Research-inspired Policy and Practice Learning in Ethiopia and the Nile region

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The Sustainability of Water Supply Schemes

A case study in Mirab Abaya *woreda*

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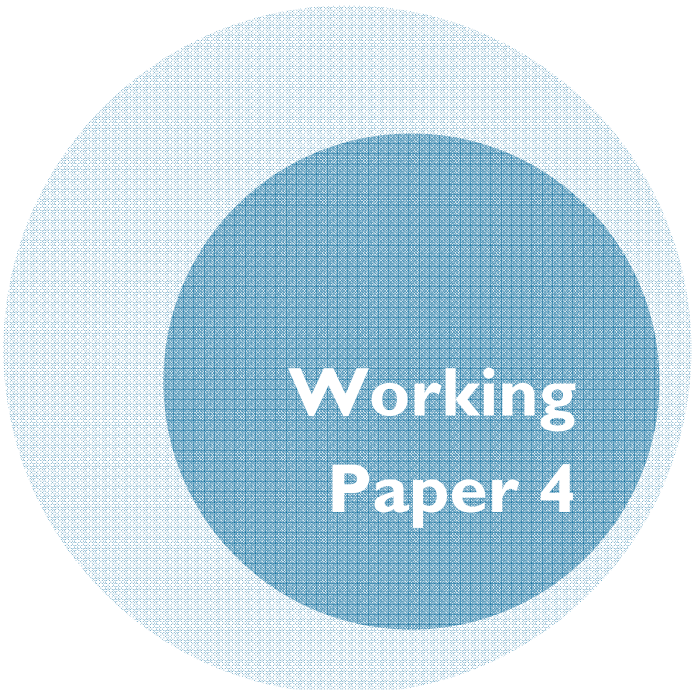

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RIPPLE Working Papers contain research questions, methods, preliminary analysis and discussion of research results (from case studies or desk research). They are intended to stimulate debate on policy implications of research findings as well as feed into Long-term Action Research.

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List of Acronyms

ADB	Asian Development Bank
AIDS	Acquired Immunodeficiency Syndrome
BH	Borehole
BoWR	Bureau of Water Resources
CBO	Community-based Organisation
DFID	UK Department for International Development
EC	Ethiopian Calendar
ESRDF	Ethiopian Social Rehabilitation and Development Fund
FGD	Focus Group Discussion
FN	Functional
GaP	Governance and Planning
GPS	Gravity Piped Scheme
HDW	Hand Dug Well
HIV	Human Immunodeficiency Virus
IDR	Institute for Development Research
IRC	International Water and Sanitation Centre
KAP	Knowledge, Attitude and Practice
l/c/d	Litres per capita per day
LP	Lister Peter
LPA	Learning and Practice Alliance
LAR	Long-term Action Research
MAW-WRDO	Mirab Abaya Woreda Water Resources Development Office
MDG	Millennium Development Goal
MoWR	Ministry of Water Resources
MSW	Machine Shallow Well
NF	Non-functional
NGO	Nongovernmental Organisation
O&M	Operation and Maintenance
ODI	Overseas Development Institute
OPS	On-spot Protected Spring
PS	Protected Spring

QIS	Qualitative Information System
RiPPLE	Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region
R-WaSH	Rural Water Supply, Sanitation and Hygiene
SNNPR	Southern Nations and Nationalities Peoples Region
SPSS	Statistical Package for Social Science
UAP	Universal Access Plan
UK	United Kingdom
UN	United Nations
UNICEF	UN Children's Fund
UNDP	UN Development Programme
USAID	US Agency for International Development
VLOM	Village-level Operation and Maintenance
WaSH	Water, Sanitation and Hygiene
WATSANCo	Water and Sanitation Committee
WHO	World Health Organization
WVE	World Vision Ethiopia
WS	Water source
WWRDO	Woreda Water Resources Development Office
WWT	Woreda Water Team
ZWRDO	Zonal Water Resources Development Office

Executive summary

The sustainability of community-managed rural water supply schemes is a key factor in meeting the Millennium Development Goals (MDGS), in terms of ensuring environmental sustainability, improving health and eradicating extreme poverty for the overwhelming rural majority living in the developing world. To sustain water supply schemes, it is vital to have the involvement of all segments of the community in the form of full participation and control over the scheme's operation and maintenance (O&M), overall management, strategic decision making, ownership and cost sharing for O&M and construction activities. Moreover, such community management has to be backed by external agents over a long period of time with regard to technical issues for O&M, training, monitoring, information collection, coordination and facilitation.

This study was conducted in Mirab Abaya Woreda by the RiPPLE programme under one of its thematic areas, the Governance and Planning theme (GaP). The aim of this theme is to identify appropriate and scalable approaches to strengthening local water governance and planning in the context of Ethiopia's Universal Access Plan (UAP) and other development planning frameworks. The non-functionality rate of water supply schemes in the country and the Southern Nations Nationalities and Peoples Region (SNNPR) is 33% and 22% to 24%, respectively. With this in mind, RiPPLE undertook a sustainability case study in Mirab Abaya Woreda with the objectives of examining functionality and service level of existing water supply schemes; identifying factors impacting on sustainability following a bottom-up approach; and recommending best approaches and practices for the upcoming Long-term Action Research (LAR) areas.

Qualitative and quantitative data collection instruments were developed and employed for focus group discussions (FGDs), interviews, knowledge, attitude and practice (KAP) surveys, institutional/stakeholder mapping, resource mapping and observation. Activities were divided into Kebele and Woreda levels. In the Woreda, these included: document review; mapping of all the schemes and water points in the Woreda; and institutional and stakeholder mapping in three Woreda sector offices (namely the Water Resource Development Office (WWRDO), the Health Office and the Woreda Administration) and World Vision Ethiopia (WVE) Mirab Abaya branch. Resource mapping was carried out in nine selected Water and Sanitation Committees (WATSANCos) at the community level, and in all the aforementioned sector offices and WVE at the Woreda level. Field visits/observations were undertaken for all schemes in the Woreda using qualitative information system (QIS) and other checklists. In total, 18 FGDs (nine with WATSANCos and nine with women in the community) and 18 interviews (nine of Kebele chairpersons and nine of other key informants) were held in the nine selected Kebeles. Moreover, one FGD was conducted with staff from the WWRDO.

Two major factors, scheme technology type and functionality, were employed as the main parameters for the selection of sample Kebeles. From the 23 Kebeles which have water supply schemes, 9 Kebeles that consist of functional and non-functional scheme and all the four types of scheme were selected.

In the Woreda are 70 schemes, using four types of technology, developed between 1966 EC and 1999 EC.[1] These include 11 boreholes (BH), 20 hand dug wells (HDW) fitted with hand pumps, 26

[1] 1966 and 1999 EC correspond to 1983-1984 and 2006-2007 of the Gregorian Calendar, respectively.

machine shallow wells (MSW) fitted with hand pumps, and 13 protected spring (PS) sources with 65 network and on-spot distribution points.

A total of 40 schemes were functional and 30 non-functional during the study. Of the 30 non-functional schemes, 37% have been completely abandoned, 40% are non-functional owing to various technical problems, 13% have stopped service because of water table drawdown, 7% have failed owing to a water quality problem and 3% are new and have not yet started service.

All of the abandoned schemes served for more than 20 years without rehabilitation. Of the 65 network and on-spot distribution points, 39% are non-functional. Of all the schemes, 86% are in the *kolla* climate. These include 18% BH, 33% HDW, 42% MSW and 7% PS. In the *dega* climate are 13% of the schemes. In the *kolla* area, 55% of schemes are functional; in the *dega* area, 80% are functional. The non-functionality rate of schemes, excluding abandoned schemes, is 32%.

The majority of the scheme developments were financed by the Catholic Relief Mission (34%) and WVE (26%). The rest were financed by governments, such as Ethiopia (13%), China (10%) and Canada (6%) and donor agencies such as the UN Children's Fund (UNICEF) (4%), the UN Development Program (UNDP) (3%) and the Safety Net programme (4%).

Most (63%) hand pumps use Afridev technology, with 28% bearing the Indian Mark II (InMrk II) brand. The rest use the oldest type of rotary hand pump technology. Of the motorised schemes, 55% are fitted with submersible pumps and the other 45% with mono-lift pumps. Moreover, 73% of the engines in the motorised schemes hold the Lister Peter brand (England). Out of the 13 PS, 46% are on-spot developed springs and 54% use a gravity distribution system.

Communities use on average 54 litres of water per household per day for domestic activity (on average 11 l/c/d). An individual walks for about two hours (roundtrip) to and from a water point. On average, it takes between two and three weeks to fix minor maintenance problems, but up to one year for major maintenance. An individual waits for water for an average of three hours, and one household fetches water twice a day. The water points are open for an average of nine hours. Women and girls bear the responsibility regarding water fetching.

In the Woreda, 63% of the technical positions in the Health Office are vacant and 57% of the technical positions and 50% of the support staff positions in the WWRDO are unoccupied. Moreover, sector offices do not have sufficient material capacity to enable them to be involved in better service delivery.

Generally, the high non-functionality rate of schemes forces communities to rely on unsafe sources of water for basic consumption. Most schemes have failed as a result of abandonment, but water quality problems, lack of proper understanding of the hydrogeology of the area (design problems), landslides, overpressure on schemes and poor capacity and low backstopping support from the WWRDO are also factors in the schemes' non-functionality and in the slow speed of maintenance.

Other factors contributing to the unsustainability schemes are: poor communication and coordination of Woreda stakeholders and line offices; lack of clarity on the roles and responsibilities of the different actors in the Woreda; lack of legitimacy, accountability and skills of WATSANCos; lack of guidelines on technology standards; absence of specialised spare parts suppliers in the Woreda; and poor information management systems leading from the WATSANCo to the Woreda sector offices.

Initial recommendations are as follows:

- Capacity building at Woreda and at WATSANCo level;
- Development of scheme technology standardisation policy/regulation/rule;
- Institutionalisation of WATSANCos into an independent and accountable organisation;
- Integration of relevant stakeholders for effective and efficient service delivery, avoidance of duplication, optimum resource utilisation and a common goal;
- Initiating the private sector to be involved in spare parts supply;
- Rehabilitation of existing schemes, expansion of motorised schemes and construction of new schemes to satisfy the high water demand;
- Involving all segments of the community (women, poor, rich, near, distant users) in all aspects of scheme development and management activities;
- Regular disinfection of water sources;
- Working on integrated watershed management to conserve water resources and prevent contamination of groundwater owing to human activities;
- Creating a proper information exchange system among stakeholders;
- Developing appropriate system monitoring and evaluation;
- Developing a computerised database system of documentation;
- Undertaking a water potential mapping for the Woreda; and
- Working on a needs assessment of community scheme preference.

1 Introduction

The sustainability of community-managed rural water supply schemes is a key factor in meeting the Millennium Development Goals (MDGs), in terms of ensuring environmental sustainability, improving health and eradicating extreme poverty for the overwhelming rural majority living in the developing world.

In the majority of cases, it is rural poor communities that are socially and economically affected by water inadequacy and subsequent poverty. The quality of potable water and the threat of waterborne diseases, such as cholera and typhoid, are critical public health issues in many developing countries (ADB, 2002). Moreover, worldwide, poor sanitation practices and a lack of safe and clean water for drinking, cooking and washing are responsible for over 12 million deaths each year (USAID, 1990). For instance, about 2.3 billion people across the world, most of them in developing countries, suffer from disease linked to water unavailability, inadequacy or contamination (POPLINE, 2000; UN, 1997).

Although these problems are diverse and complex, it can not be denied that one of the most important factors behind them is the unsustainability of community-managed rural water supply schemes. Governments, nongovernmental organisations (NGOs) and donor agencies are striving to scale up water supply and sanitation coverage in developing countries at the same time as the non-functionality rate of those water supply schemes installed is increasing. It is an alarming fact that, in most developing countries, an estimated 30% to 60% of existing rural water supply schemes are inoperative at any given time (Brikké and Bredero, 2003), with serious impacts on the health and welfare of the people. In global terms, the World Health Organization (WHO) has estimated that, again, 30% to 60% of existing water supply systems are inoperative at any given time (Davis and Brikké, 1995).

Several factors affect the sustainability of water supply schemes in rural areas. A water supply service is sustainable if (Brikké, 2002):

- It is functioning and being used;
- It is able to deliver an appropriate level of benefits in terms of quality, quantity, convenience, continuity and health to all, including the poorest women and men;
- It continues to function over a prolonged period of time (which goes beyond the lifespan of the original equipment);
- Its management is institutionalised;
- The management of the service involves the community (or the community itself manages the system);
- It adopts a perspective that is sensitive to gender issues;
- It establishes partnerships with local authorities;
- It involves the private sector as required;
- Its operation, maintenance, rehabilitation, replacement and administrative costs are covered at local level through user fees or through alternative sustainable financial mechanisms;
- It can be operated and maintained at local level with limited but feasible external support;

- It does not affect the environment negatively.

Thus, the dimensions of sustainability of a water supply scheme and its service delivery are multifaceted. There are social, technical, financial, institutional and environmental issues to address (Brikké and Bredero, 2003). To sustain water supply schemes, it is vital to have the involvement of all segments of the community, in the form of full participation and control over the scheme's operation and maintenance (O&M), overall management, strategic decision making, ownership and cost sharing for O&M and construction activities (Lockwood, 2004). Such community management has to be backed by the technical support/assistance of external agents (government and/or NGO) over a long period of time, relating to O&M, training, monitoring, information collection, coordination and facilitation aspects (Lockwood, 2004; Brikké and Bredero, 2003).

Sustainability issues are also associated with the ability to give backstopping support to the new community indefinitely; to bring legal accountability to financial management by auditing Water and Sanitation Committee (WATSANCos); and to facilitate disagreements and resolve conflicts (Schouten and Moriarty, 2003). Moreover, several actors, at different levels and degrees of participation, have to be involved to sustain community-managed water supply schemes. These include the community in which the service is being delivered, government Water Offices, NGOs working in the water sector and private service providers (construction and maintenance activities and supply of spare parts) (IRC, 1993).

In the end, these factors combined bring about the sustainability of water supply schemes, leading to vital health benefits: by sustaining accessible water supplies in sufficient quantity and quality; by reducing the time and effort used in water collection; by allowing for the provision of enhanced sanitation facilities; and by facilitating income-generating activities (Moriarty and Butterworth, 2003).

2 Research background and methodology

2.1 Background to the study area

Mirab Abaya Woreda[2] is located in the Southern Nations, Nationalities and Peoples Region (SNNPR), in Gamo-Gofa zone, and is divided into 24 Kebeles,[3] one urban and 23 rural. It has three major agro-ecologies: *dega* (high land), *woina dega* (mid-altitude) and *kolla* (low land). Out of the 24 Kebeles, 16 are in the *kolla* agro-ecology, six are in the *dega* agro-ecology and the other two are in the *woina dega* agro-ecology. The average annual rainfall in the *dega* and *woina dega* agro-ecologies is 580mm. In the *kola*, average annual rainfall ranges from 1,000-1,100mm (MAW-WRDO, 2007a).

Birbir is the political centre of the Woreda and lies about 230km away from the regional capital. The total population of the Woreda in 2006 was estimated to be 69,036. Out of this total, around 93% live in villages and the rest (around 8%) live in the town. Religion-wise, 52% of residents are Protestant, 41% Orthodox, 5% Muslim and 1% Catholic; 1% of residents follow traditional religions (MAW-WRDO, 2007a). The Woreda is bounded in the north by Wolayita Zone (Humbo Woreda and Boreda Woreda) and in the south by Arbaminch Zuria Woreda and Lake Abaya. In the east, it is bounded by Lake Abaya and in the west by Chencha Woreda. More than 90% of the population of the Woreda depends on agriculture. The total area is 107,971ha, out of which 40,200ha are covered by water, 4,262ha are woodland and 2,462ha are non-arable land.

The total safe water supply coverage in the Woreda, as reported before this study by the Woreda Water Resources Development Office (WWRDO), was 32% (MAW- WRDO, 2007a); health coverage is at 69% (MAW-WRDO, 2005b). Malaria is the most prevalent (and fatal) disease. The second and third most prevalent diseases are intestinal parasites (13.7%) and diarrhoeal disease (6.6%), both of which result from a lack of safe water, or from contaminated water, or from poor sanitation and hygienic practices (ibid). The non-functionality rate of water supply schemes in the Woreda before this study, as reported by the WWRDO, was 26% (MAW-WRDO, 2007b). Water supply schemes are found in only 23 of the Woreda's 24 Kebeles. Dega Done Kebele is highly inaccessible and there is no water supply scheme; the community relies on water from a small crater lake.

2.2 Background to RiPPLE, GaP theme and the case study

RiPPLE (Research-inspired Policy and Practice Learning in Ethiopia and the Nile region) is a five-year programme, hosted by WaterAid Ethiopia and funded by the UK's Department for International Development (DFID). It is led by a consortium of four partners, including WaterAid Ethiopia; the Institute for Development Research (IDR) of Addis Ababa University; the Overseas Development Institute (ODI) of the UK; and the International Water and Sanitation Centre (IRC) of the Netherlands. The consortium works closely with the Bureaus of Water Resources (BoWRs) of the focus regions, the Ministry of Water Resources (MoWR) Research and Development Department,

[2] The lower administrative structure of the government, or 'district'.

[3] The smallest administrative unit of Ethiopia, similar to a ward or a neighbourhood.

the Faculty of Journalism and Communications at Addis Ababa University, Hawassa University and a variety of other academic, research, nongovernmental, consultancy and technology organisations.

RiPPLE works in three regional states of Ethiopia (Oromia, SNNPR and Benishangul-Gumuz) in different research thematic areas related to water supply, sanitation and hygiene. These are the Governance and Planning (GaP) theme; the Growth theme; the Finance theme; the Mapping theme; and the Sanitation theme. The aim of the GaP theme is to identify appropriate and scalable approaches to strengthening local water governance and planning in the context of Ethiopia's Universal Access Plan (UAP) and other development planning frameworks.

A particular focus is on mechanisms for ensuring effective and efficient participation by water users. The theme attempts to look into: how planning functions in theory and practice and how water users are involved; what the incentives and barriers are to stakeholders playing a more active role in decentralised water, sanitation and hygiene (WaSH) governance; what the potential is for more coordinated provision of services; what is needed to achieve the goals of the UAP in a sustainable way, in terms of capacity, government roles at different levels, communities and external support; and, finally, how can all of these be strengthened.

Water supply and sanitation coverage in Ethiopia is among the lowest of all developing countries and even of most countries in sub-Saharan Africa. The country's water supply sub-sector has encountered a number of challenges throughout its development. Some of the factors that have affected the development process of the water supply sub-sector are as follows (MoWR, 2006):

- Water supply has not been reliable and sustainable;
- Water use has not been efficient;
- Programmes and projects have not been objective-oriented;
- Plans have not been certain and clear;
- Water schemes have lacked a focus on good O&M of services;
- Integrated water supply and sanitation services have not been achieved; and
- There has been a lack of understanding that water demand includes livestock.

At present, national safe water supply and sanitation coverage have reached 42.2% (41% rural and 78% urban) and 30% (21% rural and 80% urban), respectively (MoWR, 2007). The Ethiopian government (subsequently the regional governments) adopted the National Water Resources Management Policy in 1999 (MoWR, 1999) so as to increase and sustain water supply services in both rural and urban areas. The overall goal of the policy is to enhance and promote 'efficient, equitable and optimum utilisation of water resources' for sustainable socioeconomic development. The policy recognises that water resources development, utilisation, protection and conservation go hand-in-hand and ensures that water supply and sanitation, irrigation and drainage as well as hydraulic structures, watershed management and related activities are integrated and addressed together. Moreover, the policy stresses that water resources management has to integrate the development goals of other sectors, such as health and agriculture. The policy follows the principle that the water supply sector has to ensure that every Ethiopian citizen has access to water of acceptable quality to satisfy their basic human needs.

The government later adopted the UAP to scale up the water supply and sanitation coverage of the country and achieve 100% water supply coverage in most of the rural regions by 2012 (MoWR, 2006). This includes the SNNPR. To attain this target, the UAP assumes that, to make water supply schemes sustainable, hand pumps have to be made locally and repaired by local technicians and, generally, pumps and generators have to be standardised in relation to village-level operation and maintenance (VLOM) for sustainable service (ibid).

It has been estimated that 33% of rural water supply schemes in Ethiopia are non-functional at any time, owing to lack of funds for O&M, inadequate community mobilisation and commitment and a lack of spare parts (MoWR, 2007). With regard to this issue, the UAP aims to rehabilitate and maintain existing water supply schemes in the first two years of its seven-year plan, so as to develop a maintenance culture and increase the sustainability of both the newly constructed and the existing water supply schemes (MoWR, 2006).

In the study region, SNNPR, overall water supply and sanitation coverage in 2006 were at 48% (45% rural and 60% urban) and 22%, respectively (BoWR, 2006). There were 1,304 hand dug wells, 1,678 shallow wells, 421 deep wells, 2,686 spring developments with distribution points and 255 springs with network distributions, constructed by the regional government and NGOs in recent years (ibid). However, it has been noted that a large number (22% to 24%) of the water supply schemes are non-functional at any given time (ibid), implying negative impacts on coverage and on the attainment of the UAP. To this end, the SNNPR BoWR aimed to increase the sustainability of water supply schemes from the current 76% to 95% within seven years (ibid). With this in mind, the RiPPLE GaP theme undertook a sustainability case study in the two selected study areas, namely Mirab Abaya Woreda and Alaba Special Woreda (discussed in Working Paper 5), to examine functionality and service levels of existing water supply schemes and to identify factors impacting on sustainability, following a bottom-up approach and offering recommendations for best approaches and practices for the upcoming Long-term Action Research (LAR) areas.

