute 7%. The time factor to and from the improved water source is one of the many issues related the provision and accessibility of safe drinking water supply. As stated in table 27, 23% of the sample population have responded that it take them less than or equal to 15 minutes to fetch water from the source and come back. This being the case, others representing 41% have responded that it take them 16-30 minutes to fetch water from

the improved source and come back. Respondents representing 17% of the sample population used to have stated that it take them 31-45 minutes travel to fetch water from the improved source and come back. Those who respond 46-60 minutes travel constitute 14% of the total response. On aggregate, 64% of the respondents have responded that they spent less than or equal to 30 minutes to fetch water from the source and come back. In this respect, some researchers have indicated that household members who spent more than 30 minutes to fetch water and come back, tend to collect less amount of water and fail to fulfill the house hold daily water consumption. Besides, the time committed to conduct multiple trips to collect water is so high in economic terms and contributes to lower productivity. (WHO/UNICEF JMP, 2010).

Regarding the frequency of travel committed to fetch water from the source (table 40), 48% of the total sample have replied that they commit two trips a day to the source. Those who have commitment a single trip per day constitute 21% of the total respondents. Respondents representing 15.5% of the sample have stated that they commit 3 trips per day. The remaining 11.5% have disclosed that they travel more than 3 times a day to fetch water from the source. The likely justification given regarding the increase in the number of travel to the water source is mainly associated to an increase of water consumption by households whose premises are not connected to pipe water (Thompson J. et al, 2001).

According to the data collected from the field, what surprise most in Adama case is that most of the water supply schemes are located at a reasonable distance but what matters is the issue of average waiting time/queuing. As indicated in table 28, 44% of all the responses have confirmed that queuing time at the water source is a major issue that takes away the labor force necessary for household productive activities. In general, the number of responses that fall between queuing time of 31-60 minutes and above accounts for 59% of cases as compared to 38% of the total responses whose queuing time is between less than or equal 15-30 minutes.

Figure 23. Queuing for water at public water tap in Adullala Hatie community

Concerning the convenience of the water supply scheme location (table 29), 70% of the total sample u have disclosed that the improved water source is located at convenient place, and households are not that much suffered from fetching water traveling long distance. This response was further confirmed by the researcher's field observation, as most of the public water taps, what we call 'Birrcas'[10*] are located at a reasonable distance. Contrary to this reality, combined responses (inconvenient & very convenient) which account 18% of the total response used to have indicated that the location of the communal water taps is not convenient for the beneficiary community.

Besides, respondents representing 13% of the total sample population have stated the location of the water supply scheme in fair terms. Assessment of data concerning fees paid for water supplied (figure 9) has revealed that 26% of the respondents have indicated that the amount paid for water supplied is expensive. Cases representing 34% of the respondents have stated that fee paid per water supplied is cheap. Meanwhile, 34% of the sample respondents have responded that the amount paid for water supplied is fair, and 4% of cases have indicated that they paid none for water supplied. Majority of the respondents are still complaining about the sufficiency of improved water supply (table 30) for drinking, cooking and sanitation. This is further noted by their response regarding this issue, as 55% of the sample population used to have questioning the sufficiency of improved water supply in line with addressing their house hold need per day.

This being the case, 45% of the respondents used to state that they have sufficient improved water supply for drinking, cooking, sanitation and other purposes. In principle, the target community should be served effectively and sufficiently. Nevertheless, the capacity of rural water supply system is very inadequate with a corresponding effect of low coverage and

[11]Ethiopian name for communal water tape

seasonal fluctuation. Under such a situation, the majority of the population will have a tendency to look for alternative unsafe water sources in order cover their household basic needs. This will have far reaching effect on the health status of household members as they are exposed to unsafe water sources with high risk of being affected by water born diseases. Besides, insecure water storage will create favorable condition for contamination and risk of being exposed to water born diseases (Thompson J. et al, 2001).

5.10 Willingness of Beneficiaries to Sustain Rural Water Supply System

Concerning the issue of water supply system technical sustainability, there appears greater interest and commitment of the study communities to maintain the water supply scheme services and benefits over time. It was believed that community participation generate favourable conditions for sustainability by allowing beneficiaries to determine the kind of services to be delivered for which they are willing to pay. Besides, it allows the user community to decide on major management issues, osts, investments, and make choices and commit resources as per these choices (Sara and Katz, 1998).

Accordingly, sizable proportion of the sample respondents used to have due consideration of the water supply system sustainability in line with their livelihoods. They have shown marked commitment to provide support as required in order to secure lasting project benefit over time. As indicated in table 31, 12% of the total sample respondents used to have indicated that their water supply scheme is well functioning without any damage or technical problems. This being the case, significant proportion of the respondent representing 39% of the total response disclosed that the water supply schemes in their respective community used to have functioning with some breakage/technical problem.

While the other group of respondents representing 29% of the sample respondents has indicated that the water supply scheme in their community is partly functioning. This response is further accompanied by 7% of the total response who have disclosed that their water supply system is partly functioning with some technical problem. Besides, 9% of the sample respondents used to have stated that the water supply scheme in their community can't be said functional by any standard. There appears growing concern of community members towards their water supply scheme service capacity and tend to look for options as to how to maintain and scale up the functionality (table 32) and services.

Figure 24.Broken hand pump structure in Bubissa Kussaye community (Photo: Researcher)

To this effect, 22% of the total response have stated the availability of spare parts, upgraded local skills, technical and capacity building training for those community members who manage the water supply scheme and scale up community participation in the management of the water supply scheme for the system remains functional. The second category of respondents that constitute 21% of the sample population used to capitalize on three aspects for the water supply system to remain functional. This involves provision of technical and capacity building training for those community members who manage the water supply system, availability of spare parts, and local skills should be in place in order to operate and maintain the functionality of the water supply scheme. The third category of respondents which accounts for 20% of the total respondents, insist on the provision of technical and capacity building training for those community members who manage the water system for the water supply system remain functional. Besides, 12% of the sample population underlines the importance of up grading local skills, provision of technical and capacity building training for those community members who manage the water supply scheme.