2.3 Objectives of the study and research questions

The overall objective of the study was to assess the sustainability of the water supply schemes. The specific objectives were as follows:

- To assess the functionality and service level of existing water supply schemes in Mirab Abaya Woreda and Alaba Special Woreda;
- To examine the institutional, technological (including environmental) and financial factors impacting on sustainability of schemes;
- To examine links between participatory planning, social accountability, governance and scheme sustainability; and
- To identify issues for best practice guidelines for development practitioners to bring about improved sustainability.

2.4 Tools, methods and sampling

Qualitative and quantitative data collection instruments were developed and used for focus group discussions (FGDs), interviews, KAP (knowledge, attitude and practice) surveys, institutional/stakeholder mapping, resource mapping and observations (Annex 5). Data collection activities were divided into community (Kebele) level and Woreda level. They included: document reviews; mapping of all schemes and water points in the Woreda; institutional and stakeholder mapping in three Woreda sector offices (the WWRDO, the Health Office and the Woreda Administration) and World Vision Ethiopia (WVE) Mirab Abaya branch; resource mapping in nine selected WATSANCos at the community level, in all the aforementioned sector offices and in WVE at the Woreda level; and field visits/observations for all schemes in the Woreda using qualitative information system (QIS) and other checklists. In total, 18 FGDs (nine with WATSANCos and nine with women in the community) and 18 interviews (nine of Kebele chairpersons and nine of other key informants) were held in the nine selected Kebeles. Moreover, one FGD was conducted with staff from the WWRDO.

To undertake an in-depth study of the case, two major factors, scheme technology type (borehole – BH, hand dug well – HDW, machine shallow well – MSW or protected spring – PS) and scheme functionality (functional/non-functional) were used as main parameters for selection of sample Kebeles. From the 23 Kebeles with water supply schemes, nine Kebeles, presenting both functional and non-functional schemes and all the four scheme types, were selected in collaboration with the WWRDO: Kolla Mullato, Wanke Wajifo, Doshe, Yayike, Omolante, Ankober, Molle, Alge and Delbo. From these selected Kebeles, 21 functional and 17 non-functional schemes were observed in detail.

In Kolla Mullato Kebele, there are six schemes – four HDW and two MSW, all fitted with a hand pump. Three of the hand pumps are Indian Mark II (InMrk II) and the other three are Afridev. Of these schemes, one HDW and one MSW are non-functional because of abandonment and water quality problems. Four of the schemes were financed by the Catholic Relief Mission and two were financed by the United Nations Children's Fund (UNICEF) and the Canadian government. Most of the schemes have served for more than 14 years. In this Kebele, around 3,352 people use the schemes, solely for drinking and cooking purposes. For other domestic activities, Raya River and Lake Abaya are the main sources.

Wanke Wajifo Kebele is some 20km away from Birbir, with around 2,820 people (MAW-WRDO, 2005a). In this Kebele, there are also six schemes, including one BH, two HDW and three MSW. The BH has four water points and functions with a Lister Peter engine. Three of the hand pumps are Afridev and two are InMrk II. Out of the hand pumps, one HDW and one MSW are non-functional because of abandonment and water table drawdown. The schemes were financed by the Catholic mission, UNICEF and the Chinese government (two schemes each). The majority of these schemes have been in use for more than 14 years. The community uses water from these sources for drinking and cooking; Raya and Kemi Rivers serve as the main sources of water for bathing, washing clothes and cattle watering.

Doshe Kebele has around 1,339 residents. There are only two schemes providing a service for users. These are a PS source with network distribution and an MSW fitted with an InMrk II hand pump. The spring became non-functional four years ago owing to a landslide which damaged the capping structure and broke the distribution pipeline. The spring was constructed by the Catholic mission

and served for more than 20 years, whereas the MSW was financed by WVE and has been serving since 1997 of the Ethiopian Calendar (EC).[4] The community uses Daga River as an alternative source for bathing, washing clothes and cattle watering. However, the community uses irrigation water harnessed from the spring as its main source for cattle watering, bathing, washing clothes and other domestic activities.

In Yayike Kebele, there are two schemes, including a PS source and a BH (Lister Peter engine) with network distributions containing a total of nine water points. Both these sources are functional and serve around 3,018 people. The BH was developed by WVE in 1997 EC, whereas the PS was constructed by the Catholic mission in 1974 EC. Water from these sources is used mainly for drinking and cooking purposes. For bathing, cattle watering and washing clothes, the community uses Kollo River and Lake Abaya as the main sources.

Omolante Kebele has six schemes, of which five are HDW fitted with hand pumps and the other is a BH (Lister Peter engine) with two distribution points. These schemes, mainly the BH, provide water for around 6,776 people in the Kebele. Surprisingly, four of the five HDW are non-operational and only the BH and one HDW serve the community. Even so, people do not use water from the HDW for drinking. Four of the HDW are fitted with Afridev hand pumps and the other has an old version rotary hand pump. The causes of non-functionality of the HDW are water table drawdown, abandonment, incomplete scheme installation and various technical problems. All of the HDW were financed by the Catholic mission between 1978 and 1994 EC, whereas the motorised scheme was financed by the Chinese government in 1978 EC. The community uses the Basso and Dahe Rivers as water sources for bathing and washing clothes, and sometimes for drinking when the motorised scheme fails. Lake Abaya is used for cattle watering.

Ankober Kebele, with more than 5,062 residents, has one BH water scheme (Lister Peter engine). The scheme had been non-functional for the past three years and was under maintenance when the study was conducted. The scheme was financed by the Canadian government in 1980 EC. As a result of the technical failure of the scheme, the community has been forced to go to neighbouring Kebeles and as far as Birbir (9km away) to fetch water for drinking and cooking purposes. Shife River is used as a main source for cattle watering, bathing and washing clothes and even sometimes for drinking.

The Molle Kebele WATSANCo manages three water schemes for a population of more than 4,931. Out of the three schemes, two are HDW fitted with Afridev pumps, developed by the Catholic mission in 1987 EC, and one is a BH with a VM Italy engine with three network distribution water points, financed by the Chinese government in 1967 EC. One HDW and the BH were non-functional; the other HDW was giving service during the study. The BH has been non-functional throughout 1999 EC. Because of the failure of the motorised scheme, people are compelled to fetch water for drinking and cooking from neighbouring Kebeles, such as Alge, and from Birbir (7km away). For bathing, washing clothes and cattle watering, people use Shife River as their main source.

In Alge Kebele, more than 2,480 people have been served by about seven schemes, five of which are MSW and two of which are HDW. Both are fitted with hand pumps, either InMrk II or Afridev. Of these schemes, two of the HDW and one MSW are non-functioning, because they were abandoned by the community owing to lake transgression and subsequent community displacement. The

[4] 1997 EC corresponds to 2004-2005 (September to September) of the Gregorian Calendar. The current year is 2000 EC. Dates in this report are given in the Ethiopian Calendar.

schemes were developed by the Ethiopian Social Rehabilitation and Development Fund (ESRDF), WVE and the Catholic mission between the years 1980 and 1997 EC. The community uses water from the functional schemes only for drinking and cooking purposes. For other domestic purposes, such as bathing, washing clothes and cattle watering, they use Lake Abaya as a main source.

Delbo Kebele, the nearest to Birbir, has a population of more than 2,373. In the Kebele there are five schemes: two MSW, two HDW fitted with InMrk II or Afridev brand hand pumps and one BH with a Lister Peter engine. The schemes were financed by the Catholic mission, WVE and the Chinese government in the years between 1972 and 1997 EC. Out of the five schemes, the BH and one HDW are not giving service. The BH has a quality problem and the community stopped using it, and the HDW was so old that it faced a technical breakdown. Because of the proximity of Birbir town, most of the community of Delbo Kebele relies exclusively on water from Birbir town. Water from the hand pumps is also used for other domestic purposes.

Data collected during the survey were analysed using Statistical Package for Social Science (SPSS) version 11.5 and Microsoft Excel 2007. Questionnaires were given numbers for identification purposes and were fed into a computer in an Excel datasheet. Targeted variables, frequencies, means and standard deviations were analysed. Data collected from the FGDs were grouped together according to the checklist questions and the category of respondents. Finally, similar responses were grouped and different views of respondents were analysed independently during discussion.

2.5 Study implementation

The study took a total of three months (26 November 2007 to 26 February 2008), from preparation up to report write-up. In the field, the research team consisted of five individuals: one from the Woreda Health Office, two from the WWRDO, the RiPPLE Woreda Facilitator and the consultant. The actual field activity took a total of five weeks and was carried out in two phases.

In the first phase, scheme and water point mapping and FGDs were carried out in parallel at the community level. The help of research team members, especially those from the Woreda offices, was indispensable right from the beginning, particularly with regard to communicating with the local community through the local language (Gamo) and translating and facilitating interviews and FGDs. Team members were also involved in filling out the observation checklists.

The hospitality of the local community was exceptional. There were invitations to lunch and to drink soft drinks, coffee or tea; the team welcomed and accepted these invitations. In almost all cases, WATSANCos and Kebele Administrations collaborated fully in: executing the FGDs and interviews; WATSANCo resource mapping; gathering women from different user communities for the FGDs; giving interviews; participating in the FGDs; and showing the locations of water supply schemes in the different parts of the Kebeles.

Most of the Kebeles were accessible by car at the time of the field activity, except for some six highland Kebele schemes and some schemes in the lowland Kebeles. Mostly, spring capping structures were found at the tips of mountains; the most difficult structure to map required a more than six-hour roundtrip and the easiest required a 45-minute roundtrip. PS and BH water points were in different parts of the Kebeles. As such, long walks through the Kebele were inevitable, taking six hours on average. In some cases, the team was unable to look into WATSANCo financial

statements on income and expenditure because the person who had the book was not available, despite an appointment being made a few days ahead of the discussions.

Second phase activities were carried out at Woreda level. Activities in the Health Office, the WWRDO and the Woreda Administration, and in WVE, included: institutional/stakeholder mapping, interviews, KAP surveys, resource mapping and one FGD at the WWRDO. Field research team members were great assets in facilitating Woreda-level activities. The FGD at the WWRDO was participatory and welcoming; interviews, KAP surveys, institutional/stakeholder mapping and resource mapping at the WWRDO and Health Office were carried out efficiently. However, at WVE, only interview, KAP survey and institutional/stakeholder mapping were possible. Resource mapping was not possible owing to a lack of personnel assigned to help. Moreover, interviewing the Woreda Administrator was a great challenge, as he was engaged in political matters and was unavailable in the Woreda for many days.

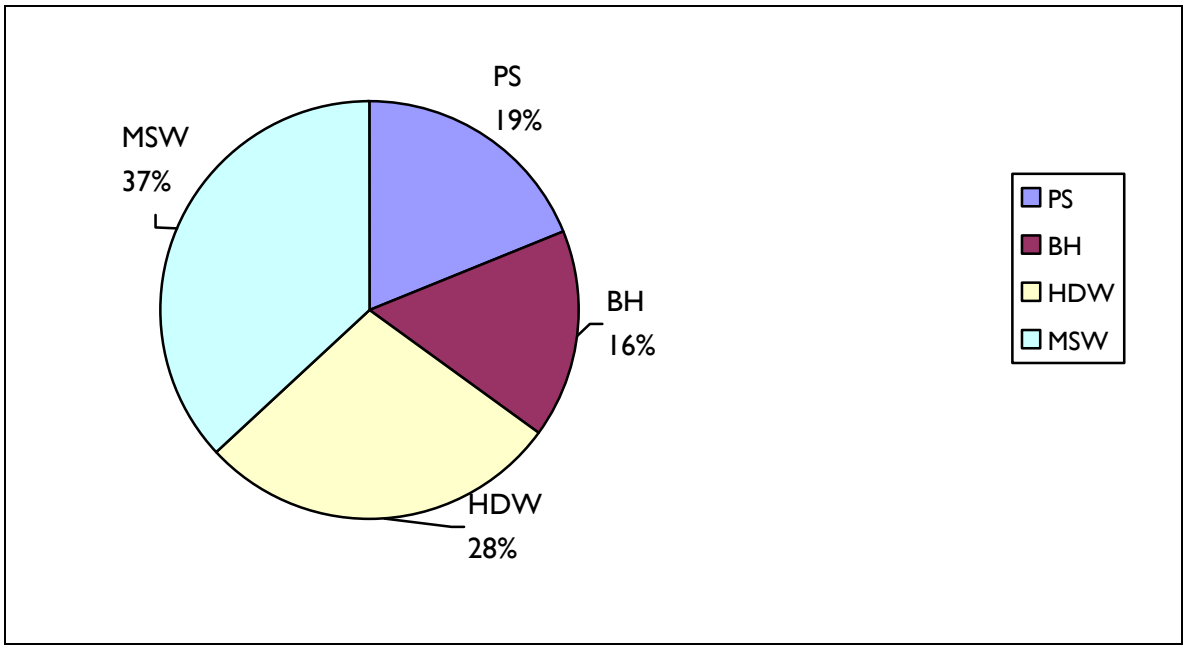
Overall, the field activity could be rated as a success thanks to the dedicated facilitation and direct support of the Woreda and Regional RiPPLE Coordinators, research team members from the Woreda Learning Practice Alliance (LPA), and overall guidance from the GaP theme members. The results of this study have been presented to Woreda and regional LPA members at different times and have been endorsed.

3 Findings

3.1 Sustainability, functionality and service level of water services in Mirab Abaya

Mirab Abaya Woreda has 70 schemes with four types of technology (Annex 1) developed between 1966 EC and 1999 EC. These include (Figure 3.1) 11 BH, 20 HDW fitted with hand pumps, 26 MSW fitted with hand pumps and 13 PS sources with 65 network and on-spot distribution points (Tables 3.1 and 3.2).

Figure 3.1: Proportion of schemes by type



Regarding the distribution of schemes in the Woreda, out of the 70 schemes, a total of 40 were found during the study to be functional and the other 30 are non-functional.[5] Out of the 30 non-functional schemes, 37% have been completely abandoned, 40% are non-functional owing to various technical problems, 13% have stopped service because of water table drawdown, 7% have failed owing to a water quality problem and 3% are new and have not yet started service. The abandoned schemes include seven HDW, three BH and one MSW scheme. Many of these abandoned schemes have were constructed more than 20 years ago and did not receive any rehabilitation (Annex 1). Of the 65 network and on-spot distribution points, 39% are non-functional.

[5] A scheme is said to be functional in this text if and only if it is providing service for its users.

Table 3.1: Existing status of water supply schemes in the Woreda

	No. functional	No. non-functional	No. abandoned
Scheme type			
BH	4	4	3
HDW	8	5	7
MSW	18	7	1
PS	10	3	-
Total	40	19	11

Of all the schemes, around 86% are found in the *kolla* climate. Of these, 17% are BH, 33% are HDW, 42% are MSW and 8% are PS. Meanwhile, 13% are found in the *dega* climate (and 1% in *woina dega*). In the *kolla* area, 55% of schemes are functional schemes; in the *dega* area, 67% are functional.

Table 3.2: Scheme functionality in Kebeles and associated population data

No.	Kebele	Pop. size	Agro-climate	Total no. schemes	Functional schemes					Non-functional schemes					Abandoned schemes				
					BH	HDW	MSW	OPS	GPS	BH	HDW	MSW	OPS	GPS	BH	HDW	MSW	OPS	GPS
1	Alge	2,480	Kolla	7			4									2	1		
2	Ankober	5,062	Kolla	1						1									
3	Birbir	5,029	Kolla	4	1					1					1	1			
4	Dega Shongole	1,852	Dega	2										1	1				
5	Delbo	2,373	Kolla	6		1	2			1				1		1			
6	Doshe	1,339	Kolla	2			1							1					
7	Faragosa	1,289	Kolla	2					1						1				
8	Fetelle	866	Kolla	1				1											
9	Fura	1,793	Kolla	4			2				1	1							
10	Kolla Barana	2,542	Kolla	4			2					2							
11	Kolla Mulato	3,352	Kolla	6		3	1					1				1			
12	Korga Geramo	508	Kolla	4		1	3												
13	Layo Tirga	2,899	Dega	2				2											
14	Menena	2,115	Woina dega	1				1											
15	Mole	4,931	Kolla	3		1				1	1								
16	Morede	2,220	Dega	1					1										
17	Omolante	6,776	Kolla	6	1	1					3					1			
18	Ugayehu	1,853	Kolla	2			1					1							
19	Wanke Wajifo	2,820	Kolla	6	1	1	2					1				1			
20	Weye Barana	3,800	Dega	1								1							
21	Yaike	3,018	Kolla	2	1				1										
22	Zala Barana	3,123	Dega	1					1										
23	Zala Gutisha	7,381	Dega	2				2											
	Total	69,421		70	4	8	18	6	4	4	5	7		3	3	7	1		

Note: Population data are from MAW-WRDO (2005a). GPS: Gravity piped spring; OPS: On-spot protected spring.

Table 3.3: Scheme main features

No.	WS No.	Kebele	Source type	Technology	Status	Pump type	Scheme brand	Donor	Year of construction	Remarks
1	043	Alge	MSW	Hand pump	FN		InMrk II	ESRDF	1997 EC	
2	044	Alge	MSW	Hand pump	FN		InMrk II	ESRDF	1997 EC	
3	045	Alge	MSW	Hand pump	FN		InMrk II	ESRDF	1997 EC	
4	046	Alge	MSW	Hand pump	FN		InMrk II	ESRDF	1997 EC	
5	047	Alge	MSW	Hand pump	NF		Afridev (India)	WVE	1987 EC	Abandoned
6	048	Alge	HDW	Hand pump	NF		Rotary hand pump	Catholic	1980 EC	Abandoned
7	049	Alge	HDW	Hand pump	NF		Afridev (India)	Catholic	1980 EC	Abandoned
8	042	Ankober	BH	Motorised pump	NF	Mono pump	England (LP)	Canada	1980 EC	Technical problem
9	055	Birbir	BH	Motorised pump	FN	Submersible	VM (Italy)	WVE	1984 EC	
10	056	Birbir	BH	Motorised pump	NF	Submersible	England (LP)	WVE	1999 EC	New scheme not yet servicing
11	057	Birbir	BH	Motorised pump	NF	Submersible	England (LP)	China	1971 EC	Abandoned
12	058	Birbir	HDW	Hand pump	NF		Rotary hand pump	Catholic	1978 EC	Abandoned
13	059	Dega Shongole	BH	Motorised pump	NF	Submersible		China	1971 EC	Abandoned
14	060	Dega Shongole	PS	GPS	NF			WVE	1992 EC	Distribution line leaking
15	061	Delbo	PS	GPS	NF			WVE	1999 EC	Distribution line cut off
16	052	Delbo	MSW	Hand pump	FN		InMrk II	WVE	1997 EC	
17	053	Delbo	MSW	Hand pump	FN		Afridev (India)	WVE	1998 EC	
18	054	Delbo	HDW	Hand pump	FN		Afridev (India)	Catholic	1980 EC	
19	050	Delbo	BH	Motorised pump	NF	Mono pump	England (LP)	China	1984 EC	Water quality problem (turbidity)
20	051	Delbo	HDW	Hand pump	NF		Rotary hand pump	Catholic	1972 EC	Abandoned
21	029	Doshe	MSW	Hand pump	FN		InMrk II	WVE	1997 EC	
22	028	Doshe	PS	GPS	NF			Catholic	1974 EC	Capping structure damaged
23	01	Faragosa	PS	GPS	FN			WVE	1987 EC	
24	02	Faragosa	BH	Motorised pump	NF	Mono pump	England (LP)	Canada	1980 EC	Abandoned
No.	WS	Kebele	Source	Technology	Status	Pump type	Scheme brand	Donor	Year of construction	Remarks