Others constituting 10% of the total responses have suggested upgraded local skills to be in place in order to operate and maintain water supply scheme. Sizable proportion of the sample respondents (table 33) 31% of the total response used to have due consideration of the water supply system sustainability in line with their livelihoods. They have shown marked commitment to provide support of any sort as required. The stated contribution and commitment of this category of respondents involve: actively participating in discussions concerning the management of the water supply scheme; labor contribution during the time of maintenance; cash contribution and paying water service fee in time.

The second category of respondents representing 30 cases and 20% of the sample population have strongly indicated participation in labor contribution during maintenance and active

participation in the management of the water supply scheme. Participation in labor contribution during maintenance has been stated as a means to ensure the water supply system by 18% of the total respondents. The fourth category of respondents which accounts for 16% of the total respondents, are those who capitalize on greater participation of the community in consultation & discussion of water supply scheme management. In all cases, what impressed most was the degree of concern of the community representatives regarding water supply in line with their livelihoods, and to what extent it could be affected if they fail to maintain the water supply system.

5.11 External Support

The respondents gave due emphasis for close collaboration with external agencies since the realization of water supply projects requires the collaborative and joint effort of all stakeholders. The presence of external support has to be in place once the water committee is formed and the provision of technical training and support for repairs has to be maintained in order to keep them encouraged and committed. In this case, the involvement of stakeholders that comprise NGOs and GOs is very important (Jansz, 2011).

In line with this understanding, the importance of communication and collaboration (table 34) with government offices has been disclosed by 45% of the sample population. Maintaining close collaboration with NGOs and government offices while planning and implementing water supply scheme has been indicated by 24% of the respondents. The importance of having working relationship with partner NGOs accounts for 7% of the total responses, followed by 5% who advocate for retaining functional partnership with government offices, NGOs, private sector, education and research institutes.

Significant proportion of the respondents representing 79% of the sample population has confirmed (table 35) that they witnessed some sort of support given to their respective water supply scheme at one point in time. Only 19% of cases have responded the absence of any form of support given from either district or zonal water and energy office. As for the kind of support given (table 36) from the district and zonal water and energy office, maintenance and other technical assistance constitute 30%, training and technical assistance represent 16%, provision of training 10%, followed by 6% of the total responses who have stated training, provision of spare parts, financial and technical assistance.

Respondents of the survey seem curious about the role of the donors and government agencies (table 37) in the management of community water supply scheme and responses in the table used to have indicated this tendency. Accordingly, combined response that involve financial support, providing maintenance service, technical & capacity building training, monitoring and evaluation represents 37% of the total respondents. Provision of technical and capacity building training accounts for 20%, followed by provision of maintenance, financial support and a combination of two representing 14%, 12% and 7.4% respectively. In general terms, responses given above indicate that the role of government offices and NGOs need to focus in the areas where the beneficiary community lacks the resources and expertise.

It was well noted that sizeable proportion of the representative sample population indicates the situation and time appropriate for the intervention of the external agencies (table 38) need to be in line with the prior request of the beneficiary community. As per this case, 37% of the sample population have stated that the intervention of external agencies in the management of the water supply scheme need to be in the best interest and formal request of the beneficiary community. The second in line represents a combination of responses which constitutes 16% of the total sample. This category represents cocktail of replies which involves request made by the beneficiary community, GOs/NGOs intervention deemed necessary, when there appears misunderstanding among members of the beneficiary community and when the water committee fails to properly manage the water supply scheme. The other two groups which also involve a combination of response are said to be sub categories of the second category and accounts for 20% of the sample population.

What one can draw from the categories of responses stated above is best explained in terms of the tendency of the beneficiary communities to be more involved in the management of the water supply scheme. In this case the beneficiary communities intend to have greater say in the management of their respective water supply schemes without being coerced by external agencies (Dessalegn, 1999). They just want to have a room to air out their feelings and expressed interest concerning their water supply scheme and related issues that affect their wellbeing. It also shows the developing trend surrounding the rural communities, who are always told to follow rules and regulations from above are now beginning to act in order to reverse this situation and scale up their involvement in matters affecting their livelihoods.

This being the case, there is still another response category that represents 21% of the total sample who replied GOs and NGOs intervention deemed necessary.

5.12 Monitoring and Evaluation

Those respondents asked whether they have got some kind of follow up and monitoring mechanism in place (table 39), in order to have updates regarding the management, operation and maintenance of the water supply scheme, 39% of the sample respondents used to have indicated that they have some sort monitoring system in place. As stated by some respondents, this was a monthly community discussion forum concerning the socio-economic affairs of their respective community where they were given updates regarding the water supply scheme service coverage and operation status. Conditions for conducting monitoring at household and community level has to be encouraged as it is found out to be one of the ingredient that greatly contribute towards the realization of sustainability, this is due to the fact that consideration remains purposeful on the required outcomes, and service beneficiaries have got an opportunity of being empowered to manipulate their management and performance (Carter, 2010).

5.13 Policy framework

The water resource management policy of Ethiopia is well versed and comprehensive addressing a wide range of sectoral and cross cutting issues. One of the fundamental principles stated in the policy document capitalize on ensuring citizens access to sufficient water of acceptable quality and enable them satisfy their basic needs. It calls for rural centered participatory water resource development approach with decentralized management that involve integrated framework. Besides, it upholds water resource management that contributes towards ensuring social justice and economic effectiveness, system reliability and sustainability norms. Enhancing the participation of women, stakeholders and beneficiary communities at large in water resource management is another area where the principle gave due emphasis (EWRMP, 2001).

Based on the guiding principles stated in the comprehensive policy document, the country water supply and sanitation policy has been devised based on the following general policy:

> "Create and promote a sense of awareness in communities of the ownership and their responsibilities for operation & maintenance of water supply system and develop participatory management

> practices. Promote the development of water supply on participation driven and responsive approaches without compromising social equity norms. Ensure that rural drinking water and livestock water supply undertakings shall be integral part of the overall socio-economic development, centered on self-reliance, community participation and management" (EWRMP, 2001).

Based on the policy imperatives indicated in the water supply and sanitation policy, policy details have been formulated involving component parts which are necessary to realize the stated policy objectives. The policy details are interdependent in the sense that they are complementary to each other and there is no part which stands alone. The finance and tariff details of the policy advocate for the promotion of self-financing project initiatives at the local level and allow the provision of subsidies to communities who cannot afford to pay for basic services on capital costs only. It make sure that all water supply undertakings will adequately address costs associated with operation and maintenance and be based on "cost-recovery" principles. Further it calls for transparency, fairness so as to enhance readiness to pay and participation by the users and communities in the financial management of water supply systems. Ensure responsibility and financial accountability in the management of water supply (EWRMP, 2001). It acknowledges area specific tariff structure in place and ensures its applicability. Accordingly, the tariff setting for the rural community need to be checked whether it is in line with the objective of recovering operation and maintenance costs. It encourages the need to have 'social tariff' and ensure that the tariff structures of the water supply systems are based on equitable and practical guidelines and criteria. Initiate flat rate tariffs for communal services like hand pumps and public stand posts (Ibid,.).

Regarding Institutions and Stakeholders, the policy advocate for the management of water supply systems to be at the lowest and most efficient level of institutional set up, which provides opportunities for full participation of beneficiaries and promote effective decision making at the lowest practical level. Taking the leading role in developing coherent and streamlined institutional frameworks for the management of water supply at the Federal, Regional, Zonal, district and community levels and clearly define the relationships and interactions among them (Ibid,.). To make smooth the implementation of the policy by stakeholders, it initiates coherent and appropriate guidelines, standards, principles and norms for streamlining the intervention of ESAs, NGOs loans, grants and other donations.

Take the initiative to build up a framework for the sustainable and effective collaboration amongst all stakeholders including the public sector, donors, communities and the private sector at all levels as well as creates and legalize forum for the participation of all stakeholders. In order to facilitate sectoral coordination and collaboration, it define and implement the respective roles of the various institutions and stakeholders at all levels including Federal, Regional governments, ESAs, NGOs, private sector, etc (Ibid,.).

In terms of capacity building, the policy upholds “objective oriented training with special emphasis on trades-level training, community participation, administration and finance, and operation and maintenance’. It also take the lead in building ‘technical capacity in terms of water source investigation, design, engineering, water quality control , operation and maintenance, construction technology and facilities” (Ibid,.). Besides, it develops streamlined and coherent legislation and regulatory framework for improving water supply as well as to control pollution, degradation and depletion of water sources. Take the lead in assisting the establishment and strengthening of water users associations. Furthermore, it recognize that livestock water supply is an integral part of the overall water sector and incorporate its development plans with comprehensive water resources management undertakings (Ibid.,).

6. CONCLUSION

If water supply projects are to be managed efficiently and are to be sustainable, it is important to promote beneficiary participation. Communities need to be given due consideration and wider platform that give them greater opportunity to manage and decide on issues affecting their livelihood. As for the finding of this study, it was confirmed that the community members take the lead in initiating the project idea of the water supply scheme. This being the case, the place given for community members in decision making on matters related to choice of technology to be installed for the water supply system is very limited. In most cases this issue has been decided by government and NGOs involved in the project.

Assessment made on how members of the community practice community participation during the project implementation has revealed that providing local materials, labor, cash and involvement in consultative discussions constitute the major forms of participation in the study area. As disclosed by participants of the focus group discussion, the essence of community participation is understood as a onetime social mobilization and support package focused at pulling the required community inputs towards materializing the intended water supply scheme. The task of collecting and transporting water is mainly assigned to women as they are the prime water users at house hold level. They are the once who spent most of their time fetching water from unsafe sources and bear higher risk of being exposed to water born diseases. This being the case, their participation in planning and implementation of water project is very limited due to multiple responsibilities at the household level.

As per study finding, the user community has acknowledged the mandate given to the water committee in order to manage the water supply scheme in terms of operation & maintenance, collecting water fee, up keep financial records. But there are also indications from the community that the water committees need to scale up their capacity in providing better services, improving financial management standards, handling operation & maintenance and discharging responsibilities as per the mandate given by the community and thereby win the lasting trust from their respective communities. In general terms, the issue of institutional sustainability has been established in the study communities as they have got acknowledged and mandated institution i.e., the water committee, responsible for the overall management of the water supply scheme in their respective communities.

Distance from the household to improved water source determines time and labor allotted for production and the level of productivity at the household level. According to the study

finding, 51% of the respondents have responded that the improved water source at their respective community is located at the easy reach of their respective household. As for time taken to fetch water and come back, 64% of the respondents have stated that they spent less than or equal to 30 minutes to fetch water from the source and come back. This position seems encouraging as some researchers have indicated that household members who spent more than 30 minutes to fetch water and come back, tend to collect less amount of water and fail to fulfill the house hold daily water consumption (WHO/UNICEF, 2010). Besides, the time committed to conduct multiple trips to collect water is so high in economic terms and contributes to lower productivity (Ibid,).

Concerning average waiting/ queuing time at water point, the result obtained (44%) have indicated that queuing time at the water source is a major issue that take away the labor force necessary for engagement of household productive activities. This is partly attributable to population growth that is not compatible with the existing limited public water supply points where community members are struggling to have their daily water share for household consumption. The average house hold water consumption pattern depends on the family size and the level of income, economic activity and the degree of engagement in productive activity and water consumption behavior.

According to the definition given by Ministry of Water Resources (1996) "adequate water supply to mean 20 liters of water per person per day and accessible within a range of 0.5 to 1.0 km from a dwelling place". Any improvement made in safe water access has to be measure as per this definition. Accordingly, the case of the study community is not encouraging as the majority of cases are beyond meeting this standard. As indicated in the finding, 55% of the sample populations used to have questioning the sufficiency of improved water supply necessary to fulfill their household requirements.