	No.		type							
25	070	Fetelle	PS	On-spot	FN			Catholic	1976 EC	
26	034	Fura	MSW	Hand pump	FN		InMrk II	WVE	1997 EC	
27	035	Fura	MSW	Hand pump	FN		InMrk II	WVE	1995 EC	
28	032	Fura	MSW	Hand pump	NF		Afridev (India)	Canada	1985 EC	Water table drawdown
29	033	Fura	HDW	Hand pump	NF		Afridev (India)	Catholic	1980 EC	Technical problem
30	025	Kolla Barana	MSW	Hand pump	FN		Afridev (India)	BoWR	1984 EC	
31	026	Kolla Barana	MSW	Hand pump	FN		Afridev (India)	BoWR	1984 EC	
32	024	Kolla Barana	MSW	Hand pump	NF		Afridev (India)	WVE	1982 EC	Technical problem
33	027	Kolla Barana	MSW	Hand pump	NF		Afridev (India)	BoWR	1984 EC	Water table drawdown
34	012	Kolla Mulato	HDW	Hand pump	FN		InMrk II	Catholic	1986 EC	
35	013	Kolla Mulato	MSW	Hand pump	FN		InMrk II	UNICEF	1994 EC	
36	015	Kolla Mulato	HDW	Hand pump	FN		Afridev (India)	Catholic	1974 EC	
37	017	Kolla Mulato	HDW	Hand pump	FN		Afridev (India)	Catholic	1977 EC	
38	014	Kolla Mulato	MSW	Hand pump	NF		InMrk II	Canada	1982 EC	Water quality problem (turbidity)
39	016	Kolla Mulato	HDW	Hand pump	NF		Afridev (India)	Catholic	1977 EC	Abandoned
40	08	Korga Geramo	MSW	Hand pump	FN		Afridev (India)	Ag. Office	1966 EC	
41	09	Korga Geramo	HDW	Hand pump	FN		Afridev (India)	Catholic	1986 EC	
42	010	Korga Geramo	MSW	Hand pump	FN		Afridev (India)	WVE	1986 EC	
43	011	Korga Geramo	MSW	Hand pump	FN		Afridev (India)	BoWR	1986 EC	
44	064	Layo Tirga	PS	On-spot	FN			UNDP	1997 EC	
45	065	Layo Tirga	PS	On-spot	FN			Safety Net	1999 EC	
46	066	Menena	PS	On-spot	FN			Safety Net	1999 EC	
47	05	Molle	HDW	Hand pump	FN		Afridev (India)	Catholic	1987 EC	
48	06	Molle	HDW	Hand pump	NF		Afridev (India)	Catholic	1987 EC	Technical problem
49	07	Molle	BH	Motorised pump	NF	Submersible	VM (Italy)	China	1967 EC	Technical problem
50	069	Morede	PS	GPS	FN			Catholic	1989 EC	
No.	WS No.	Kebele	Source type	Technology	Status	Pump type	Scheme brand	Donor	Year of construction	Remarks

51	036	Omolante	BH	Motorised pump	FN	Mono pump	England (LP)	China	1978 EC	
52	039	Omolante	HDW	Hand pump	FN		Afridev (India)	Catholic	1987 EC	
53	037	Omolante	HDW	Hand pump	NF		Afridev (India)	Catholic	1984 EC	Technical and quality problem
54	038	Omolante	HDW	Hand pump	NF		Rotary hand pump	Catholic	1978 EC	Abandoned
55	040	Omolante	HDW	Hand pump	NF		Afridev (India)	Catholic	1987 EC	Technical problem: incomplete installation (no T-handle)
56	041	Omolante	HDW	Hand pump	NF		Afridev (India)	Catholic	1994 EC	Technical problem
57	04	Ugayehu	MSW	Hand pump	FN		Afridev (India)	WVE	1994 EC	
58	03	Ugayehu	MSW	Hand pump	NF		Afridev (India)	WVE	1981 EC	Technical problem
59	018	Wajifo	BH	Motorised pump	FN	Mono pump	England (LP)	China	1972 EC	
60	020	Wajifo	HDW	Hand pump	FN		Afridev (India)	Catholic	1977 EC	
61	022	Wajifo	MSW	Hand pump	FN		Afridev (India)	China	1984 EC	
62	023	Wajifo	MSW	Hand pump	FN		InMrk II	UNICEF	1995 EC	
63	019	Wajifo	HDW	Hand pump	NF		Afridev (India)	Catholic	1977 EC	Abandoned
64	021	Wajifo	MSW	Hand pump	NF		InMrk II	UNICEF	1995 EC	Water table drawdown
65	063	Weye Barana	MSW	Hand pump	NF		Afridev (India)	WVE	1995 EC	Water table drawdown
66	030	Yayike	PS	GPS	FN			Catholic	1974 EC	
67	031	Yayike	BH	Motorised pump	FN	Submersible	England (LP)	WVE	1997 EC	
68	062	Zala Barana	PS	GPS	FN			WVE	1992 EC	
69	067	Zala Gutisha	PS	On-spot	FN			UNDP	1997 EC	
70	068	Zala Gutisha	PS	On-spot	FN			Safety Net	1999 EC	

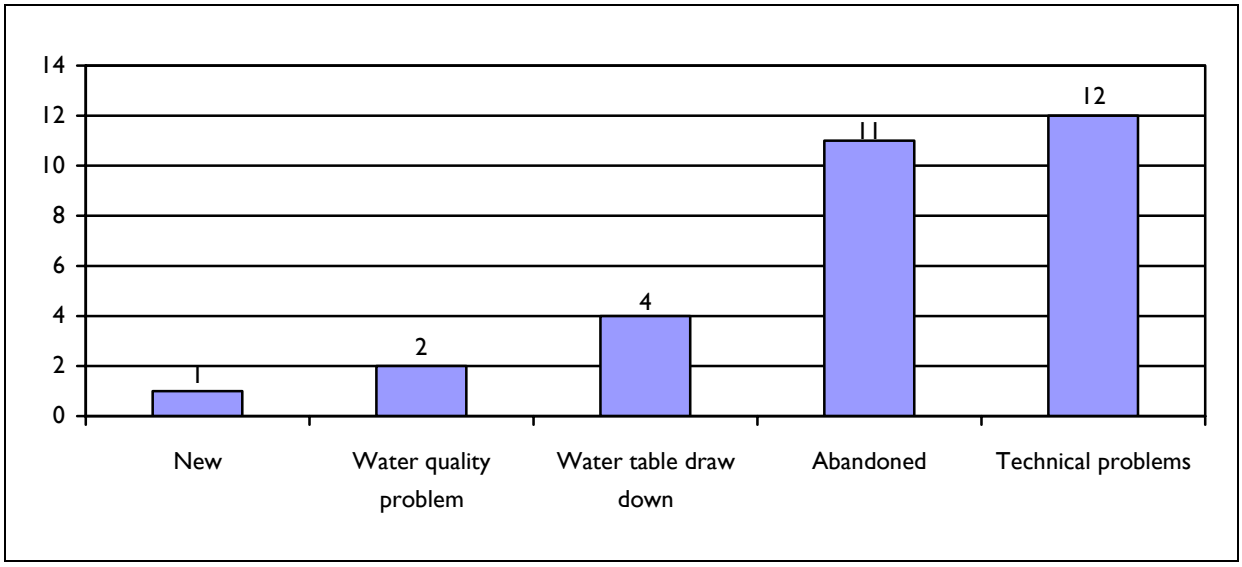
Note: WS: Water source; FN: Functional; NF: Non-functional; LP Lister Peter.

Of the 40 functional schemes, 25% have served for at least 20 years. Excluding the abandoned schemes, there are 59 schemes under some form of WATSANCo management, of which 32% is non-functional. If the abandoned schemes are included, non-functionality rate is at 43%.

Figure 3.2: Abandoned scheme

Field observation identified several factors in the non-functionality of the schemes (Figure 3.5). Most failures (12 schemes) owed to technical problems: i) there was a lack/unavailability of spare parts locally or in nearby towns; ii) it was expensive to change/repair parts; or iii) schemes needed major maintenance equipment such as a tripod. Moreover, a total of 11 schemes have been abandoned, either because the community has resettled, leaving the scheme behind, or because Lake Abaya has transgressed (Figure 3.4) onto the land and people have been displaced. Water table drawdown, especially for MSW, has made four schemes non-functional. A water quality problem (turbidity) has made two schemes non-functional. One scheme is new and has not yet started providing a service.

Figure 3.3: Causes of scheme non-functionality



The majority of the schemes were financed by the Catholic Relief Mission (34%) or WVE (26%). The rest were financed by governments, such as Ethiopia (13%), China (10%) and Canada (6%), or donor

agencies such as UNICEF (4%), the UN Development Program (UNDP) (3%) and Safety Net programme (4%) (see Figure 3.6).

Figure 3.4: Scheme development financing organisations

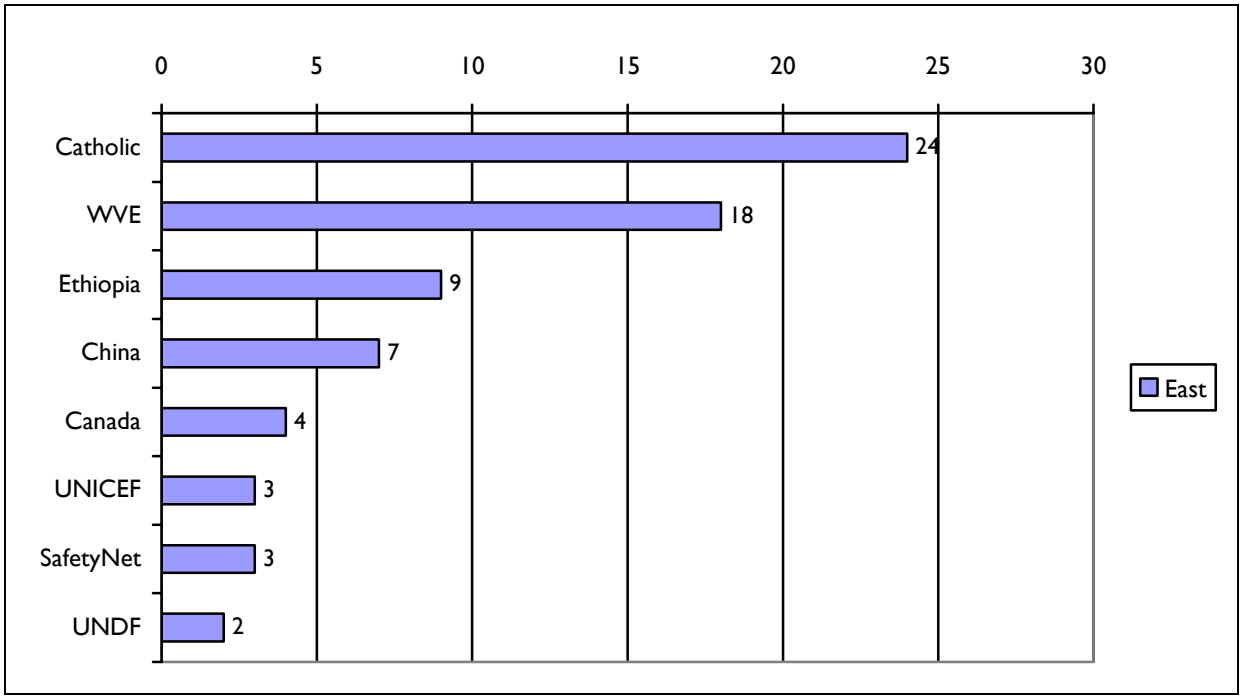


Figure 3.5: Different scheme technologies in the Woreda

Note: Above left: MSW fitted with InMrk II; Above right: HDW fitted with Afridev hand pump; Below left: A submersible motorised pump with Lister Peter engine; Below right: on-spot spring.

The majority (63%) of the hand pumps (HDW and MSW) in the area are of Afridev technology, with 28% InMrk II. The remainders use the oldest type of rotary hand pump technology. Of the motorised schemes, 55% are fitted with submersible pumps and the rest (45%) with mono-lift pumps. In addition, 73% of the engines in the motorised schemes are Lister Peter (England). Out of the 13 protected springs, 46% are on-spot developed springs, whereas 54% include a gravity distribution system of springs (Figure 3.7).

In the study, it was found that 43% of the schemes had undergone and/or required major maintenance within 12 months in 1999 EC. Another 26% of the schemes had undergone and/or required minor maintenance which was managed by local technicians. The rest (31%) did not require any type of maintenance within the 12-month period.

In total, 66.7% of the schemes have served for beyond their design period from 1966 EC to 1980 EC, without preventive maintenance practices taking place and with low rehabilitation activities.[6] Besides, 91% of the abandoned schemes were installed more than 20 years ago. 32% of the non-functional schemes (under O&M) are among those which have served beyond their design period. A large number of schemes (39%) are serving above their design population; 49% are within their design population and the rest have missing data.[7]

Hand pumps constitute 63% of the non-functional schemes (MSW & HDW) (excluding the abandoned hand pumps) in the Woreda. They are also the most recurrently failing schemes. The major cause of failure for the operational hand pumps is inappropriate use by users, especially children (as reported by users and WATSANCos). The most recurrently failing parts of hand pumps are foot valves, rods, O-rings, plungers and cylinders. In most cases, hand pumps fail at least twice a year. Moreover, they mostly require minor maintenance which can be handled by local technicians. However, the speed of maintenance depends on the type of scheme technology (InMrk II is found to be difficult to maintain), on the part of the scheme that needs either to be changed or to be repaired, and on the response rate from the WWRDO or the Zonal Water Resources Development office (ZWRDO) with maintenance support.

Boreholes fail recurrently. Most of the time, they are maintained between one week and six months. However, their speed of maintenance may sometimes take from one year up to three years (in the worst case scenario). Pumps, check and gate valves and stand-post faucets were reported to be the most recurrently failing parts in this scheme. Springs are found to be the least failing schemes in the Woreda, with faucets, gate valves and capping structures the most at risk parts. In many cases, springs are maintained within one month.

Water quality data obtained from the regional BoWR showed that some of the schemes (WS No's: 010, 018, 021, 022, 023, 029, 031, 034, 052 and 055 – see Annex 1) tested for detailed water quality analysis had water quality within the regional and WHO drinking water quality standards. Generally, as observed in this study, in 18% of the water points,[8] communities use water with complaints on quality (muddiness, saltiness, worms, other). In 82% of the water points, communities use the water

[6] Design period for BH and PS is 20 years, for HDW and MSW 15 years.

[7] The design population is drawn from the SNNPR BoWR Rural Water Supply Implementation Plan (BoWR, 2002).

[8] Water point: stand post, on-spot distribution or hand pump.

for domestic purposes without any complaint, or either community-based organisations (CBOs) or the installing organisation have certified the quality of the water.

Moreover, in the field, it was identified that, in 82% of the water points, water quality testing has not been carried out. It was also observed that, in 82% of the water points, there is a large stagnant water pool without drainage or with poor drainage which has caused the surrounding area to become very dirty. Results show that, in 46% of the water points, there has been no chlorination to disinfect the water at the source or at the reservoir. In 85% of the schemes there are no guards, and 55% of the schemes do not have a proper fence.

The service level and quantity of water an individual obtains are also important factors that significantly affect the sustainability of water supply schemes. UAP defines 'adequate' water supply in rural areas to mean 15 litres of water per person per day, accessible within a range of 1.5km (around a 45-minute roundtrip) from the dwelling place (MoWR, 2006).

Within this context, it was observed that communities use on average 54 litres of water per household per day for domestic activity.[9] An individual walks for about two hours (roundtrip) to a water point *excluding the waiting time*.[10] On average, an individual waits for three hours.[11] One household fetches water twice a day on average, with a maximum of three times in Alge and a minimum of one time in Ankober and Kolla Mulato. On average, all the water points provide a service for nine hours a day, with a maximum of 12 hours in Alge and Molle and a minimum of six hours in Wanke Wajifo. Women and girls are the responsibility bearers regarding water fetching.

Low number of stand posts for water supply was also indicated in Wanke Wajifo, Molle, Ankober and Doshe as a cause of poor service delivery. Most schemes (especially hand pumps) were designed to serve a small number of people. However, it was indicated by most WATSANCos that these schemes are over-pressured owing to the ever-increasing population. Moreover, hand pumps give a small yield and this dissatisfies the community, as there are long queues to fetch water (confirmed in the field visit).

It is observed that 36% of the water points in the wet season and 33% in the dry season are non-operational. Communities said that, in 2% of the stand posts, the supply is unpredictable in both wet and dry seasons. In 72% of the stand posts (wet season) and 47% (dry season), the supply occurs at the scheduled time and is fully predicable. Water is always available to users at 26% of the stand posts in the wet season and at 51% in the dry season. Regarding hand pumps, water supply was found to be unpredictable in 11% of cases in both wet and dry seasons. Full water predictability was found to occur at 62% of hand pumps in both seasons. It was also observed that, in 5% of the water points (especially stand posts) severe leakage had led to the disruption of the water supply to the user community.

Most of the WATSANCos do not have the necessary maintenance equipments, bar a few spanners and pipe wrenches (Table 3.4). Moreover, it was found that all the WATSANCos, except that in Omolante, save money and have their own saving account at Omo Microfinance.

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[9] On average: 11 l/c/d; maximum: 16 l/c/d in Wanke Wajifo; minimum: 8 l/c/d in Yayike, Omolante, Ankober and Molle.

[10] Maximum six hours in Ankober and minimum 20 minutes in Molle.

[11] Maximum: eight hours in Molle and minimum 30 minutes in Wanke Wajifo.

Table 3.4: WATSANCo equipment and saving

No	Kebele	Physical resources			Financial resource (Saving)
		Equipment	Type	No.	Amount in Birr
1	Alge	Spanner	17",24",18"	3	1,403
		Hammer	Medium	1	
2	Ankober	Pipe wrench	Medium	1	2,000
		Pipe wrench	Large	1	
		Spanner	11",13",14",17",19"	5	
		Screwdriver		1	
		Jerry can	20L	7	
		Barrel	200L	1	
3	Delbo	Pipe wrench	Medium	1	3,300
		Barrel	200L	1	
		Hook	Long	1	
		Spanner	24"	2	
4	Doshe	-	-	-	800
5	Kolla Mullato	Spare parts	17/19",24"	4	3,428.52
		Hammer	Medium	1	
6	Molle	Spanner	17/19"	1	2,000
		Jerry can	30L	2	
		Barrel	200L	1	
7	Omolante	Pipe wrench	Small	1	Never saved
		Spanner	12",14"16",17",19"	5	
		Pliers		1	
		Screwdriver		1	
		Oil filter		2	
		Air filter		2	
		Jerry can	25L	2	
		Barrel	200 L	1	
		Wooden box		1	
8	Wanke Wajifo	Spanner	12",16",24"	3	6,200
		Pipe wrench	Large	1	
		Wooden box	Medium	1	
		Barrel	200L	1	
		Jerry can	35L	2	
9	Yayike	Pipe wrench	Small (20")	1	1,900
		Pipe wrench	Large (40")	1	
		Jerry can	25L	2	
		Spare parts	Different	10	

Most of the WATSANCos indicated that their income was greater than their expenses. The majority of the WATSANCos' expenditures are on major maintenance costs, fuel and oil for motorised

schemes; salary for tap attendants and operators; or per diem for maintenance technicians and for WATSANCo members when they go to the Woreda and/or the zone for different scheme-related issues, such as reporting, depositing money or spare parts purchase.

3.2 Resource availability at Woreda

In the Health Office, 63% of the technical positions are vacant, while 57% of the technical positions and 50% of the support staff positions in the WWRDO are unoccupied (Table 3.5). Around 90% of the present technical staff in the WWRDO have either a diploma from technical and vocational education schools (10+3) or an advanced diploma from Arba Minch University (Annex 2).

Regarding budgets, it was identified that, within four years (1997-2000 EC), the budget allocated by the Woreda Council/Cabinet to the WWRDO as running costs for the year 1999 EC was 5,000 Birr (8.6% of the total budget); in 2000 EC, the allocation for running costs went down to 420 Birr (0.41% of the total budget). However, overall, the budget allocated to the WWRDO rose from 35,000 Birr in 1997 EC to 102,576 in 2000 EC: an average 44% yearly budget increment. Moreover, in 1998 EC, the office received funding amounting to 64,219 Birr from the World Bank R-WaSH (Rural WaSH) programme as part of the sector's capacity-building process.

Table 3.5: Summary of human resources available and required by sector offices

Woreda office	Health		WWRDO		Administration	
Type of staff	Technical	Support	Technical	Support	Technical	Support
No. required	21	3	23	4	6	2
Qualification of staff						
Degree	4					
Advanced Diploma			3			
Diploma	4		6	1		
Certificate			1	1	6	
High School	1					
No. vacant positions	15	3	13	2		2

On the other hand, in 1999 EC, an approved grant from UNICEF Safety Net programme amounting to 487,811 Birr was lost somewhere before it reached the office. A large proportion of the budget goes on salary payments, so little budget is allocated as running costs. For instance, for the 2000 EC budget year, only 0.4% of the total budget has been allocated as running costs for the WWRDO. The main sources of budget for the WWRDO are projects/programmes of WVE, Safety Net programmes and the World Bank R-WaSH programme.

Most sector offices in the Woreda have poor office material capacity (Table 3.6). Some do not have even a computer which could supply a useful database management system. Others do have a few functional motor vehicles for fieldwork.

Table 3.6: Material resources available and required for basic service delivery

No.	Physical resources	Health Office			WWRDO			Woreda Admin.			WVE		
		No.	FN	NF	No.	FN	NF	No.	FN	NF	No.	FN	NF
1	Building blocks	2	2		1	1		1	1		4	4	
2	Offices	7	6	1	2	2		4	4		10	10	
3	Computers				2	2		1	1		3	3	
4	Printers				2	2		1	1		2	2	
5	Photocopier							1	1		1	1	
6	Phone line	1	1		1	1		1	1		1	1	
7	Generator				1	1					1	1	
8	Motorcycle	4	2	2	2	2					2	2	
9	Maintenance kit				1	1							
10	Chain block				1	1							
11	Tripod				2	1	1						
12	Mould				2	2							
13	Car							1			3	3	

3.3 Knowledge, attitude and practices (KAP) of service providers and users in Mirab Abaya

3.3.1 Users

Most users (women) said that they did not participate in the scheme development projects, in terms of consultation in the pre-feasibility study, technology selection or construction. Besides, they (the women) are not called to Kebele meetings to discuss water-related issues or are not given the chance to express their views in the meetings. They said: *'Mostly our husbands go for Kebele meetings to discuss water-related issues. But our husbands mostly do not tell us what the discussion was about.'* Another respondent said: *'The WATSANCo and the Kebele Administration do not give the chance to women to give their views on water issues.'* Users said that they participate in scheme management aspects by contributing labour for scheme cleanliness and by bringing wood for fencing and gravel to prevent water stagnation around the schemes and water points. They confessed that hand pumps fail mostly because children and young females are not aware of how to use them properly. Others indicated that the main reason of failure of motorised pumps is that technicians are not skilled enough to operate and manage the schemes.