In this case, it can be concluded that access has been ensured but adequacy is not, as the major social sustainability aspect that demands for sustained services that satisfy consumer expectations is partly fulfilled. This being the case, sizable proportion of the sample respondents representing 31% of the total response used to have given due consideration of the water supply system sustainability and shown marked commitment to provide support as required.

The practice of cost sharing for operation and maintenance of the water supply scheme is one of the area where the benefiting community is expected to commit itself and act responsibly

for the water supply system extend its services over time. In this regard, findings of the study have indicated that the communities in the study area have long years of experience concerning users pay principle and are acting accordingly. To this effect, the financial sustainability aspect of the water supply systems under investigation has been materialized as the financial resources necessary for meeting the costs of operation and maintenance has been ensured.

Concerning the issue of water supply system technical sustainability, there appears greater interest and commitment of the study communities to maintain the water supply scheme services and benefits over time. This being the case, 12% of the total sample respondents used to have indicated that their water supply scheme is well functioning without any damage or technical problems. Significant proportion of the respondents representing 39% of the total response have disclosed that the water supply schemes in their respective community used to have functioning with some breakage/technical problem. This is the area where the question of technical sustainability is not yet adequately addressed.

Water sources need to be protected and safe guarded from possible agents of contamination. There are possible health hazards which are associated with exposure of the water supply source to human waste, wild life, livestock and uncontrolled flooding. As for the study areas under investigation, there appears a condition where some water supply points were exposed without any protective fence and the like thing. Being exposed to human contact, let alone that of livestock or wild life can create a favorable condition for water born disease to prevail. It is also an indication of planning and implementation focused WASH activities where issues pertaining to water, sanitation and hygiene are well addressed.

Besides, the indiscriminate use of different kinds of pesticides by small and large scale irrigation schemes, untreated water and chemical discharges from agro-industrial facilities and smallholders have contributed a lot for surface and ground water contamination of the area under investigation. Taking in to account the prevailing environmental concerns in the study area, the issue of ensuring environmental sustainability is out of reach. In order to reverse this situation and ensure environmental sustainability focused and concerted environmental protection measures need to be taken involving governmental agencies, NGOs and the target community at large.

Attitudinal change and practicing improved method of waste disposal can greatly maximize the benefits of accessing safe drinking water and thereby maximize productivity. This can

only be ensured having awareness regarding household sanitary situations and working towards improving the sanitary facilities at the household level. To this effect, the study finding has revealed that much has to be done with respect to improving the sanitary facilities at the household level as only 3.4% of the respondents used to have ventilated and improved pit latrine (VIP), followed by pit latrine with slab/open pit which constitutes 45% of the total sample.

Concerning technical and capacity building training for water committee members, it was found out to be a onetime training dosage that was given to the water committee right before the newly constructed water supply scheme commences its operation. The possibility for refresher training is unthinkable in most cases due to the budget constraint of the district water and energy office. As for external support and collaboration with external agencies, the respondents give due emphasis for collaboration with partners, since the realization of water supply project requires the collaborative and joint effort of all stakeholders in design and implementation.

Their support is considered vital to materialize and sustain the water supply system. Regarding monitoring and evaluation of the water supply service, the condition on the ground is not promising as 60% of the total sample has disclosed that they do have no monitoring and follow up mechanism in place in order to have updates regarding the financial management, operation and maintenance of the water supply scheme. This is one of the growth areas where the stakeholders need to exert concerted action in order to scale up community monitoring practices.

Finally, what has been assessed by the researcher regarding the issue of rural water supply management and sustainability has brought to light prevailing trends and concerns surrounding safe drinking water access in rural Ethiopia context. These involve the issue of community participation, water committee empowerment, community management and governance of water supply scheme, women participation, functional status of water supply scheme, WASH case, external support and monitoring system. These are areas identified as practical field research issues where further studies in the area need to investigate in depth as per rural water supply system sustainability.

7. RECOMMENDATION

7.1 Community participation

Community participation has to be scaled up and need to involve two levels, namely participation in management and governance. In this case, management is mainly deals with the day to day supervision and decisions at the operational level, while the sole purpose of governance is devising working rules and regulations commonly practiced across the entire water supply project itself (Dessalegn, 1999). This will necessitate the drafting of appropriate management and governance structures that best suit the intended purpose. Government and other partners need to be committed to the development of such institutions as it is a long-term process that calls for in depth work with beneficiaries. Otherwise, participation in management without involving governance is not effective as has been practiced and will not ensure the sustainability of the water supply projects (Ibid,).

7.2 Women participation

The introduction of safe drinking water has got far reaching effect on the life of women as access to safe water for women would mean saving time, labor and effort which they can employ in more productive agricultural and income generating activities. To that effect, women should be involved in the planning, operation and maintenance of rural water supply schemes. Women should have a say in the choice of technology, and should be trained in the basic maintenance of the technologies involved (Ibid,).

7.3 Water committee

The presence of external support has to be in place once the water committee is formed and the provision of technical training and support for repairs has to be maintained in order to keep them encouraged and committed (Jansz, 2011). This is the area where the district water and energy office need to work hard mobilizing partners in line with ensuring the technical capacity of the water committees to upkeep financial records, operation and maintenance and thereby contributing towards water system sustainability.

7.4 Ensuring safe water access

Investigation done concerning the level of consumer satisfaction has revealed that 55% of the sample population used to have questioning the sufficiency of improved water supply in terms of their house hold need for drinking, cooking and sanitation. In principle, the target community should be served effectively and sufficiently. Nevertheless, the capacity of rural

water supply system is very inadequate with a corresponding effect of low coverage and seasonal fluctuation. Under such a situation, the majority of the population will have a tendency to look for alternative unsafe water sources in order cover their household basic needs. This will have far reaching effect on the health status of household members as they are exposed to unsafe water sources with high risk of being affected by water born diseases. Besides, insecure water storage will create favorable condition for contamination and risk of being exposed to water born diseases (Thompson J. et al, 2001).

Partners involved in the water supply system need to give due consideration for sufficiency of safe drinking water in line with the current population growth. This may involve expanding the existing safe water supply schemes, extending piped water from adjacent highland districts or looking for other alternative sources.

7.5 Improved sanitation facilities

The study finding has revealed that much has to be done with respect to improving the sanitary facilities at the household level as 39% of the total responses has confirmed open defecation, and only 3.4% of the respondents used to have ventilated and improved pit latrine (VIP), followed by 45% of the total respondents who has stated the practice of traditional pit latrine in their respective community.

7.6 Environmental protection

The indiscriminate use of different kinds of pesticides by small and large scale irrigation schemes, untreated waste water and chemical discharges from agro-industrial facilities and smallholders have contributed a lot for surface and ground water contamination of the area under investigation.

In order to reverse the present environmental stress in the Awash river basin, and ensure environmental sustainability focused and concerted environmental protection measures has to be taken involving governmental agencies, NGOs and the target community at large.

7. 7 Capacity building

Stakeholders involved in the water supply project must continue to monitor the situation of water committees in communities after construction, and need to be engaged in providing capacity building training and refresher training in order to scale up the capacity of the water committee to better operation and maintain the water supply scheme as well as improving their financial management standards. Besides, community training on water, sanitation and

hygiene (WASH) has to be strengthened as there appears community members' tendency to resort to unsafe water sources due to inadequate water supply from the improved water source. This in turn results the deterioration of the water quality and increase the risk of being exposed to water born diseases.

7.8 External Support

Evidence from discussions, literature review and the national policy itself highlights the need for constant external support to communities in terms of hardware and software aspects in order to maintain rural water services over time. These aspects need to be simultaneous and constant because, as respondents and the literature review stated, it is unrealistic to expect a community to simply maintain a water point over time (Jansz, 2011). Rural water supply services can only be maintained and sustained over time with sufficient external software support to ensure water committees or community management models constantly operate as effectively as possible. Combined with this, external technical support must always be available when communities cannot repair water points and need someone to promptly assist them (I bid,).

7.9 Monitoring and Evaluation

Monitoring and follow up of the water supply service itself should be undertaken in line with agreed upon time frame and provide beneficiaries and supporting partners with the necessary information for ensuring sustainability of services (Parry-Jones et al, 2001). Conditions for conducting monitoring at household and community level has to be encouraged as it is found out to be one of the ingredient that greatly contribute towards the realization of sustainability, this is due to the fact that consideration remains purposeful on the required outcomes, and service beneficiaries have got an opportunity of being empowered to manipulate their management and performance (Carter, 2010). Quite contrary to this situation, significant proportion of the sample respondents that constitute 46% of the total have stated the absence of follow up and monitoring mechanism regarding their respective water supply scheme.

As disclosed by some community members who participated in the focus group discussion, there appears a growing tendency of misuse of funds by water committee. This is due to the absence of monitoring mechanism in place in order to make sure the water fee collected is well managed and used for operation and maintenance of the water supply system. This reality was confirmed while the researcher has conducted key informant interview session with some of the experts working in Adama district water and energy office. In order to

mitigate this problem and take timely corrective measure, there has to be some sort of monitoring & follow up mechanism in place so as to check for water supply scheme financial management and operation standards. This is one of the growth areas where the stakeholders need to exert concerted action in order to scale up community monitoring practices.

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APPENDIX

1. Household survey Questionnaire

Dear respondent,

This questionnaire is meant to assess determinants of community participation and factors affecting sustainability of community based rural water supply scheme, and thereby make invaluable contribution towards the future development, management and sustainability of community based water supply schemes. To that effect, I would like to assure you that all information gathered will be used solely for the study purposes only and the identity of the community members, who share their view, or that of any individual within the community and organization will not be revealed.

Date…… Name of the enumerator……..... …Code……..
Name of the Village/kebele.....…… ……. Household reference No…….....
Name of the Water Supply scheme…….. Type and Year constructed……
Name of the Supervisor……

Part I. Demographic and Socio-Economic characteristics of the respondent

Household status of the respondent 1.household head 2. Spouse 3.Others……..
Gender: 1. Male 2. Female
Age range of the respondent 1. 15-30 2. 31-45 3.46- 60 4.above sixty
Educational status of the respondent 1. Illiterate 2. Read and write 3. Elementary (1- 6) 4. Junior (7- 8 grade) 5. High school (9-10 grade) 6. Preparatory (11-12) 7. Above 12 grade

Main occupation of the respondent
1. Farming 2. Trading 3. Farmer/Trader 4. Artisan/crafts 5. animal rearing 6.Others.....
1.6 Annual income of the respondent
1. Less than 2000 birr 2. 2001- 4000 3. 4001-6000 4.6001-8000 5.8001-10000 6. More than 10000

Part II. Access to safe drinking water and water use practices at house hold level

2.1 What is the main source of water used for drinking, cooking and sanitation in your community?
1. From River 2. 2. From improved water supply point 3. From nearby unprotected spring 3. From household hand dug well 4. From Pond 5. From Earth dam 6. Rainwater collection 7. Other specify……
……
2.2 When do most households in your community collect water?
1.6am- 10am 2. 10 am-3pm 3. 4 pm-7pm 4. After 7pm 5. Others specify…….