All users (women) know that the WATSANCos manage the overall activities of the water supply schemes. However, they said that they had no idea as to how the WATSANCos were selected and how water tariffs are set. Moreover, they do not know whether WATSANCo selection, term and duration follows or considers any criteria or guideline.

The user communities stated that their responsibilities in water service delivery lie in paying for the water as per the tariff, properly queuing up to fetch water and participating in protecting the hygiene of schemes and water points. They explained that they have the full right to fetch water on the

scheduled time basis and clearly state their complaints to the WATSANCo and Kebele Administration regarding improper water service delivery. They said that the money collected from the water service is used for O&M activities and they feel that they can afford to pay for the water service. However, several users complained that the WATSANCo had never reported on their income and expenditure to the community. Moreover, in many Kebeles, the community complained about the lack of: transparency in financial management; coordination and supervision among WATSANCo members; WATSANCo capability in repairing non-functional schemes; tap attendants' employment procedures; and women's involvement in scheme-related meetings.

The community in Omolante Kebele reported that the WATSANCo is not storing reserve fuel for the motorised scheme and, when the fuel is all used up, the service stops until they go to Arbaminch to buy fuel. Moreover, sometimes fuel may be scarce or not available, which leads the community to rely on unsafe sources of water. However, many users said that they prefer motorised pumps to hand pumps because of the high discharge and low labour requirements. All users confirmed that water supplies have improved their lives in terms of the health of their families, saved time and energy for productive activities and household activities, and enabled their children to go to school.

3.3.2 WATSANCos

Generally, WATSANCos do not know of any formal criteria behind their selection but previous experience in scheme management, social acceptance, nearness to a water point and education (able to read and write) were the perceived requirements. Most WATSANCos reported that the selection process involves household heads, especially men. They said that selections are organised by WWRDO in collaboration with the Kebele Administration. However, WATSANCos do not know whether there are rules regarding terms and duration. They perceive that their management duration depends on their management performance and the community's reliance on them. Regarding the low number of women in WATSANCos, one respondent said: *'Most of the time women are engaged in household activities, hence there is little time for them to be fully involved in O&M activities. Moreover, maintenance cases require labour and travel to the Woreda for reporting, which women can not do.'* They said that, despite what most people believe, the participation of women in the committee is mandatory.

All the WATSANCos say that their responsibilities in scheme management are: scheduling time for proper service delivery; involvement in the maintenance of schemes; fencing and cleaning of water points by mobilising the community; employing operators and tap attendants for revenue collection and supervising them; protecting water sources and water points from pollution and making the area hygienic; giving awareness education on personal hygiene and sanitation; saving the collected money for future maintenance; water tariff setting in collaboration with the community and Kebele Administration; and reporting to the Woreda in case of major maintenance problems beyond their capacity.

Most WATSANCos reported that there was no payment-based incentive for them beyond getting clean and safe water, increased social acceptance and training to broaden their knowledge on water supply, sanitation and hygiene. All the WATSANCos said that they go to the WWRDO and ZWRDO for spare parts support and major maintenance activities even though they have the money to buy the spare parts.

WATSANCos said that users (household heads) are aware of their responsibilities to attend meetings and to participate in meeting discussions and in scheme O&M activities, such as fencing and cleaning of water points and sources. They also exercise their full rights to use the water indiscriminately at a scheduled time and clearly state their complaints to the Kebele or ward committee in case of mistreatment. Moreover, many WATSANCos indicated that Kebele Administrations are influencing, ordering, interfering or not cooperating with the WATSANCos. The WATSANCos pointed out that community members are not willing to attend meetings called by the committee. Meetings called by the Kebele Administration are used as a means to communicate with the community for mobilisation.

In a few Kebeles, WATSANCos report that the community is not generally willing to participate in scheme management, such as fencing, cleaning and cash contribution, because of poor awareness on the importance of community participation. Most WATSANCos said that, owing to a lack of formal rules and regulations, they make decisions collectively in the presence of all members and have no scheduled or regular meetings. Besides, they consult the community in case of major decisions to be made, such as tariff or fixed price allocation. Moreover, many WATSANCos do not take meeting minutes, whereas others take them irregularly.

All the WATSANCos know that they are accountable to the Kebele Administration and that they are visited by the WWRDO for support. They recognise that the WWRDO has little capacity for maintenance and mostly point out the involvement of ZWRDO for support. All the WATSANCos pointed out that they do not have a legal status and communicate with any organisation or office through the Kebele Administration. Moreover, although the committees do not have legal recognition as an association, there is a system to help them save revenue at the Woreda microfinance office. WATSANCos state that they are accountable to the Kebele and their reporting is to them.

In none of the visited Kebeles was there a system of reporting to the community or to their perceived accountability base – the Kebele Administration. No committee knows when or how to report. Most of the committees said they had reported at least once since their election (many of them have been working for more than three years). However, Molle Kebele WATSANCo confessed that it had never reported to the community on income and expenditure; in Omolante, the committee had reported twice within 10 years. On the other hand, the WATSANCo in Yayike said that it had been reporting to the Kebele every three months.

Most of the WATSANCos do not have any idea about their role in scheme technology selection and design considerations. They indicated that the major challenges they face are a lack of spare parts shops nearby; low water discharge of hand pumps; poor salary payment to the tap attendants; sometimes slow responses from the Woreda/zone on major maintenance cases; and insufficient water supply even for domestic activities. Some WATSANCos noted a lack of community awareness on their responsibilities (fencing and cleaning of water points and contribution in cash or labour in case of maintenance activities) regarding water point protection and collaboration with WATSANCos. All the WATSANCos feel that maintaining the non-functional schemes, expanding others and rehabilitating the old ones will improve the water supply service. Moreover, they underline the importance of backstopping support in the form of trainings from the WWRDO.

3.3.3 Woreda level

The WWRDO said that it does not have a standard guideline or manual for WATSANCo selection. Informal criteria, such as permanent residence in the locality, community acceptance and willingness to work of the nominee have been used. The office also does not have any guideline on the term and duration of WATSANCos. Regarding the involvement of women in the WATSANCos, the office indicated that it has been raising the awareness of the community on the importance of women in the committees and at least one woman has been included in every WATSANCo.

The office said that it does not have a legal linkage with the WATSANCos. However, it supports the WATSANCos in minor maintenance activities and communicates with the respective zonal office for major maintenance support. The WWRDO said that WATSANCos are visited, but irregularly. The office stressed that it can not directly command the WATSANCos as the WATSANCos are accountable to the Kebele. Hence, the WWRDO works with the Kebele on WATSANCo selection and overall performance evaluation. When it finds a WATSANCo is performing badly it communicates with the Kebele Administration and community in order to change membership, either fully or partly. The WWRDO encourages WATSANCos to save money and has made it so that if a WATSANCo wants to withdraw money from its saving account, it must first get a signature from the WWRDO. This system, the office said, also ties in with Omo Microfinance.

The WWRDO said that most people in the Woreda, including the WATSANCos, think that the government repairs their schemes. Therefore, they take poor care of them. The office also added that some WATSANCos do not report scheme failure because they may be required to purchase spare parts from their own savings. The office said that it is not directly involved in setting water tariffs for the community.

Communities that have hand pumps would prefer motorised schemes. Thus, there is a tendency to complain about hand pumps and request motorised scheme installation. This is because hand pumps require labour to pump the water. Regarding reporting, the WWRDO stated that it has given trainings on all aspects of scheme management, including reporting systems. It said that, because of the lack of structural linkages between the WATSANCos and their office, the WWRDO has become unable to monitor and audit WATSANCos and request regular reports.

The WWRDO said that it has a serious budget problem. The problem of budgeting has roots in the fact that the office is not a member of the Woreda Cabinet, which allocates the budget to sector offices. The office complained that the Woreda Finance Office, not the Cabinet, should proportionally allocate the budget. One respondent said: *'Most of the Cabinet members think that water-related activities are NGO activities. Hence they are not ready to allocate a reasonable budget for the sector from government capital.'* Moreover, the ZWRDO said that, even at the zonal level, Cabinet members are not well aware of the need to allocate sufficient budget to the water sector. It also added that the direct representation of the WWRDO in the Cabinet could contribute a great deal in terms of fair budget allocation to the sector.

The Woreda Administration on its own indicated that the zonal counterpart allocates a very small budget to the Woreda. When this budget is allocated to the different sectors, the water sector gets a meagre share. The office also indicated that the water sector had been given less attention in budget allocation by the Woreda Council/Cabinet members. The office agreed that the absence of the WWRDO in the Cabinet might affect budget allocations to the sector, but added that budget allocations would not change that much if the WWRDO were included. Nonetheless, the WWRDO

said, as long as finance permits, it has been carrying out capacity-building activities, such as trainings on water, hygiene and sanitation for WATSANCos, scheme operators and caretakers in collaboration with WVE and UNDP. Maintenance activities are carried out when reported by WATSANCos. If there are more cases than the WWRDO can deal with, the office reports to the ZWRDO.

WVE explained that it has a strong link with the WWRDO, the ZWRDO, the Woreda Administration and the Health office. One of the challenges in project activities, as indicated by WVE, is that sometimes WATSANCos may change in the middle of a project, affecting the pace of the project: newly elected members take a long time to get familiar with the project. Furthermore, WVE indicated that community participation in scheme construction was below what was expected. It was believed that, in the project agreement, 15% of project capital would be covered by the community in terms of labour and local materials. WVE added that none of its water supply schemes had undergone technical failures as a result of poor standards, as standards were selected by the ZWRDO.

4 Discussion

4.1 Institutional factors

4.1.1 Capacity of WATSANCos, WWRDO and others

In most of the Kebeles visited, WATSANCos are dominated by men, although there is at least one woman per committee in almost all of them (Annex 2). In Molle Kebele, there are three women in the committee. Moreover, in all the Kebeles, all the chairperson and secretary positions are held by men. This shows that the participation of women in WATSANCo leadership is still nonexistent. Women are mainly involved as supervisors, cashiers or storekeepers, and take up 31.1% of all positions (there are five positions in each WATSANCo) in the nine Kebeles visited. These positions have been given to women mainly because they are thought to be trustworthy and strict in carrying out their duties.

Figure 4.1: Wanke Wajifo Kebele WASANCo members and operators in an FGD

Most of the WATSANCo members, caretakers and operators had undergone training, mainly on water service management, general O&M, HIV/AIDS, sanitation, environmental and personal hygiene, book keeping and financial management. The trainings were organised by the Catholic Relief Mission, UNICEF, ESRDF and WVE in collaboration with the ZWRDO, the WWRDO, the Woreda Health Office and BoWR.

In most cases, WATSANCo members had received at least one training. For instance, in Doshe and Yayike Kebeles, WATSANCo members had taken on average three trainings per individual (maximum five, minimum one). In Wanke Wajifo Kebele (Figure 4.1), all the five WATSANCo members and one operator have been trained. On average, two trainings per person had been given in this Kebele. In Kolla Mulato Kebele, all the five WATSANCo members and the operator were trained, with three trainings on average. However, most WATSANCos complained that although trainings were relevant they were insufficient and short. Moreover, they stressed that trainings given by the WWRDO and WVE did not have training manuals. Notes were taken in exercise books from the blackboard. This kind of training does not give lasting knowledge, as most of the WATSANCo

members have limited education (maximum Grade 12, minimum adult education) (Annex 2) and have poor handwriting; the absence of pictorial demonstrations means that training is forgotten very soon. This shows that installing organisations are in general not equipping WATSANCos sufficiently in terms of providing relevant training. Some training was found to be irregular and shallow. Most WATSANCos felt that trainings were relevant and useful but bemoaned the lack of training manuals to refresh themselves. Moreover, in most of the Kebeles, operators complained that the trainings given at the Woreda were more theoretical and very short (given in less than five days) and were not sufficient to pass on good technical skills.

Figure 4.2: Maintenance tools – Ankober Kebele

In the nine visited Kebeles, it was observed that WATSANCos have very limited, if any, maintenance equipment (pipe wrenches, spanners, screws and hammers) (Table 3.4). Only Ankober Kebele has reasonable maintenance tools (Figure 4.2). The poor maintenance capacity of WATSANCos might result from the fact that, in many scheme development projects, the provision of maintenance toolkits was not included as an overall component of capacity building.

Regarding WATSANCo supervision, the WWRDO tries to visit and assist the WATSANCos and to identify problems related to scheme management as much as possible. However, these activities are irregular and not uniform, and mostly depend on budget (the major constraint) and the availability of transportation vehicles. The lack of budget for running costs, the low number of professional staff (only 41.4% of positions are staffed) and the few functional motor vehicles available for service delivery (Table 3.6) are felt to be major factors behind the poor performance of the WWRDO in supporting the WATSANCos. The WWRDO added that most activities to support WATSANCos are being carried out jointly by using other project budgets from NGOs and other grants, making the office dependent on NGO money. The budget the WWRDO relies upon came from the Safety Net programme, UNDP project grants, the World Bank R-WaSH programme and the WVE WATSAN programme.

In the WWRDO, technical staffing includes diploma and advanced diploma graduates in water resources engineering, small-scale irrigation and drainage, rural water supply and sanitation, electromechanical technology and civil engineering. They constitute 43% of the total technical staff required. In the Health Office, only 29% of the technical staff positions are occupied. The WWRDO has fairly good material capacity for service delivery, although it has very few offices (Table 3.6). Mostly, the sector offices share a car with the Woreda Administration. However, the Woreda Health Office has little capacity to manage its database.

4.1.2 Roles and responsibility of the different actors

Full community participation in rural water supply scheme management has been assumed to be the central theme of assuring long-term sustainability of water service delivery (IRC, 1993). In the study area, the community collaborates with WATSANCos in fencing, water point cleaning, cash contributions and some laborious maintenance activities. Moreover, household heads (men in most cases) attend meetings and participate in discussions. Women are involved in fencing and cleaning of water points and sources and provision of gravel and wood for scheme cleanliness.

The community uses water as per the schedule of WATSANCos. They also check and balance the activities of WATSANCos with the help of the Kebele Administration, to which the WATSANCos are accountable. The Kebele Administration supervises the overall activities of the WATSANCos. The roles and responsibilities of the WWRDO constitute overseeing all the water supply schemes in the Woreda and providing backstopping support for WATSANCos. These include: controlling and supervising water supply scheme design and construction; managing water supply schemes; providing maintenance support and relevant trainings for users and WATSANCos; and controlling the quality of water supplied for domestic activities. The Health Office, through R-WaSH, has the responsibilities of preventing waterborne diseases which arise as a result of a lack of safe and adequate water and because of poor hygiene and sanitation practices, and providing/arranging trainings and awareness creation programmes for user communities and WATSANCos on better water supply, hygiene and sanitation practices.

WVE said that it is engaged in various development projects, including water supply, sanitation and hygiene and education. WVE installs water supply schemes in the Woreda to increase the supply of safe and adequate water to all communities. The Woreda Administration and Council supervise the overall activities of sector offices and NGOs and try to facilitate the duties of the various offices. The Council allocates the budget to the sector offices and the Finance Office releases the budget in accordance with its schedule. In all of the government offices, there are insufficient budget and technical staff and poor understanding of roles and responsibilities, which hinders their effectiveness in implementing their strategic and annual plans.

4.1.3 Linkages and accountability between actors

The management of water supply schemes will only be effective if legal arrangements are put in place. In most cases, legal support to a WATSANCo is missing, making these bodies ineffective (Bolt and Fonseca, 2001). The lack of legal status or absence of legal registry by a competent body makes WATSANCos unable to open bank accounts, enter into contractual arrangements or resolve water-related disagreements in the community or outside. Nor can they be audited by the Finance Office. The WWRDO and all the WATSANCos pointed out that they do not have legal status and they communicate with legal offices through the Kebele Administration. In the community, WATSANCos are accountable to the Kebele, which in turn is accountable to the Woreda Administration. The Kebele organises the community for any local activity. In the Woreda, the WWRDO, Health Office and other sector offices are under the command of the Woreda Administration and are accountable to their zonal counterparts (Annex 4). The work of WVE in the Woreda is overseen by the Woreda Administration, the Finance Office and the respective sector office for each project, but WVE is directly accountable to its regional office.

4.1.4 Communication and coordination between the different stakeholders

A successful partnership brings about the development of 'human capital'; improved operational efficiency; organisational innovation; increased rate of coverage; a stable society; enhanced reputation (among employees and other stakeholders); cost reductions; access to resources; empowerment; access to information and materials; ensured capacity of members to deliver; and developed relationships between public, private and civil society (Graas et al, 2007).

In this regard, in the water sector, the integration of stakeholders began with the World Bank R-WaSH programme, with the formation of a Woreda Water Team (WWT). The team includes representatives of the WWRDO and the health, finance, women's affairs, agriculture and education offices, and is chaired by the Woreda Administration. WATSANCos communicate and work with the Kebele Administration to mobilise the community for different activities and for maintenance support from the WWRDO. However, the Kebele Administrations are mostly found to be unhelpful: they influence, interfere with or do not help activities. The WATSANCos, by means of a formal letter, communicate a request for maintenance support to the WWRDO. Moreover, the WWRDO may formally request support from the zonal counterpart if a maintenance case is beyond its capacity.

The WWRDO stressed that it has been working with WVE on scheme development, rehabilitation activities and trainings for WATSANCos. However, there has not been any effort to integrate or communicate its strategic and annual plans with relevant stakeholders such as WVE and the Health Office. This owes to the absence of a platform for such a kind of communications. As the sector offices and the Woreda Administration indicated, because of the absence of a platform, sector offices and the Woreda Administration are unable to exchange information on similar tasks smoothly.

WVE said that it has strong communication and collaboration with water, health and finance offices and the Woreda Administration in all its projects. However, owing to poor staffing in the health office, its participation in the planning stages of projects is very low. In the case of the WWRDO, staffing problems are solved through ZWRDO technical support. Communication gaps and independent development strategies, however, make projects unsustainable. In most cases, these do not recognise the interests of the community in which the schemes are to be installed or the strategic plans of the sector office concerned. In addition, the WWRDO stated, NGOs are not interested in rehabilitating non-functional schemes if they were not installed by their own organisation. This was also noted by WVE, which claimed this is an organisational policy issue. WVE has begun to be involved in rehabilitation and strengthening of existing water supply schemes and is intending to launch advocacy activities on hygiene and sanitation rather than fully relying on scheme construction.

The WWRDO, however, complained that WVE did not communicate and harmonise its strategic plan with its own strategic plan. Moreover, the WWRDO said that there is no proper document exchange or handover process with WVE; WVE does not give handover documents to the office owing to a lack of concern by their employees and high turnover. WVE agreed that there is high turnover and there are heavy workloads but said that handover processes mostly go in accordance with procedure. However, WVE did not deny that documents need to be sent to the regional office for approval before they are given to the WWRDO. Meanwhile, if the person handling the project leaves, the document may be left somewhere.

WVE confirmed that it has strong links with its major stakeholders in the sector, such as the ZWRDO and the WWRDO. It added that, in scheme development, the WWRDO and WATSANCos are directly involved in site selection, design and project supervision activities.

4.1.5 Information management

It was observed that in the WWRDO and other sector offices information management systems are very poor. The WWRDO and Woreda Health Office do not have a record officer. Documents are placed haphazardly and are difficult to access. Most are in hard copy which makes the documentation system very primitive. Most of the documents regarding the schemes developed in the Woreda are not in the hands of the WWRDO. The office explained that the documents are in the hands of the ZWRDO, BoWR or the scheme-installing organisation. This system may have come about because the WWRDO was recently reorganised and there were few resources to organise documents for better service delivery and to improve coordination and communication among stakeholders.

4.2 Financial factors

4.2.1 Tariffs and tariff setting

In the majority of cases, the WATSANCos and Kebele Administrations confirmed that tariff setting had mostly been carried out in consultation with the community (household heads). There are two kinds of payment system for the service from the water supply schemes. These are i) a monthly fixed price system and ii) a tariff based on spot payment system. The communities said that the tariffs and monthly fixed prices consider the socioeconomic conditions of poor and marginalised people. All of the Kebeles visited are using a monthly fixed price or a tariff system or both. Generally, the average water tariff is 10 cents for 45l of water (maximum 10 cents/20l; minimum 10 cents/100 l) and a 2 Birr average fixed price (maximum Omolante – 5 Birr/month; minimum Ankober – 0.5 Birr/month).

Most WATSANCos indicated that poor people who cannot pay for water are allowed to use water for free. Most of the user communities confirmed that the tariffs are affordable, although in Wanke Wajifo Kebele the community said that the tariff is very expensive (i.e. 10 cents/20l from the motorised scheme). Generally, the WATSANCos use a customary tariff-setting system. This does not consider, for instance, price fluctuations in consumable supplies such as fuel and motor oil. This also affects the amount of money that would be collected if it followed an approach that also considers the local situation.