2.3 What is the mechanism of water collection by individuals in your community? **(multiple responses is possible)** 1. Human head 2. Using domestic animals 3. Bicycle 4. Human back 5.others….....
2.4 Where is your livestock watered?.....
2.5 How long does it take to go to the water source, fetch water and come back? (Note that the question refers only to a single water-hauling trip and does not consider multiple trips in a single day)
1. 1. 15 minutes or less 2. 16- 30min. 3. 31- 45min 4. 46- 60 5. More than 1hrs (write time…..……)
2.6 Who is usually going to the water source to fetch the water for your household? **(multiple responses is possible)** 1. Adult woman 2. Adult man 3.Female child (under15 yr) 4.Male child (under15 yrs) 5. Girls above 15 yrs 6. Boys above 15 yrs 7. Others specify…….
2.7 How many times does this person travel to the water source within a day in order to collect water?
1. Once a day 2. 2 times a day 3. 3 times a day 4. More than 3 times a day 5. Others…….
2.8 How far is the water source from your household (estimated distance)?
1. 500 mts or less 2. 501- 1000mts. 3. 1001- 1500mts. 4.1501-2000mts 5.More than 2Kilo meters
2.9 How do you see the location of the water source with respect to your household?
1. Convenient 2.Inconvenient 3. Very convenient 4. Very inconvenient 5. Fair 6. Others…….
2.10 How long is the average waiting/queuing time at the water source?
1. 1. 15 minutes or less 2. 16- 30min. 3. 31- 45min 4. 46- 60 5. More than1hrs (write time…..……)
2.11 Do you obtain drinking water from your present source with les effort than the former source?
1. Yes 2. No
2.12 Who has initiated the idea of building the water supply project in your community? **(multiple responses is possible)** 1. Community residents 2. Community leaders 3. NGOs and Governmental offices 4. Responsible government office 5. NGOs 6. Others …….
2.13 Who has chosen the source area of the project? **(multiple responses is possible)**
1. Responsible government office 2. Community residents 3. NGOs and Governmental offices
4. Community leaders 5. Others……..
2.14 Who was responsible for choice of the water supply scheme technology? **(multiple responses is possible)** 1. NGOs and Governmental offices 2. Community members
3. Community leaders
4. Responsible government office 5. Others…….
2.15 Who has constructed the water supply scheme in this village?
1. Regional government 2. NGOs and government 3. Local community and NGOs 4. Government and local community 5. Private sector 6. Others……
2.16. What kind of toilet facility do members of your household usually use?

1. Ventilated improved pit latrine (VIP) 2. Pit latrine with slab/open pit 3. Composting toilet 4. No facilities or bush or field/open defecation 5. Other (specify)……

2.17 How do you dispose faeces of children under three years of age in the household? (because children's faeces are the most likely cause of faecal contamination to the immediate household environment)

1.Put into drain or ditch 2.Thrown into garbage 3. Buried 4. Child used toilet/latrine 5. Left in the open 6.Other (specify)……..

2.18 On the average, how much water do your household collect per day ?

1. 25 liters or less 2. 26 - 40lit. 3. 41- 60 lit. 4. 61- 80 lit. 5. 81- 100lit. 6. More than 100 lit. 7. Others…..

2.19 For what purpose are you using the improved water supply? **(multiple responses is possible)**

1. Drinking 2. Cooking 3. Washing clothes 4. Live stock/animal watering 4. Irrigation 5.Vegetable production 6. If others specify……..

2.20 Do you think that the amount of water you get from improved water source is enough for drinking, cooking and sanitation purposes? 1. yes 2. No

2.21 In Q.20 above if the answer is No, what do you think are the potential reasons for the shortage? **(multiple responses is possible)**

1. Reduction of the potential of the water due to aridity 2. The number of house holds using single water point are higher 3. Others specify……

2.22 What benefits have you gained from the improved water supply? **(multiple responses is possible)**

1. Health of family members has improved 2. House hold income has improved 3. Relieved drudgery for women and children 4. More time is available for productive activities 5. More social and domestic activities 6. Productivity of livestock has improved 7. Other specify……
…….

Part III. Household and community attitude toward safe drinking water

3.1 What do you think are the characteristics (qualities) of safe (clean) Water?

1. Taste 2. Color 3.Clearity 4.smell 5. Other specify……

3.2 How do you see the current safety of water from your local source?

1. Safe 2. Partially safe 3. Somewhat unsafe 4. Not safe at all 5. Very safe 6. Others.....

3.3 Which of the following affects the safety of your water source? (Indicate one or more)

1. Livestock contamination 2. Bird and wild life contamination 3. Human faeces contamination 4. Algae development 5. Contamination due to flooding 6. Others specify.....

3.4 Can drinking water cause illness? 1. Yes 2. No

If yes what kinds of illness are related to water and how do they affect your health?
…….....
.....

3.5 Why do some get sick and not others when drinking the same water? 1. Individual difference 2. Resistance factor 3. Because some keep water containers clean while others not

4. Because some expose drinking water for contamination 5. Some tend to treat their drinking water using methods available 6. Others specify…….

3.6 Did you have some awareness raising session or training about water safety?

1. Not at all 2.Simple awareness creation made by the water use committees 3.Relatively intensive teaching provided by local health extension workers 4.Extremely intensive awareness raising sessions provided by the water use committees, health extension workers and other agencies 5. Others…….

3.7 To your understanding, what are the signs of safe drinking water?

1. Taste 2. Color 3.Clearity 4.smell 5. Others specify……..

3.8 How/where can drinking water become unsafe or contaminated?

1.At source 2.On the route 3. At home 4. Others specify……...

3.9 Is water a major problem in your community? 1. No 2. Yes,

3.10 If yes In what way (s)? **(multiple responses is possible)**

1.Far away 2. Taste 3.muddy 4.hardness 5.Breakdown 6.queues 7. Quantity 8.cause illness 9. Other……

3.11 What solutions do you suggest to ease this problem? 1. Protect existing sources 2.improve the source 3. Improve storage 4.treat water 5. Develop new source 6.move to other place 7.reduce consumption 8. Other, specify……..……

3.12 Where from you had been collecting water before this source is introduced? 1. From river 2. Nearby unprotected spring 3. Pond 4. Earth Dam 5.Household hand dug well 6. Rainwater collection 7. Other specify……..

3.13 What were the hardships and problems that forced you to demand for the current improved water supply?

1. More time were spent to fetch water 2. Problems related to water borne diseases 3. Drudgery for women and children to fetch water 4. Lack of water source during dry season 5. If others specify……..

3.14 Do you know the source of the finance used for the construction of the water supply project?

1. Yes 2. No

IV. Tariff management of the Water Supply Scheme

4.1. How much do you pay for water per Jerrycan/month? ……

4.2. How do you evaluate the existing water fees? 1. Expensive 2. Fair 3.Cheap 4. No fee

4.3. In Q.2 above if the answer is expensive, what is the reasonable price you propose

Per Jerrycan/month?
4.4 Do you pay additional fee for operation and maintenance? 1. Yes 2. No
4.5. In Q.4 above if the answer is yes, how much do you pay per month/year?.....
4.6. Who collects water fees from user community?
1. Water committee 2. Hired employee 3.Village elder 4. If others specify……
4.7. Do you think beneficiaries should pay water fee? 1. Yes 2. No
4.8. In Q.7 above if the answer is yes, why? Because 1. It could enable them to build new water scheme
2. It will cover operation and maintenance cost 3. If others specify…….....
4.9. In Q.7 above if the answer is no, why? Because
1. Water is considered as a gift of nature and hence it should be provided for free
2. The villagers are poor and they cannot afford 3. The use of traditional source of water has no problem and I prefer to use that source rather than paying fee for improved water 4. Others…….
4.10. When do you pay water fee?
1. Every time water is drawn 2. Every month 3. Once or two times a year 4.others specify…….
4.11. If you are unable to pay the water fees, what are the reasons for failing to do so? 1. Poverty 2. Less harvest 3. No land for farming 4. Dissatisfaction with the services 5. Others…….

Part V. Community participation in planning and management of water supply projects
5.1 Did your community participate in decision-making in all aspects related to water project development, planning and implementation? 1. Yes 2. No
5.2 .Yes, if yes in what way?…….....
.....
5.3 .No, If no why not……
……..
5.4 Do women in your community participate in planning and management of water supply scheme?
1. Yes 2.No
If yes how and to what extent?
……..... . ……
If No, If no why not……
…….
5.5 Do Communities willingly (without being coerced) contribute to the development and operation of the water supply scheme? 1. Yes 2. No
5.6 If yes, in what terms? **(multiple responses is possible)** 1. Money 2.material 3.equipment 4. labor 5.participation in project management committees 6. Others specify……
5.7 If No, explain the reason……
……..

5.8 How do you rate the degree and level of your community participation during the project development, planning and implementation process (during the time of the construction of the water supply scheme)?
1. Very low 2.Low 3.Fair 4.good 5.Very good 6.Excellent 7. Others.....
5.9 If your community had participated, in what aspect was the community participated? **(multiple responses is possible)** 1. Providing labor 2.Providing cash 3.Providing local materials (wood, stone and sand) 4. Others
……
……..
5.10 Do those responsible for managing community water projects/water committee, represent the diversity within the community, and elected democratically? 1. Yes 2 . No if not
why?.....
.
5.11 The water supply scheme service depends on the financial contribution of the community for its management. Does the community properly understand this and act responsibly? 1. Yes, 2. No
If yes in what
terms?.....
If No, if no why
not?…….……
…….
5.12 Are the roles and responsibilities of each stakeholder clearly defined to avoid confusion in the management of the water supply scheme? 1. Yes 2. No,
5.13 If your response is No why
not?……
…….
5. 14 When do you think external agencies (donors, government and others) should Intervention in the community water supply scheme? **(multiple responses is possible)** 1. When requested by the community 2. when GOs/NGOs intervention deemed necessary 3. When there appears misunderstanding among members of the beneficiary community 4.when the water committee fails to properly manage the water supply scheme 5.other specify…….....
5.15 Who is responsible to make major decisions related to the water supply scheme and determine the outcome of the decisions? 1. Donor agencies 2. Government bodies 3. The beneficiary community 4.Water committee 5. Others.....
5.16 What should be the role of donor and government agencies in the management of community water supply scheme? 1. Provide maintenance 2. Financial support 3. Provide maintenance and financial support 4. Provide technical and capacity building training 5. Monitoring and evaluation 6. Others specify……
5. 17 Do the community have trust on water management committee in terms of utilizing community contribution for the intended purpose? 1. No trust at all 2.Little trust 3.Fair trust 4.Good trust 5.Very good trust 6.Full trust 6. Others, explain…….....

VI. Sustainability of the water supply system

6.1 Who is operating and managing the water supply scheme in your community? **(multiple responses is possible)**

1. Donor agency 2. Government office 3. Water committee representing the community 4. Joint management that involve gov't agency and community 5. Joint management that involve donor agency and community 6.other specify……..

6.2 Do the water committee members given adequate technical and capacity building training in order to enable them operate and manage the water supply system? 1. Yes 2. No,

6.3 if no why not.....
.....

6.4 What to be done in order to ensure reliability of the water supply systems? **(multiple response is possible)**

1. Availability of spare parts needs to be ensured for the system remains functional
2. Local skills should be in place in order to operate and maintain water system
3. Technical and capacity building training need to be in place for those community members who manage the water system 4. Scale up community members participation in the management and governance of the water supply scheme 5. Other specify.....…….....

6.5 Are women well represented in the water management committee? 1. Yes 2. No,

6.6 if not please explain
…….....

6.7 Do the water management committee have autonomous and flexible institutional structure that enables it to implement any necessary remedial measures? 1.Yes 2. No

If no, why not?.....

6.8 What do you do as a community member in order to enable the water supply scheme be sustainable? **(multiple responses is possible)** 1. Labor contribution during maintenance 2. Paying service fee in time and cash contribution 3. Actively Participate in discussion on water scheme issues 4. Other specify…….....

6.9 How do you practice cost sharing for operation and management of the water supply scheme? 1. Users pay as per water supplied 2. Monthly contribution 3. Quarterly contribution 4. Annual contribution 5. Other specify.....

6.10 Do you have collaboration with other agencies in terms of planning and implementation of your community water supply scheme? 1. Yes 2. No

6. 11 If yes with whom do you have such collaboration? 1. Government offices 2. NGOs 3. Private sector 4. Education and research institutes 5. Others.....

6.12. If no why not…….

6.13 How is the functionality of your community water supply system in terms of water availability and seasonal fluctuations? 1.Not functioning at all 2.Functioning with some breakage/technical problems 3.Well functioning without any damage or technical

problem 4. Partly functioning 5. Others……
…….