4.2.2 Financial management systems

Out of the nine Kebeles, seven have a saving account at Omo Microfinance; one (Ankober) has a bank account at Arbaminch Commercial Bank; and the Omolante WATSANCo has no saving account at all and has never saved any money from revenue collection. This owes to the fact that the Kebele Administration is directly involved in monthly revenue collection (of the monthly fixed price) and saving this in its current account, despite the rules in the WATSANCo Organisational Manual that stating that the WATSANCo should directly manage revenue collection, saving and expenditures for various activities (BoWR, 2000). Moreover, the WATSANCos in Omolante complained that their expenditure is far higher than their income. They stated that the revenues collected from the day-to-day water service delivery did not even pay back the fuel cost. However, observation showed that

the water reservoir has been non-functional and boosting directly to the stand post consumes more fuel. This might be one of the reasons for higher fuel consumption.

The saving of revenue to an appropriate organ is indicated in the WATSANCo Organisational Manual as a possible alternative until a committee's financial strength gets better and it can open a bank account. Most of the WATSANCos said that saving at this stage is used for major maintenance activities. However, it was very difficult to carry out financial tracking of yearly income and expenditure using their documents. This owes to poor recording systems and an absence of annual financial reports. It was observed that, in most of the WATSANCos, income is greater than expenditure. Most expenditure goes on major maintenance costs, fuel and oil for motorised schemes, salaries for tap attendants and operators, and per diem for maintenance technicians and for WATSANCos when they go to the Woreda and/or zone for different scheme-related issues, such as reporting, depositing money or spare parts purchase.

Generally, it was observed that there is poor financial management in most of the WATSANCos. Income and expenditure are not properly registered. None of the committees has a financial manual; in most of the Kebeles, revenues and expenses are written in a book but haphazardly. All the WATSANCos have poor document handling systems. There are no trained book keepers who can handle financial matters effectively. Almost all of the WATSANCos use simple tickets for revenue collection that are authorised with the Kebele stamp. Such a system is not acknowledged in the WATSANCo Organisational Manual. In Omolante Kebele, revenue collection is being done without receipts, and there is no formal revenue collection and monitoring system. In Delbo Kebele, the WATSANCo uses non-authorised simple tickets to collect the water service fee. Using such systems leads to susceptibility to misuse of money, by leaving it in the hands of tap attendants and those who collect the money. Although the WATSANCo Organisational Manual states that the committee will be audited by the ZWRDO, none of the WATSANCos visited had been ever audited.

4.2.3 Cost sharing

The WATSANCos spend money mainly on maintenance. They pay for spare parts if they can. Moreover, they pay for per diems and fuel and transport allowances for motor vehicles used by technicians. The WWRDO and ZWRDO provide technicians, vehicles for transportation, maintenance tools and free spare parts in support of the WATSANCos if the spare parts are not available in the market or are too expensive for the WATSANCos to buy. The BoWR may be involved in major maintenance activities which require the mobile maintenance garage and forklift.

4.3 Technical factors

4.3.1 Technology choice

Generally, the WATSANCos said that they have never participated in technology selection activities. Some committees said that only the ESRDF schemes had involved community representatives in technology selection. The WWRDO complained that most NGOs come with grants approved for a given type of technology and install the scheme without getting community input or holding prior consultation with the WWRDO. WVE, one of the major scheme installers in the Woreda, said that it had been working together with the ZWRDO in technology selection and with the WWRDO,

WATSANCos and Kebele Administrations in scheme design. It added that it was the ZWRDO that gives them the technology standards before schemes are developed in specific project sites.

Regarding community participation, WVE said that it tries to discuss with and convince the community regarding the schemes to be installed in the project site, but does not consult on scheme type selection. The organisation said that it is up to the community to choose whether to have the scheme installed or to reject it. However, WWRDO said that most people who have hand pumps want to have motorised schemes because hand pumps require some labour. Others, fed up with motorised schemes because of the O&M costs, prefer springs.

Even when the World Bank 'advocated' for simple and affordable technologies, such as hand pumps, these were rejected by some communities. The WWRDO said that two Kebeles had been selected by the World Bank as operational Kebeles for the R-WaSH programme, including hand pump installation. But the communities refused to accept the programme when they were told that hand pumps would be installed: they wanted a motorised scheme. For this reason, other Kebeles were chosen as operational Kebeles instead. Nonetheless, the absence of community participation in technology selection leads to a lack of community acceptance of schemes and underutilisation (Brikké, 2002) which also impacts significantly on the sustainability of schemes.

4.3.2 Spare parts

Generally there are no specialised spare part suppliers in the Woreda. That is why, most of the time, the ZWRDO is engaged in the provision of free spare parts in case of scheme failure. This office is also dependent on spare parts provision from the regional BoWR. The main reason for this is that, in the majority of cases, hand pump spare parts are not found as single units but rather as part of a set, hence they are very expensive. Spare parts for motorised pumps are very expensive and mostly they are to be found in Addis Ababa. However, the ZWRDO has said that it has the intention of opening two specialised spare parts supply shops in the zonal town, Arbaminch. Most of the WATSANCos indicated that spare parts available in the market are expensive, except those that are found in ordinary building material shops in Arbaminch and Wolayita Sodo towns.

5 Conclusions and Recommendations

5.1 Conclusions

The non-functionality rate of schemes in the Woreda (32%)[12] is well above the regional average (22% to 24%). This has forced communities to rely on unsafe sources of water for basic consumption. For most of the schemes in the Woreda that have failed owing to abandonment, this is because of long years of service without rehabilitation. Environmental factors, lack of proper understanding of the hydrogeology of the area (design problems), water quality problems and landslides are also contributing factors. On the other hand, weak WATSANCo, operator and caretaker performance in scheme management, lack of spare parts suppliers in the Woreda, lack of community awareness on proper use of schemes, overpressure on schemes, poor capacity and low backstopping support from the WWRDO are identified as the main factors accelerating the failure of schemes and stagnating maintenance.

Speed of maintenance is also affected by the availability of spare parts in the market or the ZWRDO, financial ability of the WATSANCo to purchase the required spare parts, the type and technology of the failed scheme and its ease of maintenance, maintenance equipment required, capacity of the WWRDO in terms of budget and manpower to act and speed of WATSANCos in asking the WWRDO for support. The majority of the scheme developments (87%) in the Woreda are financed by NGOs, donor agencies and foreign governments.

The absence of fences and the presence of large stagnant water pools around water points may lead to contamination of water sources especially those tapped from hand dug wells and shallow wells. Irregular and low coverage disinfection may also lead to the threat of waterborne diseases: only 53.8% of the water points had been disinfected at least once. Women and children walk and wait long hours in search of safe water, much beyond the UAP and WHO standards for water adequacy and accessibility. In most of the Kebeles, there is high water inadequacy (11 l/c/d) and water is barely accessible for most users (five-hour roundtrip on average). This water inadequacy and inaccessibility compromise basic consumption and hygienic practices.

Communities use the water supply schemes solely for drinking and cooking purposes. For bathing, washing clothes and cattle watering (and sometimes for drinking) they rely exclusively on unsafe sources, such as rivers, streams and Lake Abaya, requiring long extra hours of walking. The search for water wastes the productive time of women and children, which could be used for schooling or in income generation.

Recurrent scheme breakdowns have also contributed greatly to increasing the amount of walking the communities have to do in search of water, thereby reducing the quality of service delivery. In addition to frequent breakdowns, slow maintenance speed, limited number of stand posts, failure of reservoirs, poor WATSANCo management and low discharge of hand pumps all contribute to reducing the quantity of water and quality of service delivery to the user communities. Consequently, water demand in the Woreda is very high. On the other hand, the provision of safe water has

[12] The non-functionality rate does not consider abandoned schemes.

brought (at least for some of the community) better health and increased productive time for other income-generating activities.

Owing to a lack of standardised WATSANCo selection criteria and the absence of participation of all segments of the community, WATSANCos currently managing schemes rarely represent the community that they are serving. The low number of women in the WATSANCos and their marginalised positions indicate that they are still not invited to be fully involved in the decision-making process. Culture contributes to the low participation and involvement of women in water-related meetings, WATSANCo member selection and committee representation.

The absence of terms and durations on WATSANCo management leads to WATSANCo members continuing to run schemes despite community complaints on their non-transparent activities and lack of reporting on O&M activities, including income accrued and expenditure. This also prevents others from showing their talents in scheme management, which might help the community find better WATSANCo members to manage the schemes. Moreover, the absence of financial incentives for WATSANCo members and low salary payments to operators, caretakers and tap attendants could force them to focus mainly on their personal (household and agricultural) activities and to give less attention to the management of the scheme. This can be substantiated by the lack of regular meetings of WATSANCo members (they meet as the need arises).

The lack of legal entitlement and accountability of WATSANCo members opens the door to corruption and misuse of revenue collected from the service. WATSANCos can perform poorly in terms of financial management and reporting to the community and the WWRDO. Kebele Administrations were found to influence and interfere with WATSANCos in their activities. The absence of a clear structure of command for the WATSANCos leads to the Kebele acting as the dominant authoritative body to which WATSANCos are accountable. However, their accountability is actually to the WWRDO and the community, in the form of reporting.

Moreover, WATSANCos had never been audited by a competent authority, as they do not have the legal procedures in place to audit their financial and capital resources. Lack of legality hampers WATSANCos and stops them communicate independently with relevant stakeholders, putting them in the hands of the Kebele Administration for legal communication with different offices and organisations. Moreover, WATSANCos can not have their own governing rules and regulations as an institution. Legal status with defined responsibility and clear accountability is very important to avoid any external interference that may significantly impact on the performance of the WATSANCos and hence on scheme sustainability.

In majority of cases, tariff setting involved the community (household heads) and took place with prior consultation. Tariffs set are affordable; it could be concluded that they represent the different socioeconomic groups of the community. Moreover, the presence of saving accounts and savings for most WATSANCos could be considered an important step towards proper financial management and subsequent scheme sustainability.

Although trainings undertaken by most WATSANCos have gone some way to helping them in managing the schemes, members are not strong enough to create efficient and effective committees. Many of the inefficiencies of WATSANCos are rooted in the lack of regular trainings and refresher courses. Members are given only short trainings, which are too theoretical; relevant training materials are not properly developed and given to them. It was also observed that WATSANCos are not properly equipped with the necessary maintenance equipment. In most cases, scheme-installing

organisations are not aware of or have given little attention to the need to equip committees with maintenance toolkits and training for the sustainability of the schemes.

The community participates when mobilised by the Kebele Administration: many WATSANCos face challenges mobilising the community for O&M activities. The resistance of communities to involvement in scheme management might have resulted from the fact that their involvement in technology selection, design and overall scheme development activities has been nonexistent or marginal. However, users do know their full rights to use the water indiscriminately on the tariff set and report their complaints to the competent local authority in case of ill treatment.

Owing to insufficient budget, technical staff and other resources, the WWRDO is unable to fully support and supervise the WATSANCos in maintenance and other management issues. There is also poor integration of relevant stakeholders working in the various spheres of water supply and sanitation activities. In addition, the lack of a proper documentation system at the WWRDO has decelerated information exchange with different stakeholders and prevented the office from developing plans for rehabilitation, expansion and new scheme development activities in target Kebeles. Moreover, the lack of vehicles, budget for maintenance crews, transportation and per diem, major maintenance technicians (in the Woreda) and local spare parts suppliers (dependency on spare parts provision from the ZWRDO) are factors delaying maintenance of water supply schemes.

5.2 Recommendations

Although, the challenges that significantly affect the sustainability of water supply schemes and better service delivery are diverse and intricate, the following recommendations are forwarded as footsteps towards sustainable scheme management and better service delivery in the Woreda:

- Capacity building both at Woreda and at WATSANCo level;
- Development of scheme technology standardisation policy/regulation/rule for better provision of spare parts and creation of skilled technicians;
- Institutionalisation of WATSANCos into an independent and accountable organisation;
- Integration of relevant stakeholders at both Woreda and community level for effective and efficient service delivery, avoidance of duplication of efforts, optimum resource utilisation and achieving a common goal;
- Initiating the private sector to be involved in spare parts supply (at least on a zonal level);
- Rehabilitation of existing schemes that have worked for more than their lifespan, expansion of motorised schemes that have few stand posts and construction of new schemes to satisfy the high water demand;
- Involving all segments of the community (women, poor, rich, near, distant users) in all aspects of scheme development and management activities;
- Regular disinfection of water sources;
- Working on integrated watershed management activities to better conserve water resources and prevent contamination of groundwater owing to human activities;
- Creating a proper information exchange system among stakeholders;

- Developing appropriate system monitoring and evaluation of projects and handover processes;
- Developing a computerised database system of documentation by stakeholders;
- Undertaking a water potential mapping for the Woreda; and
- Working on a needs assessment of community scheme preference.

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Annex 1: Mirab Abaya mapping data

Water supply scheme data: Nos 1-10

No.	1	2	3	4	5	6	7	8	9	10
WS No.	043	044	045	046	047	048	049	042	055	056
Kebele	Alge	Alge	Alge	Alge	Alge	Alge	Alge	Ankober	Birbir	Birbir
Distance from Birbir (km)	5							9		
Accessible	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specific location	Kokale Mender	Tima	Alge	Lemat	Tima	Kokale	Lemat	Ketena 3	Ketena 1	Ketena 1
Nearby institution/area	Mekaneyesus Church	Mesfin Beraf	Babatu Aelelew	Agena Madamo	Kalehiwot Church	School	Beyene Basamo Beraf	School	Delbo	Shumeye Wefecho Beraf
Source type	MSW	MSW	MSW	MSW	MSW	HDW	HDW	BH	BH	BH
Technology	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Motorised pump	Motorised pump	Motorised pump
E (coordinates)	37.79284	37.79586	37.79694	37.79791	37.80101	37.80670	37.80579	37.73948	37.76385	37.76631
N (coordinates)	6.27824	6.27648	6.27781	6.27572	6.27207	6.26866	6.27229	6.25105	6.29363	6.29416
Alt. (m)	1201	1196	1197	1198	1194	1192	1187	1223	1202	1230
Climate	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla
Status	FN	FN	FN	FN	NF	NF	NF	NF	FN	NF
Total no. DWPs								4	14	**
FN								4	11	**
NF									3	**
Yield (L)**	0.28	0.28	0.28	0.28	0.28	0.14	0.14	3	3	3
Depth (m)	50	45	50	45		12		79	100	108
HH served (at start)	60	70	100	60	160	30	40	591	550	
Current users (HH)	90	80	120	40	**	**	**	591	1550	
Reservoir								FN	FN	
Reservoir service								NF	FN	
Reservoir type								Concrete	Concrete	
Reservoir capacity (m^3)								25	50	
Reservoir coordinates E								3773910	3776730	
Reservoir coordinates N								625483	629980	
Alt. (m)								1225	1242	
Pump type								Mono pump	Submersible	Submersible
Scheme brand	InMrk II	InMrk II	InMrk II	InMrk II	Afridev	Rotary HP	Afridev	LP	VM (Italy)	LP
Power source								Generator		Electricity
Donor	ESRDF	ESRDF	ESRDF	ESRDF	WVE	Catholic	Catholic	Canada	WVE	WVE
Year of construction	1997 EC	1997 EC	1997 EC	1997 EC	1987 EC	1980 EC	1980 EC	1980 EC	1984 EC	1999 EC
Date of survey	27/03/00 EC	27/03/00 EC	27/03/00 EC	27/03/00 EC	27/03/00 EC	27/03/00 EC	27/03/00 EC	26/03/00 EC	29/03/00 EC	29/03/00 EC
Remarks					Abandoned	Abandoned	Abandoned	Tech. prob		New scheme

Note: DWP: Distribution water point.

Water supply scheme data: Nos 11-20

No.	11	12	13	14	15	16	17	18	19	20
WS No.	057	058	059	060	061	052	053	054	050	051
Kebele	Birbir	Birbir	Birbir	Dega Shongole	Dega Shongole	Delbo	Delbo	Delbo	Delbo	Delbo
Distance from Birbir (km)				106						2
Accessible	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Specific location	Ketena 2	Ketena 1	Ketena 2	Mugurta	Agaya	Ketena 3	Ketena 3	Ketena 1	Ketena 3	Ketena 2
Nearby institution/area	Haile Deyasa Beraf	Primary School	Primary School	Fara kare Chura	Mosque	Kalehiwot Church	Kebele Office	Tunka Tuma Beraf	Kebele office	Hellano Kassa Beraf
Source type	BH	HDW	BH	PS	PS	MSW	MSW	HDW	BH	HDW
Technology	Motorised pump	Hand pump	Motorised pump	GPS	GPS	Hand pump	Hand pump	Hand pump	Motorised pump	Hand pump
E (coordinates)	37.76643	37.76841	37.76941	37.65522	37.66835	37.75863	37.76423	37.76214	37.76315	37.76073
N (coordinates)	6.29488	6.28801	6.28879	6.39346	6.39033	6.28942	6.28935	6.29310	6.28959	6.28976
Alt. (m)	1242	1238	1228	2605	2450	1236	1237	1240	1231	1232
Climate	Kolla	Kolla	Kolla	Dega	Dega	Kolla	Kolla	Kolla	Kolla	Kolla
Status	NF	NF	NF	NF	NF	FN	FN	FN	NF	NF
Total no. DWPs	2		**	2	2				2	
FN			**							
NF	2		**	2	2				2	
Yield (L)**	3	0.14	3	3	3	0.28	0.28	0.14	3	0.14
Depth (m)	100					45	33	33	102	28
HH served (at start)	500	**		95	40	100	337	340	337	**
Current users (HH)	**	**		95	77	160	500	450	460	**
Reservoir				FN	FN				FN	
Reservoir service				NF	FN				NF	
Reservoir type				Concrete	Concrete				Steel	
Reservoir capacity (m^3)				15	15				6	
Reservoir coordinates E				3765882	3766914				3776073	
Reservoir coordinates N				639725	639083				628976	
Alt. (m)				2563	2410				1232	
Pump type	Submersible		Submersible						Mono pump	
Scheme brand	LP	Rotary HP				InMrk II	Afridev	Afridev	LP	Rotary HP
Power source	Generator								Generator	
Donor	China	Catholic	China	WVE	WVE	WVE	WVE	Catholic	China	Catholic
Year of construction	1971 EC	1978 EC	1971 EC	1992 EC	1999 EC	1997 EC	1978 EC	1980 EC	1984 EC	1972 EC
Date of survey	29/03/00 EC	29/03/00 EC	29/03/00 EC	01/04/00 EC	01/04/00 EC	28/03/00 EC	28/03/00 EC	28/03/00 EC	28/03/00 EC	28/03/00 EC
Remarks	Abandoned	Abandoned	Abandoned	Distribution line severely leaking	Distribution line cut off				Water quality problem (turbidity)	Abandoned

Water supply scheme data: Nos 21-30

No.	21	22	23	24	25	26	27	28	29	30
WS No.	029	028	01	02	070	034	035	032	033	025
Kebele	Doshe	Doshe	Faragosa	Faragosa	Fetelle	Fura	Fura	Fura	Fura	Kolla Barana
Distance from Birbir (km)		9	11.5		12			25		
Accessible	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Specific location	Demesha	Kollo	Gamaye	Chalga	Solesow	Mendida	Ketena 6	Ketena 3	Mendida	Kelate
Nearby institution/area	Gara River	Kollo River	None	None	Kolasheno River	Ermias Sema Beraf	Kalehiwot Church	Kebele Office	Birhanu Beraf	Kebele Office
Source type	MSW	PS	PS	BH	PS	MSW	MSW	MSW	HDW	MSW
Technology	Hand pump	GPS	GPS	Motorised pump	On-spot distribution	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump
E (coordinates)	37.72643	37.72150	37.70419	37.73907	37.71372	37.68448	37.68819	37.68700	37.68522	37.74179
N (coordinates)	6.36856	6.37541	6.24444	6.23879	6.333375	6.17853	6.17903	6.17600	6.17570	6.43731
Alt. (m)	1332	1381	1593	1225	1683	1220	1222	1207	1211	1263
Climate	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla
Status	FN	NF	FN	NF	FN	FN	FN	NF	NF	FN
Total no. DWPs		5	3	0	1					
FN			3	0	1					
NF		5		0						
Yield (L)**	0.28	3	3	0	0.33	0.28	0.28	0.28	0.14	0.28
Depth (m)						65	67	45	35	53
HH served (at start)	200	150	148		60	85	85	200	170	80
Current users (HH)	216	210	238		120	120	120	**	170	120
Reservoir		FN	FN		FN					
Reservoir service		NF	FN		FN					
Reservoir type		Concrete	Concrete		Concrete					
Reservoir capacity (m^3)		**	16		16					
Reservoir coordinates E		3772405	3772583		3772401					
Reservoir coordinates N		637258	622847		634093					
Alt. (m)		1370	1278		1487					
Pump type				Mono pump						
Scheme brand	InMrk II			LP		InMrk II	InMrk II	Afridev	Afridev	Afridev
Power source				Generator						
Donor	WVE	Catholic	WVE	Canada	Catholic	WVE	WVE	Canada	Catholic	BoWR
Year of construction	1997 EC	1974 EC	1987 EC	1980 EC	1976 EC	1997 EC	1995 EC	1985 EC	1980 EC	1984 EC
Date of survey	21/03/00 EC	21/03/00 EC	17/03/00 EC	17/03/00 EC	04/04/00 EC	26/03/00 EC	26/03/00 EC	26/03/00 EC	26/03/00 EC	20/03/00 EC
Remarks		Capping structure damaged by land slide		Abandoned				Water table drawdown	Technical problem	

Water supply scheme data: Nos 31-40

No.	31	32	33	34	35	36	37	38	39	40
WS No.	026	024	027	012	013	015	017	014	016	08
Kebele	Kolla Barana	Kolla Barana	Kolla Barana	Kolla Mulato	Kolla Mullato	Kolla Mulato	Kolla Mulato	Kolla Mulato	Kolla Mulato	Korga Geramo
Distance from Birbir (km)		20		21						33
Accessible	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Specific location	Gochero	Kelate	Kelate	Group 2	Group 3	Hazala	Ela	Zeleke Beraf	Konena	Abebech Handa Beraf
Nearby institution/area	Melse Mada Beraf	Kalehiwot Church	Merkene mena Beraf	Farmers Training Centre	Full Gospel Church	Kalehiwot Church	Banana Farm	Zeleke Beraf	Banana Farm	School
Source type	MSW	MSW	MSW	HDW	MSW	HDW	HDW	MSW	HDW	MSW
Technology	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump
E (coordinates)	37.74107	37.74177	37.74592	37.74734	37.74943	37.75359	37.76809	37.75130	37.76096	37.80669
N (coordinates)	6.433720	6.43614	6.43715	6.46432	6.46714	6.46187	6.46400	6.46602	6.46397	6.53803
Alt. (m)	1263	1262	1251	1222	1207	1201	1192	1204	1193	1206
Climate	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla
Status	FN	NF	NF	FN	FN	FN	FN	NF	NF	FN
Total no. DWPs										
FN										
NF										
Yield (L)**	0.28	0.28	0.28	0.14	0.28	0.14	0.14	0.28	0.14	0.28
Depth (m)	54	53	52							
HH served (at start)	100	85	80	100	50	90	**	120	**	30
Current users (HH)	150	250	100	150	75	120	**	180	**	50
Reservoir										
Reservoir service										
Reservoir type										
Reservoir capacity (m^3)										
Reservoir coordinates E										
Reservoir coordinates N										
Alt. (m)										
Pump type										
Scheme brand	Afridev	Afridev	Afridev	InMrk II	InMrk II	Afridev	Afridev	InMrk II	Afridev	Afridev
Power source										
Donor	BoWR	WVE	BoWR	Catholic	UNICEF	Catholic	Catholic	Canada	Catholic	Agricultural office
Year of construction	1984 EC	1982 EC	1984 EC	1986 EC	1994 EC	1974 EC	1977 EC	1982 EC	1977 EC	1966 EC
Date of survey	20/03/00 EC	20/03/00 EC	20/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC
Remarks		Technical problem	Water table drawdown					Water quality problem (turbidity)	Abandoned	

Water supply scheme data: Nos 41-50

No.	41	42	43	44	45	46	47	48	49	50
WS No.	09	010	011	064	065	066	05	06	07	069
Kebele	Korga Geramo	Korga Geramo	Korga Geramo	Layo Tirga	Layo Tirga	Menena	Molle	Molle	Molle	Morede
Distance from Birbir (km)				115		130	7			18
Accessible	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No
Specific location	School compound	Bogale Sefer	Shankiko	Borcha	Kae	Hashila	Health post	Mesfin Beraf	Ketena 2	Woye
Nearby institution/area	School	Bogale Sefer	Shankiko	Kebele Office	Eta Carae	Health Post	Health Post	**	**	**
Source type	HDW	MSW	MSW	PS	PS	PS	HDW	HDW	BH	PS
Technology	Hand pump	Hand pump	Hand pump	On-spot distribution	On-spot distribution	On-spot distribution	Hand pump	Hand pump	Motorised pump	GPS
E (coordinates)	37.80878	37.80335	37.77634	37.65942	37.65928	37.67703	37.77243	37.76909	37.76488	37.69813
N (coordinates)	6.53953	6.53633	6.50466	6.33121	6.33166	6.30461	6.26823	6.26543	6.26035	6.34869
Alt. (m)	1210	1209	1194	2296	2290	1815	1217	1220	1222	2167
Climate	Kolla	Kolla	Kolla	Dega	Dega	W.Dega	Kolla	Kolla	Kolla	Dega
Status	FN	FN	FN	FN	FN	FN	FN	NF	NF	FN
Total no. DWPs				1	1	1			3	4
FN				1	1	1			3	4
NF										
Yield (L)**	0.14	0.28	0.28	0.33	0.33	0.33	0.14	0.14	3	3
Depth (m)							22	26		
HH served (at start)	20	15	60	50	64	90	200	80	420	120
Current users (HH)	50	20	100	50	70	90	418	220	800	119
Reservoir									NF	FN
Reservoir service									NF	FN
Reservoir type									Steel	Concrete
Reservoir capacity (m^3)									16	16
Reservoir coordinates E									3776492	3769831
Reservoir coordinates N									626061	635221
Alt. (m)									1222	2127
Pump type									Submersible	
Scheme brand	Afridev	Afridev	Afridev				Afridev	Afridev	VM (Italy)	
Power source									Generator	
Donor	Catholic	WVE	BoWR	UNDP	Safety Net	Safety Net	Catholic	Catholic	China	Catholic
Year of construction	1986 EC	1986 EC	1986 EC	1997 EC	1999 EC	1999 EC	1987 EC	1987 EC	1967 EC	1989 EC
Date of survey	18/03/00 EC	18/03/00 EC	18/03/00 EC	02/04/00 EC	02/04/00 EC	02/04/00 EC	17/03/00 EC	17/03/00 EC	17/03/00 EC	04/04/00 EC
Remarks								Technical problem	Technical problem	

Water supply scheme data: Nos 51-60

No.	51	52	53	54	55	56	57	58	59	60
WS No.	036	039	037	038	040	041	04	03	018	020
Kebele	Omolante	Omolante	Omolante	Omolante	Omolante	Omolante	Ugayehu	Ugayehu	Wajifo	Wajifo
Distance from Birbir (km)	30							6	19	
Accessible	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specific location	Sheraro	Ketena 2	Ketena 1	Ketena 1	Ketena 2	School	Bongota	Ginbe	Group 9	Meka
Nearby institution/area	Kalehiwot Church	Abayneh Kalo Beraf	Mekaneyesus Church	Banana Farm	Abebe Gido Beraf	School	Health Post	Kebele	Near Bridge	Dawit Farm
Source type	BH	HDW	HDW	HDW	HDW	HDW	MSW	MSW	BH	HDW
Technology	Motorised pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	Motorised pump	Hand pump
E (coordinates)	37.65771	37.65943	37.66090	37.65974	37.65813	37.66720	37.76320	37.76242	37.74594	37.75509
N (coordinates)	6.11655	6.16090	6.16555	6.16352	6.15915	6.16679	6.29554	6.25699	6.45914	6.45292
Alt. (m)	1224	1190	1194	1188	1194	1196	1220	1223	1224	1212
Climate	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla	Kolla
Status	FN	FN	NF	NF	NF	NF	FN	NF	FN	FN
Total no. DWPs	2								4	
FN	1								2	
NF	1								2	
Yield (L)**	3	0.14	0.14	0.14	0.14	0.14	0.28	0.28	3	0.14
Depth (m)	81	6		9	15					
HH served (at start)	300	300	150	130	**	**	107	86	200	150
Current users (HH)	800	500	150	**	**	**	170	160	400	10
Reservoir	NF								FN	
Reservoir service	NF								FN	
Reservoir type	Steel								Concrete	
Reservoir capacity (m^3)	8								**	
Reservoir coordinates E	3765391								3774181	
Reservoir coordinates N	616445								645655	
Alt. (m)	1213								1215	
Pump type	Mono pump								Mono pump	
Scheme brand	LP	Afridev	Afridev	Rotary HP	Afridev	Afridev	Afridev	Afridev	LP	Afridev
Power source	Generator								Generator	
Donor	China	Catholic	Catholic	Catholic	Catholic	Catholic	WVE	WVE	China	Catholic
Year of construction	1978 EC	1987 EC	1984 EC	1978 EC	1987 EC	1994 EC	1994 EC	1981 EC	1972 EC	1977 EC
Date of survey	26/03/00 EC	26/03/00 EC	26/03/00 EC	26/03/00 EC	26/03/00 EC	26/03/00 EC	17/03/00 EC	17/03/00 EC	18/03/00 EC	18/03/00 EC
Remarks			Technical problem (+ quality problem)	Abandoned	Incomplete installation (no T-handle)	Technical problem		Technical problem		

Water supply scheme data: Nos 61-70

No.	61	62	63	64	65	66	67	68	69	70
WS No.	022	023	019	021	063	030	031	062	067	068
Kebele	Wajifo	Wajifo	Wajifo	Wajifo	Weye Barana	Yayike	Yayike	Zala Barana	Zala Gutisha	Zala Gutisha
Distance from Birbir (km)					100	14		103	120	
Accessible	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No
Specific location	Group One (shita)	Kemi	Merkato	Shita	Gamo	Kolo	Ketena 1	Farchura	Mendida	Dalba
Nearby institution/area	None	Mamo Farm	Orkafo Farm	Nana Albe House	Tekle meno Beraf	Tira Tira River		Warda Wana Beraf	Shota Waa'e Beraf	Kasaye Beraf
Source type	MSW	MSW	HDW	MSW	MSW	PS	BH	PS	PS	PS
Technology	Hand pump	Hand pump	Hand pump	Hand pump	Hand pump	GPS	Alkasha	GPS	On-spot distribution	On-spot distribution
E (coordinates)	37.74595	37.74905	37.76016	37.74162	37.64486	37.72235	37.74412	37.65460	37.63340	37.62477
N (coordinates)	6.45064	6.44314	6.45218	6.44873	6.40457	6.38588	6.39405	6.39284	6.32434	6.32864
Alt. (m)	1227	1232	1205	1246	2472	1365	1273	2613	2584	2640
Climate	Kolla	Kolla	Kolla	Kolla	Dega	Kolla	Kolla	Dega	Dega	Dega
Status	FN	FN	NF	NF	NF	FN	FN	FN	FN	FN
Total no. DWPs						3	6	3	1	1
FN						3	6	3	1	1
NF										
Yield (L)**	0.28	0.28	0.14	0.28	0.28	3	3	3	0.33	0.33
Depth (m)					60					
HH served (at start)	150	15	200	70	80	47	295	225	50	90
Current users (HH)	500	37	**	70	80	152	295	312	50	90
Reservoir						FN	FN	FN		
Reservoir service						FN	FN	FN		
Reservoir type						Concrete	Steel	Concrete		
Reservoir capacity (m^3)						**	**	**		
Reservoir coordinates E						3773755	3773755	3765397		
Reservoir coordinates N						639257	639257	639795		
Alt. (m)						1291	1291	2558		
Pump type							Submersible			
Scheme brand	Afridev	InMrk II	Afridev	InMrk II	Afridev		LP			
Power source							Generator			
Donor	China	UNICEF	Catholic	UNICEF	WVE	Catholic	WVE	WVE	UNDP	Safety Net
Year of construction	1984 EC	1995 EC	1977 EC	1995 EC	1995 EC	1974 EC	1997 EC	1992 EC	1997 EC	1999 EC
Date of survey	18/03/00 EC	18/03/00 EC	18/03/00 EC	18/03/00 EC	01/04/00 EC	21/03/00 EC	21/03/00 EC	01/04/00 EC	02/04/00 EC	02/04/00 EC
Remarks			Abandoned	Water table drawdown	Water table drawdown					

Distribution point data (stand posts)

No.	WS No.	DWP No.	Kebele	Specific location	Nearby institution/area	Source type	E	N	Alt. (m)	Climate	Total	FN	NF	Start HH	Current users	Tech	Service	Date of survey	Remarks
1	01	01	Faragosa	Daqa Kare Bona	Kebele Office	PS	37.72720	6.23009	1270	Kolla	1	1		58	78	FN	FN	17/03/00 EC	
2		02	Faragosa	Kuchuro Inko Beraf	**	PS	37.72876	6.23219	1263	Kolla	6	2	4	90	160	FN	FN	17/03/00 EC	
3		03	Faragosa	Dilba	**	PS	37.72789	6.23293	1265	Kolla	1	1		**	**	FN	FN	17/03/00 EC	
4	07	01	Molle	Zeleke Beraf	**	BH	37.76844	6.26382	1218	Kolla	4		4	40	80	FN	NF	17/03/00 EC	
5		02	Molle	Ketena 4	Health Post	BH	37.77263	6.26742	1217	Kolla	6		6	60	120	FN	NF	17/03/00 EC	
6		03	Molle	School	School	BH	37.77626	6.26919	1212	Kolla	6		6	**	**	NF	NF	17/03/00 EC	
7	018	01	Wajifo	Group 10	**	BH	37.74006	6.45618	1228	Kolla	1	1		**	76	FN	FN	18/03/00 EC	
8		02	Wajifo	School	School	BH	37.74187	6.45652	1233	Kolla	6		6	**	**	NF	NF	18/03/00 EC	Closed
9		03	Wajifo	Group 9	Church	BH	37.74546	6.45917	1224	Kolla	2	2		100	200	FN	FN	18/03/00 EC	
10		04	Wajifo	Group 4	**	BH	37.74400	6.45438	1225	Kolla	2		2	100	**	NF	NF	18/03/00 EC	
11	028	01	Doshe	Alata	Abandoned Area	PS	37.72268	6.37400	1380	Kolla	1		1	65	**	FN	NF	21/03/00 EC	No service 4 years
12		02	Doshe	School	School	PS	37.72715	6.37379	1357	Kolla	2		2	**	**	FN	NF	21/03/00 EC	
13		03	Doshe	Markos House	Church	PS	37.72619	6.37104	1358	Kolla	3	1	2	48	48	FN	NF	21/03/00 EC	
14		04	Doshe	Kebele	Kebele Office	PS	37.72409	6.37114	1348	Kolla	2		2	56	65	FN	NF	21/03/00 EC	
15		05	Doshe	Garo Alta	**	PS	37.72882	6.37068	1333	Kolla	3		3	64	70	FN	NF	21/03/00 EC	
16	030	01	Yayike	Group 1	Health Post	PS	37.74536	6.39724	1258	Kolla	1	1		7	35	FN	FN	21/03/00 EC	
17		02	Yayike	Bafena	Kalehiowt Church	PS	37.74003	6.39393	1283	Kolla	2	2		25	87	FN	FN	21/03/00 EC	
18		03	Yayike	Group 2	Group 2	PS	37.74362	6.39551	1270	Kolla	2		2	15	30	FN	FN	21/03/00 EC	
19	031	01	Yayike	Alkasha	**	BH	37.74400	6.39410	1269	Kolla	4	4		200	200	FN	FN	21/03/00 EC	
20		02	Yayike	Mime	**	BH	37.74202	6.39302	1280	Kolla	4	4		25	25	FN	FN	21/03/00 EC	
21		03	Yayike	Group 1	**	BH	37.74162	6.39623	1283	Kolla	4	4		30	30	FN	FN	21/03/00 EC	
22		04	Yayike	Group 2	Ketera Lefo Beraf	BH	37.74567	6.39514	1262	Kolla	4	4		25	25	FN	FN	21/03/00 EC	
23		05	Yayike	Group 2	Kalehiowt Church	BH	37.74731	6.39618	1252	Kolla	4	3	1	15	15	FN	FN	21/03/00 EC	
24		06	Yayike	School	School	BH	37.74836	6.39650	1249	Kolla	4	2	2	**	**	FN	FN	21/03/00 EC	
25	036	01	Omolante	Adebabay 1	Kebele Office	BH	37.65674	6.16319	1205	Kolla	5	5		500	800	FN	FN	26/03/00 EC	
26		02	Omolante	**	Abota Borko Beraf	BH	37.65208	6.16247	1211	Kolla	5	5		300	**	FN	NF	26/03/00 EC	
27	042	01	Ankober	Kebele Office	Kebele Office	BH	37.73913	6.25497	1225	Kolla	4	4		125	250	FN	NF	26/03/00 EC	
28		02	Ankober	Kebele Office	Kebele Office	BH	37.73923	6.25458	1225	Kolla	4	4		175	250	FN	NF	26/03/00 EC	
29		03	Ankober	Ketena 2	Mena Bolba Beraf	BH	37.74069	6.24990	1221	Kolla	4	4		120	225	FN	NF	26/03/00 EC	
30		04	Ankober	Ketena 1	Mekaneyesus Church	BH	37.74186	6.24601	1219	Kolla	4	4		110	175	FN	NF	26/03/00 EC	
31	050	01	Delbo	Ketena 3	Darimo Dale Beraf	BH	37.76078	6.28967	1232	Kolla	5		5	337	460	FN	NF	28/03/00 EC	
32		02	Delbo	Ketena 3	Kebele Office	BH	37.75863	6.28942	1236	Kolla	5		5	150	250	FN	NF	28/03/00 EC	
33	055	01	Birbir	Ketena 1	Board Office	BH	37.76669	6.29478	1239	Kolla	4	2	2	150	30	FN	FN	29/03/00 EC	
34		02	Birbir	Ketena 1	Full Gospel Church	BH	37.76644	6.29317	1232	Kolla	4	2	2	300	150	FN	FN	29/03/00 EC	
35		03	Birbir	Ketena 1	Yohannes Oyeda Beraf	BH	37.76623	6.28952	1237	Kolla	3	2	1	200	110	FN	FN	29/03/00 EC	
36		04	Birbir	Ketena 1	Inside School	BH	37.76738	6.28724	1236	Kolla	4		4	**	**	FN	NF	29/03/00 EC	
37		05	Birbir	Ketena 1	Near School	BH	37.76755	6.28850	1241	Kolla	4		4	**	**	FN	NF	29/03/00 EC	No user community

38		06	Birbir	Ketena 2	Near School	BH	37.76941	6.28879	1228	Kolla	2		2	**	**	FN	NF	29/03/00 EC	No user .community
39		07	Birbir	Ketena 2	Inside School	BH	37.76971	6.28806	1225	Kolla	8	3	5	**	**	FN	FN	29/03/00 EC	User school community
40		08	Birbir	Ketena 1	Gerebo Shelemo Beraf	BH	37.76741	6.29238	1222	Kolla	3	2	1	310	50	FN	FN	29/03/00 EC	
41		09	Birbir	Ketena 1	W/yohannes Doya Beraf	BH	37.76733	6.29617	1226	Kolla	4	2	2	150	50	FN	FN	29/03/00 EC	
42		10	Birbir	Ketena 2	Megersa Endaye Beraf	BH	37.76846	6.29292	1218	Kolla	4		4	350	500	FN	FN	29/03/00 EC	
43		11	Birbir	Ketena 3	Green Area	BH	37.77254	6.29134	1213	Kolla	3	2	1	100	350	FN	FN	29/03/00 EC	
44		12	Birbir	Ketena 3	Market Area	BH	37.77415	6.29487	1212	Kolla	3	2	1	50	110	FN	FN	29/03/00 EC	
45		13	Birbir	Ketena 3	Yelma Sorsa Beraf	BH	37.77135	6.29472	1220	Kolla	3	1	2	150	100	FN	FN	03/04/00 EC	
46		14	Birbir	Ketena 2	Taddesse Kassa Beraf	BH	37.76889	6.29419	1222	Kolla	3	1	2	300	50	FN	FN	03/04/00 EC	
47		15	Birbir	Ketena 2	Tera Mido Beraf	BH	37.76908	6.29634	1219	Kolla	4	4		**	**	FN	FN	03/04/00 EC	
48		16	Birbir	Ketena 2	World Vision Beraf	BH	37.76908	6.29634	1219	Kolla	4		4	**	**	FN	NF	03/04/00 EC	No user community
49	060	01	Dega Shongole	Eyaho	Health Post	PS	37.66848	6.38903	2458	Dega	4	4		55	95	FN	NF	01/04/00 EC	Worked only for a year
50		02	Dega Shongole	Dima	Abota Ako Beraf	PS	37.66505	6.39033	2513	Dega	5	5		40	40	FN	NF	01/04/00 EC	Worked only for a year
51	061	01	Dega Shongole	Agaya		PS	37.67192	6.39192	2347	Dega	4		4	80	80	FN	NF	01/04/00 EC	Severe pipeline leakage
52		02	Dega Shongole	Mogisa	Delko Beraf	PS	37.67555	6.39259	2313	Dega	4		4	30	50	FN	NF	01/04/00 EC	Severe pipeline leakage
53	062	01	Zala Barana	Mugurta	Ukre Oshe Beraf	PS	37.65397	6.39795	2559	Dega	1	1		150	170	FN	FN	01/04/00 EC	
54		02	Zala Barana	Chasho	Market Area	PS	37.65446	6.40077	2512	Dega	1	1		15	55	FN	FN	01/04/00 EC	
55		03	Weye Barana	Gamo	Health Post	PS	37.64885	6.40256	2503	Dega	1	1		60	87	FN	FN	01/04/00 EC	Source in Zala Barana
56	064	01	Layo Tirga	Ginage	Kebele Office	PS	37.65942	6.33121	2296	Dega	1			50	50	FN	FN	02/04/00 EC	
57	065	01	Layo Tirga	Eta Kare	Shambel Tseda Beraf	PS	37.66137	6.32888	2274	Dega	1	1		64	70	FN	FN	02/04/00 EC	
58	066	01	Menena	Hashile	Health Post	PS	37.67703	6.30461	1815	W.Dega	1	1		90	90	FN	FN	02/04/00 EC	
59	067	01	Zala Gutisha	Eta kare	Shota waye Beraf	PS	37.63340	6.32434	2584	Dega	1	1		50	50	FN	FN	02/04/00 EC	
60	068	01	Zala Gutisha	Dalba	Kassaye Farm	PS	37.62459	6.32768	2641	Dega	1	1		90	90	FN	FN	02/04/00 EC	
61	069	01	Morede	Zerusa	Health Post	PS	37.69582	6.35375	2112	Dega	2	2		27	30	FN	FN	04/04/00 EC	
62		02	Morede	Hanchiche	Kastro Kama Beraf	PS	37.69825	6.35028	2149	Dega	2	2		58	75	FN	FN	04/04/00 EC	
63		03	Morede	Abaya	Soma Sorsa Beraf	PS	37.70006	6.35092	2065	Dega	1	1		24	24	FN	FN	04/04/00 EC	
64		04	Morede	Dubusha	Abayneh Addisu Beraf	PS	37.70034	6.34879	2049	Dega	1	1		25	28	FN	FN	04/04/00 EC	
65	070	01	Fetelle	Gutera	Kebele Office	PS	37.72602	6.34085	1465	Dega	1	1		60	120	FN	FN	04/04/00 EC	