6.14 If the observed functionality is '2', what are the main damage……..
……..……
……..

6.15 What need to be done if there appears a problem of seasonal fluctuations and water availability?

1. Need to dig additional borehole/shallow well 2. Develop protected spring 3. Constructing rain water harvesting structure 4. Need to construct earth dam 5. Looking for river water supply 6. Resorting to unprotected springs 7. Other specify.....

6.16 Have Zonal and woreda water offices given you some sorts of support for your water supply scheme? 1. Yes 2. No

6.17 If your answer to Q 16 is yes what are the assistance given to you? **(multiple responses is possible)**

1. Training 2.Spare parts 3.Financial support for maintenance 4.Professional assistance 5. Others specify……
……

6.18 From what you have observed so far, do you think that your community water supply management/governance and experience can be replicable to other communities?

1. Yes, 2. No

6.19 if yes how?.....

6.20 if no why not .....

6.21 To your understanding, what type of water supply schemes are more sustainable and what need to be done in the future in order to improve household water supply?

1. Borehole 2. Shallow well 3. Spring capping/protected spring
4. Pipe water extended from adjacent communities 5. Other specify.....

6.22 Is there some kind of follow up and monitoring mechanism regarding the operation of the water supply scheme and?

1. Yes 2. No If yes how frequent do you conduct the process?.....

Thank you for your time and cooperation!

2. Key informant interview questions

Dear interviewee,

This interview is meant to assess the determinants of community participation and factors affecting sustainability of community based rural water supply scheme, and thereby make invaluable contribution towards the future development, management and sustainability of community based water supply schemes. To that effect, I would like to assure you that all information gathered will be used solely for the study purposes only and the identity of the community members, who share their view, or that of any individual within the community and organization will not be revealed.

1. Who is the water supply project initiator?
2. Rate of community participation in decision-making related to water project planning and implementation.
3. Capacity building training given to the water committee members.
4. Existence of water committee reporting systems to the concerned body.
5. Obtaining safe drinking water from the present source with less effort.
6. Members make timely payments of water fee and its sufficient for operation & maintenance cost.
7. Responsible for follow up and maintenance of the water supply schemes.
8. The extent of women participation in planning and management of the water supply scheme.
9. Benefits gained from improved water supply scheme.
10. Major problems of your water supply scheme.
11. Suggested solutions to sustain the operation of the existing water supply scheme.
12. Presence of follow up and monitoring mechanism regarding the water supply scheme.
13. The role of Kebele administration in the operation and management of the water supply scheme.
14. Capacity building support given from NGOs the water supply scheme.

Thank you for your cooperation and participation!!!

3. Focus Group Discussion questions

Dear discussion participants,

This discussion is meant to assess the determinants of community participation and factors affecting sustainability of community based rural water supply scheme, and thereby make invaluable contribution towards the future development, management and sustainability of community based water supply schemes. To that effect, I would like to assure you that all information gathered will be used solely for the study purposes only and the identity of the community members, who share their view, or that of any individual within the community and organization will not be revealed.

1. Degree of community participation in planning and implementation of the water supply project.
2. Community participation on choice of technology installed for the water supply scheme.
3. Capacity building training given to water committee members.
4. Water committee reporting systems in place.
6. Accessing safe drinking water with less effort.
7. Collect and management of the water fee.
8. Updates given to user community regarding the financial management of the water supply scheme.
9. Major problems of your water supply scheme.
10. Benefits of the improved water access.
11. What do you suggest to improve and sustain the operation of the existing water supply scheme?
12. Follow up and monitoring mechanism in place regarding the water supply scheme.
13. Suggested solution to sustain the operation of the water supply scheme.

Thank you for your cooperation and participation!!!

4.FGD and KI interview participants

S/N	Name	Sex	Remark
1.	Jemila Bedasso	F	Cheka Dewero women representative & water fee collector
2.	Hussien Jaree	M	Cheka Dewero Water committee chairman
3.	Adem	M	Cheka Dewero Health Centre Head
4.	Gemechu Adugna	M	Cheka Dewero Junior secondary school Director
5.	Representative	F	Geldiya Galiye community, women committee
6.	Representative	F	Geldiya Galiye community, Health clinic
7.	Bizunesh Tefaye	F	Bubissa Kussaye community representative
8.	Genet Biftu	F	Bubissa Kussaye community representative
9.	Demirew Biru	M	Bubissa Kussaye community representative
10.	Kebede Lemma	M	Bubissa Kussaye community representative
11.	Hayliye Habte	M	Bubissa Kussaye community representative
12.	Gezahegn Tilahun	M	Bubissa Kussaye community representative
13.	Worku Abera	M	Bubissa Kussaye community representative
14.	Wubeshet Tesfa	M	Bubissa Kussaye community representative
15.	Mekit Gezahegn	M	Bubissa Kussaye community representative
16.	Astatike Mineshaw	M	Bubissa Kussaye community representative
17.	Birke Abose	M	Bubissa Kussaye community representative
18.	Getaneh Eshete	M	Bubissa Kussaye community representative
19.	Meseret Gezahegn	M	Bubissa Kussaye community representative
20.	Representative	M	Adulla Hatie community water committee
21.	Representative	F	Adulla Hatie community women committee
22.	Representative	M	Adulla Hatie community administration
23.	Representative	M	Adulla Hatie community youth committee
24.	Representative	M	Adulla Hatie community elders
25.	Tulu Tenkolu		Geldiya Galiye community representative
26.	Megerssa Roressa		Geldiya Galiye community representative
27.	Jimma Degife		Geldiya Galiye community representative
28.	Tewabech Negash		Geldiya Galiye community representative
29.	Amare Mengistu		Geldiya Galiye community representative
30.	Kebede Mekonnen		Geldiya Galiye community representative
31.	Regassa W/Mariam		Geldiya Galiye community representative
	Mebrat Addis		Bubissa Kussaye community representative

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