Annex 2: WATSANCo resources, selected Kebeles

Human resources, selected Kebeles

No.	1	2	3	4	5	6	7	8	9
Kebele	Alge	Ankober	Delbo	Doshe	Kolla Mulato	Molle	Omolante	Wanke Wajifo	Yayike
Chairperson									
Sex	M	M	M	M	M	M	M	M	M
Age	35	52	39	35	48	50	40	45	40
Religion	OR	PR	PR	MU	PR	PR	PR	OR	PR
Service	8	10	10	5	4	3	10	3.5	26
Education	5	8	6	5	8	8	12	3	ADE
Status	AC	AC	AC	AC	AC	AC	AC	AC	AC
Secretary									
Sex	M	M	M	M	M	M	M	M	M
Age	35	37	67	40	32	40	45	28	40
Religion	PR	PR	OR	PR	OR	PR	PR	OR	PR
Service	3	0.2	10	5	4	3	4		6
Education	7	7	5	8	NFE	9	8	12	5
Status	AC	AC	AC	AC	AC	AC	AC	AC	AC
Supervisor									
Sex	F	M	M	F	F	F	M	M	F
Age	30	42	42	35	38	30	52	35	35
Religion	PR	PR	PR	PR	PR	PR	PR	PR	OR
Service	3	0.2	4	5	4	3	10	7	6
Education	7	10	9	ADE		7	ADE	5	3
Status	AC	AC	AC	AC	AC	AC	AC	AC	AC
Cashier									
Sex	M	M	F	M	M	F	F	F	M
Age	67	50	50	50	55	35	37	36	55
Religion	PR	PR	PR	PR	OR	PR	PR	PR	PR
Service	8	0.2	10	5	4	3	10	2	6
Education	ADE	5	6	2	NFE	5	6	9	ADE
Status	AC	AC	AC	AC	AC	AC	IA	AC	AC

Storekeeper									
Sex	M	F	F	M	M	F	M	F	F
Age	40	35	37	45	50	27	45	30	25
Religion	PR	PR	PR	PR	PR	PR	PR	OR	MU
Service	3	0.2	10	4	4	3	10	10	6
Education	3	7	2	4	4	5	2	7	2
Status	AC	AC	AC	AC	NFE	AC	AC	AC	AC
Technicians									
Total no.	5	2	3		2	1	2		1
M	4	2	2		2	1	2		1
F	1		1						
Tap attendants							1		
Total no.		1			3			3	4
M									
F					3			3	4
Guards									
Total no.							2		1
M							2		
F									

Note: ADE: Adult education; NFE: No formal education; MU: Muslim; PR: Protestant; OR: Orthodox; AC: Active; IA: Inactive.

Physical and financial resources, selected Kebeles

No.	Kebele	Equipment	Type	Quantity	FN	NF	Amount in Birr
1	Alge	Spanner	17",24",18"	3	FN		1,403
		Hammer	Medium	1	FN		
2	Ankober	Pipe wrench	Medium	1	FN		2,000
		Pipe wrench	Large	1	FN		
		Spanner	11",13",14",17",19"	5	FN		
		Screwdriver		1	FN		
		Jerry can	20 L	7	FN		
		Barrel	200L	1	FN		
3	Delbo	Pipe wrench	Medium	1	FN		3,300

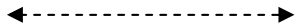
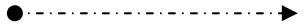
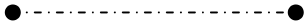
		Barrel	200L	1	FN		
		Hook	Long	1	FN		
		Spanner	24"	2	FN		
4	Doshe						800
5	Kolla Mulato	Spare parts	17/19",24"	4	FN		3,428.52
		Hammer	Medium	1	FN		
6	Molle	Spanner	17/19"	1	FN		2,000
		Jerry can	30L	2	FN		
		Barrel	200L	1	FN		
7	Omolante	Pipe wrench	Small	1	FN		Never saved
		Spanner	12",14"16",17",19"	5	FN		
		Pliers		1	FN		
		Screwdriver		1	FN		
		Oil filter		2	FN		
		Air filter		2	FN		
		Jerry can	25L	2	FN		
		Barrel	200 L	1	FN		
		Wooden box		1	FN		
8	Wanke Wajifo	Spanner	12",16",24"	3	FN		6,200
		Pipe wrench	Large	1	FN		
		Wooden box	Medium	1	FN		
		Barrel	200L	1	FN		
		Jerry cans	35L	2	FN		
9	Yayike	Pipe wrench	Small (20")	1	FN		1,900
		Pipe wrench	Large (40")	1	FN		
		Jerry can	25L	2	FN		
		Spare parts		10	FN		

Note: Most WATSANCos have a haphazard way of writing up income and expenditure. Only a few record them regularly in an ordered manner. It was not possible to track these incomes and expenditures because they were directly or indirectly unwilling to show the data, or because data were written down in different places and some were missing, making tracking difficult.

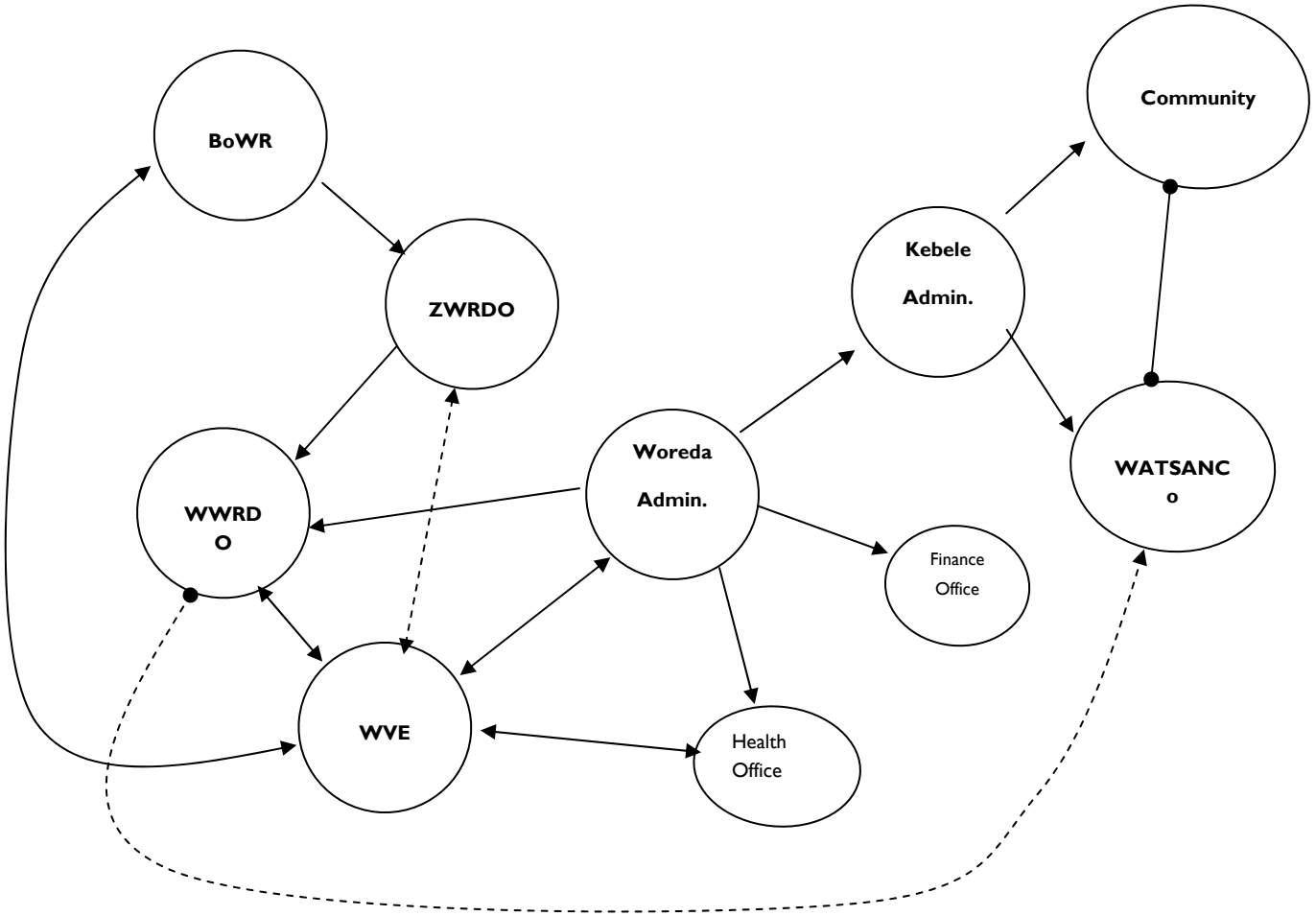
Annex 3: Woreda office resources

Information resource	**Budget**									
Resource types		1997 E.C			1998 E.C			1999 E.C		2000 E.C
Information desk	Budget	Total	Donors		Total	Donors		Total	Donors	Total	Donors
Documented minutes of meetings	Requested	838,148			890,907			1,243,166		1,312,136	
Documented Reports	Approved	494,535	673,288		528,819			561,830		?	
Communicate Management board decisions											
Project team regular meetings											
Organize Workshop											
Working telephone											
Documents											
Posters											
Drawings											
Maps											
Has Information desk?	Requested									237,402	
Has documented minutes of meetings?	Approved	35000	70,000		64,219			57882	487811**	102,576	
Has documented Reports?											
Communicating Management board decisions?											
Working telephone											
Documents											
Pamphlets											

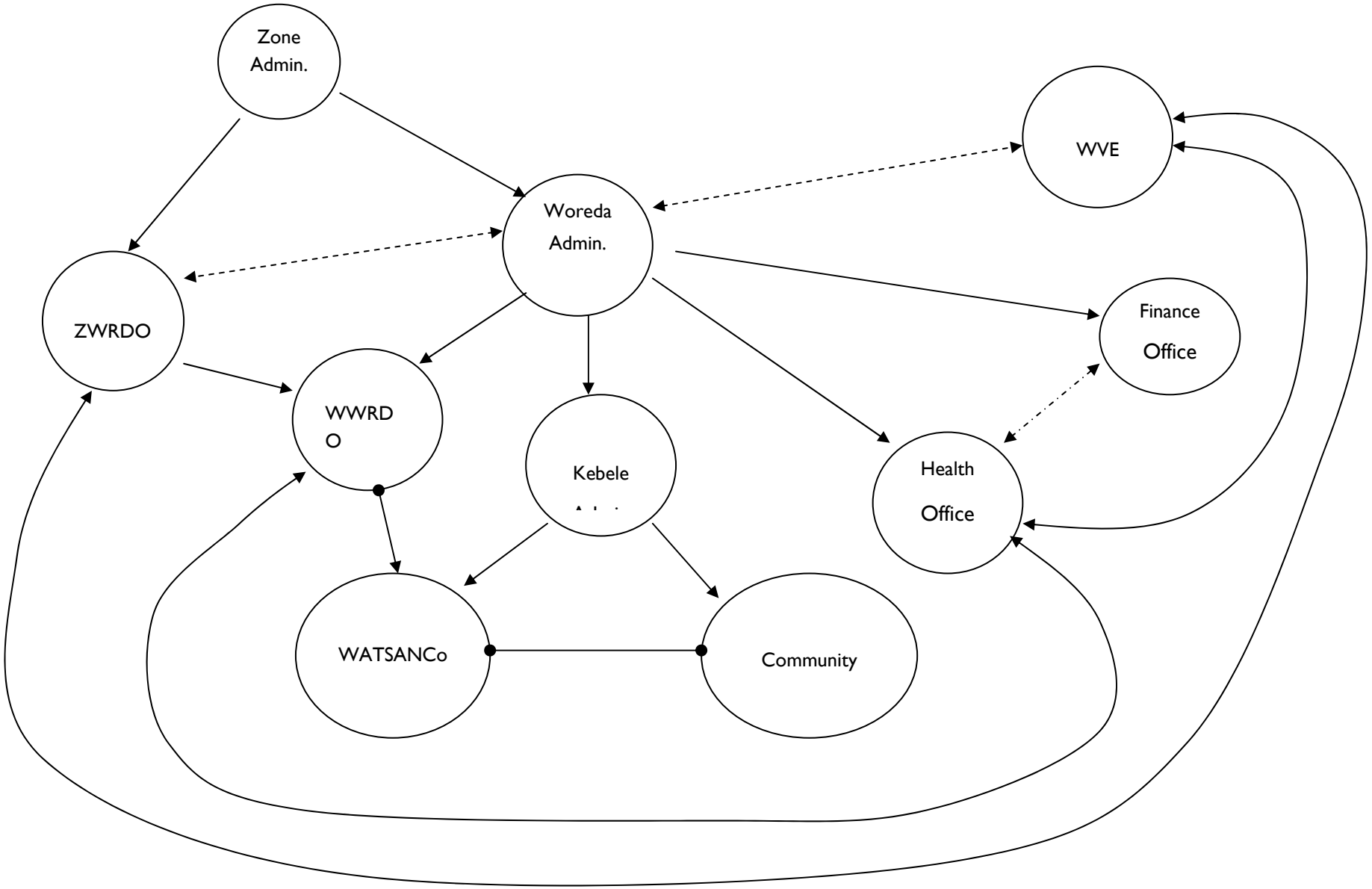
Annex 4: Stakeholder mapping

Control/command and support	
Information exchange	
Mutual collaboration	
Support and supervision	
Dependency	
Weak relations	

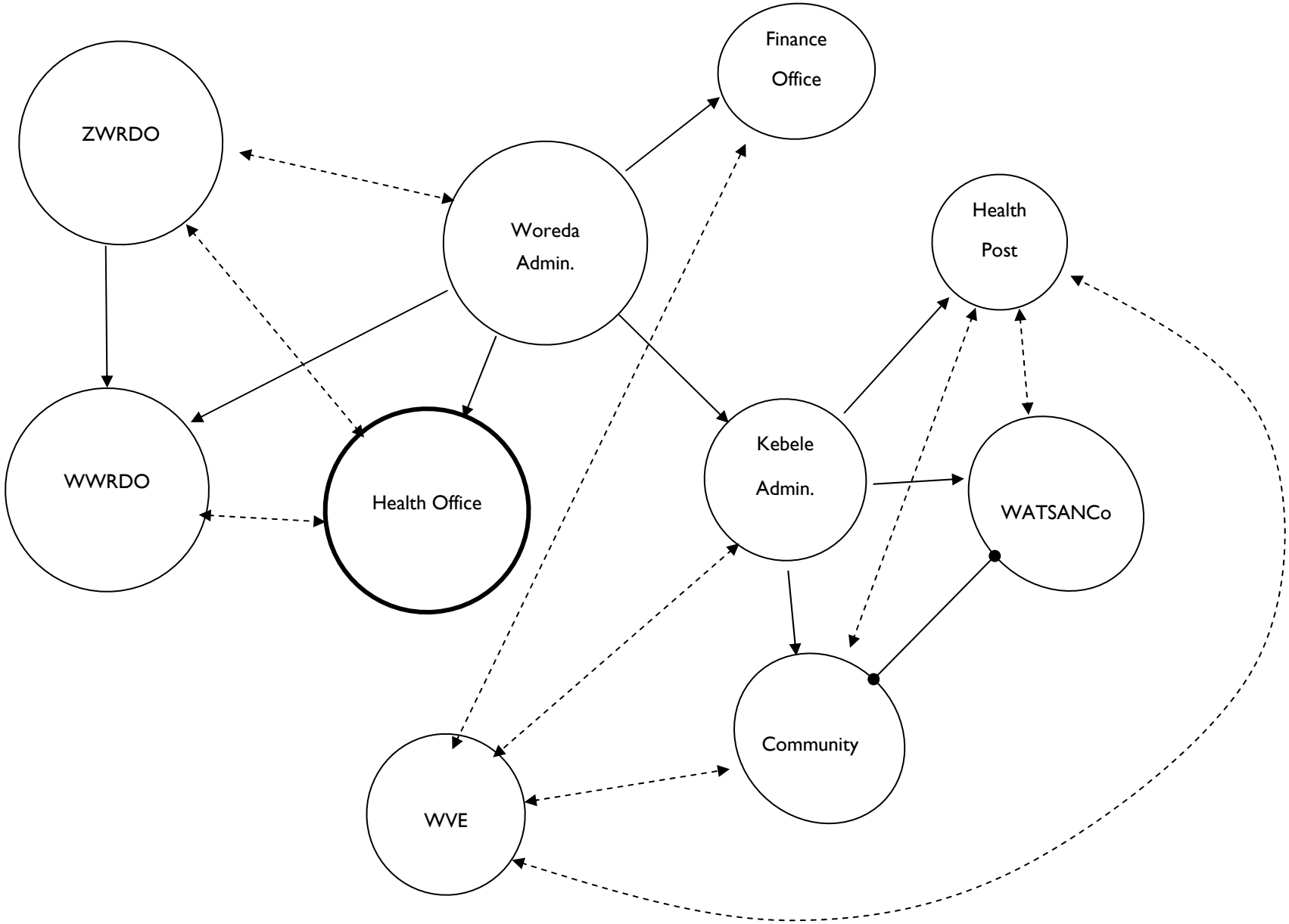
WWRDO (Mirab Abaya)



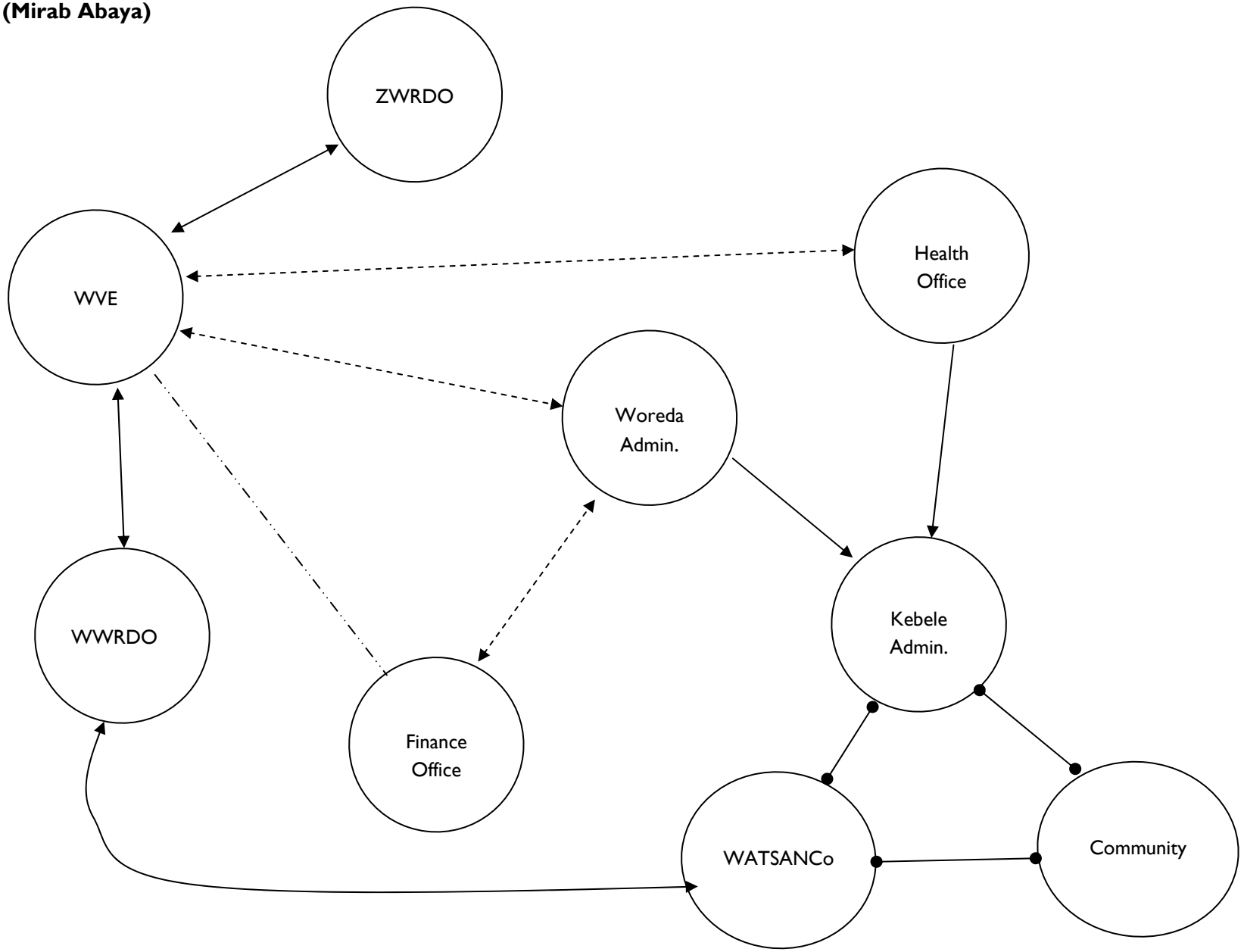
Woreda Administration (Mirab Abaya)



Woreda Health Office (Mirab Abaya)



WVE (Mirab Abaya)



Annex 5: Checklists and questionnaires

Community-level FGD

Water Use and Accessibility
1. What is your main source of water supply? • Is the water point functional? • For how low long has it been in operation? • For how long is the water point open every day? • How much is the volume of water a household is allowed to take? Do you have a restriction on water use? • What can you say about the quality and quantity of the water from this source? • Is the water sufficient for your daily activities? • What is the condition of water from the water points? (during dry season and wet season; presence of queuing up) • Where do you get water from when the scheme fails to work and there is a shortage of tap water? Does everyone have access to the water point?
2. How far is the main source from your residence? (in time and distance) • How much time do you spend collecting water per day? (time spent at water point + time to travel – roundtrip) • How many times do you fetch water per day? • What means of transportation do you use to transport the water? • Which members of the family are actively involved in fetching water?
3. How frequently you travel to fetch water per day? (dry and rainy season)
4. How much water do you use per day?
5. Do you access an alternative source? Why do access the alternative source? • How far is the alternative source from your residence? (in time and distance) • When do you use the alternative source? (dry time, wet time, throughout the year) • What is the quality of the water from this source? • Is there any mechanism you use to filter it?
6. What are the criteria to get water service from the water point? Who set up the criteria, what was your role in decision making?
7. For what purposes do you use the water? (from the main source, alternative source)
8. What can you say concerning water charges you are paying? • Do you know why you pay? • How much do you pay? • Is the tariff affordable?
9. What problems are you facing regarding water for home use?
10. Are there health problems related to the use of the water source?
Scheme Functionality
1. How is the functionality of the scheme? • How frequently do systems fail to work throughout the year? • How soon are they maintained? • How soon do systems fail after construction? What are the reasons? • Which type and part of the scheme often faces failure?
2. What kind of water scheme do you prefer and why? (Reason)
3. What do you think are the main reasons for failure? If operating for a longer time without breakdown what

do think is the reason?
Community Participation
1. Did you remember how the scheme was installed here? • What was the role of the community in problem identification, prioritisation, site selection, project design selection, and technology and service level selection? • Do you think that your views and comments were respected and taken into account while the project was being developed?
2. Explain how you participated in the construction of the scheme. What was your contribution during the scheme construction?
3. What influenced you to participate in project activities?
4. What contribution do you make to the following activities: • Operation and maintenance of the scheme? (cash, kind, labour, involvement) • Rehabilitation of the scheme and expansion of service?
5. Explain your rights and responsibilities in water service delivery and management.
6. Explain your participation in the water-related meetings.
Management of Water Service
1. Who is responsible for the day-to-day management activities of the water in the scheme?
2. Can you tell me how and when the WATSANCo came into being? • What are the criteria to select the members? Who set these? • What was your role during the selection? • What is the composition (gender, age, religion, poor and marginalised people) of the WATSANCo? Is there an incentive for being member? • What is the duration and term of operation for the WATSANCo?
3. What can you say about the management capacity of water service delivery by WATSANCos and tap attendants? • Do you feel satisfied with the management operation of the water service? If yes, what are the positive sides? If no, explain why not. • What do you think should be done to help them? • Are there any managerial problems? What are they?
4. Explain how transparent the committee is with regard to income accrued and expenditure? Does the committee call for formal meetings to report the financial status of the institution? If yes, how frequent?
5. Who is responsible for setting the water charge? How are decisions reached to set the tariff? What was your role in setting the water tariff? Did the tariff setting take into account the different socioeconomic conditions of the community? (willingness and capacity to pay, poor, middle income, better off, marginalised, women, etc)
6. How do you pay for the water service? (on-the-spot payment for the service, monthly payment for a definite volume of water etc)
7. Are you wiling to pay for the service with the set tariff and why?
8. How are operation and maintenance activities done?
Impact of Water Scheme (Positive and Negative)
1. Do you think the water supply system has changed the life of people in this community? In what ways? (explain the social, economic and health impacts of the scheme)
2. What are your comments for achieving sustainability of water and sanitation services in the area?

FGD for WATSANCos, caretakers, operators, mechanic, pump attendants, promoters

Objective: To uncover underlying factors impacting sustainability of water supply schemes
Institutional Factors
1. Can you tell me how and when the WATSANCo came into being? • What were the criteria of selection? • How was the participation of women, poor, youth, elderly, CBOs, Kebele Admin., NGOs? • Who organised the selection process? Kebele/NGOs/Woreda/BoWR? • When was the selection done? • How many times can a committee be selected? • What is the duration of service for WATSANCOs in one election?
2. What are the roles and responsibilities of WATSANCos? What do WATSANCos do?
3. What is the composition of WATSANCos in terms of gender, religion, economic status, location in the Kebele? • Men to women ratio • Religious composition • Poor vs rich • Distant users vs users near by
4. Do you have a legal registration certificate? If so … (if no why not?) • To whom are you accountable? (Kebele/Woreda Admin./WWRDO) • Do you report to them? When? About what? • What action can be taken by the WWRDO or community following the report? • Give examples
5. What incentive mechanisms are there for WATSANCos? (benefits in being a WATSANCo member?) • Increased social acceptance? • Trainings? • Money? • Increased awareness on hygiene and sanitation?
6. Do you report to the community about your activities? (Y/N)…….. (if no, why not?) • About what kinds of activities do you report to them? (Revenues and expenses?) • How frequently do you report? (once in…….) • How is the response of the community regarding your reporting?
7. How do you monitor the activities of every WATSANCo member and caretaker? A system to monitor daily revenue collection and other activities?
8. How do you manage your financial activities? • Have a bank account? • Have financial manual? • Have legal revenue collection receipts? • Have justifying documents (receipts, payroll, etc) for your expenses? • Properly handle financial documents? • Have a trained bookkeeper? • Financial reports?
9. Do you audit your financial and capital resources? • Who does the auditing? • How frequently? (once in a ……..)
10. Do you have a bookkeeping system for your incomes and expenses? Do you show it to relevant people or organisations as the need arise?

11. How is the technical capacity of WATSANCos to manage the scheme? • Have you taken trainings? What kinds of trainings? (financial, maintenance, managerial?) • By whom are they given? For whom? • How many trainings? How many WATSANCos trained? • How do you rate the trainings? Are they relevant?
12. Are users aware of their rights and responsibilities in water service delivery? • Attend meetings organised by WATSANCos? • Participate in the discussion? • Contribute in cash or labour for the scheme as requested by WATSANCos? • Feel sense of ownership of the scheme? • Clearly state their complaints/appreciation to you about the service delivery?
13. How is your-decision making process? (how do you make decisions?) • Does it follow your organisational rules and regulations? • Do you take minutes of meetings? • Implement decision made? • Consult the community?
Financial Factors
1. What are the main sources of income for operation and maintenance costs? • Revenue? • Fines? • Community fund raising? • Donations? Grants? • Support from Woreda/region?
2. How much is the water use tariff? How was it set? • Did it take in to account the different socioeconomic conditions of the community? • Poor, better off, marginalised, women? • Are they able to pay? (Y/N) (if no, why not?) • Willing to pay in accordance with the tariff? (Y/N) (if no, why not?) • What do you do when people are not paying for the service? • Do you have a system to support people who cannot pay for the service?
3. How do you see your annual income and expense in the past three to five years? • Compare your incomes and expenses. • What are the major expenditures? (the causes?)
4. Do you save money? (Y/N) • For what purposes do save? (maintenance, expansion, rehabilitation) • How much have you saved in the past three to five years?
Technical Factors
1. How is the functionality of the scheme? • How frequently does the system fail (per year)? • How soon is it maintained after breakdown?
2. What do you think are the major reasons for the breakdown/non-functionality? • Are there design problems? • Are there construction problems? • Is it technology selection? • Water quality problems? • Cultural matters?

3. Who selected the technology installed? • Community participated? • Community choice/recommendations addressed/included?
4. How do you explain the situation in relation to maintenance? • Which parts fail more recurrently? • Where do you get your spare parts for minor and major maintenance? • How is the price of spare parts? • How do you cover the price of spare parts? • Are there local private spare parts suppliers? • Do you get spare parts in a timely manner? • Do you do minor maintenance? • How many are locally maintained? (by whom?) • How many are maintained by external agents? (by whom?)
5. Is there a structural link between WATSANCo and the Woreda/NGOs? • Do they regularly visit you? How frequently? (once in……..) • How many times do they supervise you annually? • How many times has the Woreda/region supported you with maintenance?
WATSANCo Capacity Building and General Comments
1. How many trained WATSANCos and caretakers do you have? • How many trainings given? Aspects of the training? (O&M, financial, managerial) • How was the time allocated for the training? (sufficient?) • How did you find the trainings? (interesting? relevant?) • How were training manuals used? Were they easy to understand?
2. What can you say about the general water supply and demand in the village? • Insufficient for domestic activities? • People also use unsafe alternative sources? • Competitive uses for agriculture and domestic activities?
3. What do you think are the main challenges you face in water supply service delivery and management?
4. What do you think should be done to tackle these challenges and sustain the functionality of the scheme?
Thank you for your collaboration and patience

FGD for WWRDO

Objective: to identify gaps, challenges and opportunities for the sustainability of water supply schemes in the Woreda
Functionality and Service Level
1. How do you explain the functionality of the schemes developed in the Woreda? • How long do they perform after construction? (give special examples of difference) • How soon are they maintained? • Which schemes fail more recurrently and why? • Which schemes perform for a longer period of time without failure? Why? • Is it serving beyond its design population? • For what purposes are they used? (domestic, irrigation, cattle watering) Are there schemes which the people are not using although they are technically functional? If yes, why?

2. How do you see the schemes' capacity/ability to meet the water demand of user communities? • High population pressure on the schemes beyond the designed population? • What quality problems are there? Where? How do you understand the problem? • How is scheme location in relation to user communities? (near, average, far)
3. Are there any basic functionality differences in schemes developed by the government (Woreda/zone/region/fund) and NGOs? If yes, why?
4. Is there a regular monitoring system for the water quality of schemes? If yes……. • Who does the monitoring? • How soon? • Is the water quality analysis data in line with regional/WHO water quality criteria?
5. Are there any complaints by the user community on the quality of the water delivered? • What kinds of complaints are they? (taste, odour, colour) • Are there observed waterborne disease cases because of the use of the scheme?
Institutional, Technical and Financial Factors
1. What are the roles and responsibilities of the office regarding R-WaSH-related activities?
2. What criteria are there for WATSANCo selection?
3. How is your involvement in WATSANCo selection?
4. Is there a legal structure between your office and WATSANCos? If yes: • Do you have signed agreements? How frequently do they report to you? • About what do they report to you? If no: • How do you communicate? • To whom are the WATSANCos accountable? • How do you perceive the roles and responsibilities of WATSANCos?
5. What major barriers are there affecting the performance of WATSANCos? In what ways do they affect them?
6. In what ways do you support WATSANCos? • Capacity building? How many trainings have you given to them? In what aspects? • Budget allocation? For what purposes? (O&M?) • Human resource allocation? Technicians for major scheme failure maintenance? • Spare parts provision?
7. How do you perceive the legal status of WATSANCo and their accountability in case of mismanagement of the scheme resources? What is the office's role in correcting WATSANCo mismanagement?
8. What are the qualities of best performing WATSANCos in the Woreda? Who are they?
9. What are the causes of worst performing WATSANCo in the Woreda? Who are they?
10. What opportunities are there to make WATSANCos perform effectively and efficiently?
11. Do you do regular follow-up and supervision of the schemes and WATSANCos? • How frequently? • What aspects do you see while you supervise and follow up?
12. How do see the performance of your office in implementing the office's strategic plan and annual plan of the past five years? What do you intend to do for the next five years?
13. What factors affect your efficiency of implementation? In what ways? • Human resources? • Budget? • Integration with relevant stakeholders? • Logistics?

14. What are your accomplishments in R-WaSH-related activities in the past five years?
15. What do you think should be done to make the office more efficient and effective in implementing its strategic plans and optimise the overall working condition for sustainable R-WaSH intervention?
16. What factors most affect the sustainability of water supply schemes in the Woreda? • Spare parts: availability, price, local providers? • Design and construction problems? • Water quality problems? • Poor stakeholder communication? • WATSANCo inefficiency? • Low community awareness on hygiene and sanitation? • Low community participation?
17. Do you participate in feasibility studies (potential assessment; community, site and technology selection) and implementation phases of scheme development? If yes, how? If no, why not?
Higher-level Interaction
1. Do you communicate your strategic plans with relevant stakeholders? If no, why not?
2. Do the different actors working in R-WaSH interventions communicate their plans and activities to your office? If no, why not?
3. Are there any attempts to integrate the relevant actors working in the area of R-WaSH? If no, what are the reasons?
4. How do you perceive the roles of different actors working in the area of R-WaSH activities? (health, education, agriculture and rural development offices, NGOs)
5. I s there support from the zonal and regional water offices and NGOs? Y/N • What type of support do you get from them? • Which support is most important for the effective functioning of the office?
6. How do you explain the handover of water supply schemes developed by development partners?
7. What challenges and opportunities are there to integrate the relevant stakeholders in the area of R-WaSH to avoid duplication of efforts and bring positive change?
8. Is there a standard for scheme technology selection for the Woreda/region?
9. How do you observe the willingness and participation level of the community for the sustainability of their water schemes? What factors limit community participation?
10. What do you think should be done to effectively and efficiently sustain the functionality of schemes?
Thank you for your collaboration and patience

Interview for Woreda Administration (Council)

1. How do you perceive your office's roles and responsibilities in the development and sustainability of rural water supply, sanitation and hygiene activities? • What barriers are there to stop you from performing your roles and responsibilities? • In what ways do they challenge you?
2. How do you perceive the roles and responsibilities of stakeholders (such as WWRDO, Health Office, Agriculture and Rural Development Office, NGOs, CBOs and the community) working in the area of R-WaSH interventions?
3. Do you work with the stakeholders? Y/N. If no, why? If yes, how?
4. How do you support the R-WaSH activities in the Woreda? • Include these activities in your strategic plans and allocate budget? • Financial support for the community for maintenance/expansion/rehab/?

• Look for support/grants?
5. Is there a coordinated effort by stakeholders to integrate their tasks for common activities? Y/N. If no, why? If yes, how? (strategic plans, fund allocation, capacity building)
6. Are there barriers that hindered the collaboration? What are they? (bureaucracy, lack of system of communication, lack of knowledge of roles and responsibilities of actors, lack of manpower)
7. What factors are most significant in impacting your task performance positively and negatively? • How do they affect positively? • How do they affect negatively?
8. Do you share information with stakeholders on their tasks? How?
9. What factors affect implementation efficiency of your plans?
10. Do you supervise the R-WaSH activities being undertaken in the Woreda? Y/N. If yes, how? If no, why not?
11. What do you think should be done to sustain the water supply, hygiene and sanitation activities in the Woreda?
Thank you for your collaboration and patience

Interview for Health Office

General Details					
1. Woreda					
2. Kebele					
3. Name of organisation					
4. Date of survey					
5. Name of investigator					
6. Interviewee background information					
Name					
Sex		Age		Educational qualifications	
Past work experience					
Position in the organisation					
Service years in the organisation					
Major responsibilities					
1. What are the office's roles and responsibilities in R-WaSH interventions in the Woreda? What are the challenges affecting the office's performance efficiency?					
2. Do you integrate your plans with other relevant stakeholders such as WWRDO, Woreda Administration, NGOs and CBOs working in R-WaSH interventions? Y/N. If yes, how? If no, why not?					
3. How does the sustainability water supply scheme relate to your office's activities?					
4. Is there a situation where a scheme breakdown/non-functionality or contamination has resulted in increased health problems? If yes: • How? Where? • How was it solved? How did you know about it, do you have a data?					
5. What are the major water-related diseases in the Woreda? Why and how do they occur? (show document)					

6. How do you explain the perception of communities in the Woreda about water supply, hygiene and sanitation activities? Does the office work on change of community behaviour? How?
7. What mechanisms does your office use to achieve its plan and objectives?
8. Do you support WaSHCos? If yes, how? (give trainings? on what aspects? how many trainings given?
9. How do you see the performance of your office in implementing the office's strategic plan and annual plan of the past five years? What do you intend to do for the next five years?
10. How do you explain the importance of sustainable water supply in improving the health of the community?
11. What factors most affect the office's efficiency of implementation? • In what ways do they affect the office's efficiency? • Human resources, budget, integration with relevant stakeholders, logistics?
12. What do you think should be done to make the office more efficient and effective in implementing its strategic plans and optimise the overall working condition for sustainable R-WaSH intervention?
13. What do you think should be done to effectively and efficiently sustain the functionality of schemes?
Thank you for your collaboration and patience

Key informant interviews

Interview for Kebele Administration (Chairperson)
1. Can you tell me how and when the WATSANCo came into being? (criteria of selection, participation of women, youth, elderly, CBOs, Kebele Admin., NGOs, organisers of the selection, etc)
2. How do you see the composition of the WATSANCo? (gender, age, religion, poor and marginalised people)
3. What was the Kebele's role during scheme development? (problem identification and prioritisation, community mobilisation, WATSANCo selection, etc)
4. What is the Kebele's role in the scheme management? (collaboration with WATSANCos, WATSANCo promotion, request for support to the Woreda, etc)
5. How do you see the performance of WATSANCos in scheme management? (financial management, transparency, reporting, quality of service delivery, complaint acceptance and correction)
6. Do you know to whom the WATSANCos are accountable?
7. What will be done if WATSANCos mismanage the scheme? (technical inability, corruption, discrimination, etc) What can the Kebele do if it gets information of mismanagement by the WATSANCo?
8. What else does the Kebele do in water supply, sanitation and hygiene in its locality?
9. What do you think should be done to tackle the challenges facing WATSANCos in scheme management?
10. What complaints are there about the use of the water scheme? (quality, quantity, distance, waiting time, scheme failure, speed of maintenance, WATSANCo concern, service delivery, etc)
Key Informant Interview
1. Can you tell me how and when the WATSANCo came into being? (criteria of selection, participation of women, youth, elderly, CBOs, Kebele Admin., NGOs, organisers of the selection, etc)
2. How do you see the composition of the WATSANCo? (gender, age, religion, poor and marginalised people)
3. How do you participate in scheme management? (community mobilisation, WATSANCo promotion, funds granting for scheme upgrading/rehab/maintenance, etc)
4. What else you do in water supply, sanitation and hygiene activities in your locality?
5. How do you see the performance of WATSANCos in scheme management? (financial management, transparency, reporting, quality of service delivery, complaint acceptance and correction)
6. What do you think should be done to tackle the challenges facing WATSANCos in scheme management?

7. How do you explain the community demand for water in relation to its population? (pressure on scheme, community conflict, difficulty in providing quality service)				
8. What complaints are there about the use of the water scheme? (quality, quantity, distance, waiting time, scheme failure, speed of maintenance, WATSANCo concern, service delivery, etc)				
General Details				
1. Woreda				
2. Kebele				
3. Specific location				
4. Coordinates	E		N	
5. Date of interview				
6. Name of investigator				
7. Water source used				
8. Interviewee background information				
Name				
Sex		Age		Educational qualifications
Water point no.				
Position held in the community				

NGO interview

General Details				
1. Woreda				
2. Kebele				
3. Name of the organisation				
4. Date of survey				
5. Name of investigator				
6. Interviewee background information				
Sex		Age		Educational qualifications
Position in the organisation				
Service years in the organisation		Major responsibilities		
Organisational Activities				
1. What is the role of your organisation regarding R-WaSH-related activities?				
2. What is your next five/10-year strategic plan in the sector?				
3. How do you see your relations with other actors in the sector?				
4. How do you think it is possible to integrate your tasks with other government sectors and CBOs?				
5. Is there an external body that assesses the performance of your activities? Who/how?				
Community Participation				
1. Explain how you identify and prioritise water-needy villages?				
2. In what ways are the local communities taken into consideration during the development of the scheme? • What was the role of the community during the pre-feasibility and feasibility study of the project?(problem identification, prioritisation, site selection, project design selection, technology and service level selection) • How did the handover of the schemes taken place?				

• How does the local community participate in the implementation, management and monitoring of the scheme?
3. What constraint do you face regarding community participation in project activities?
Type of Scheme Technology
1. How is the nature of the scheme you installed in the Woreda? (type of technology, number, water volume, design period, service lifespan, beneficiaries, type of water use, beneficiary intended at design period versus current no. of users, community participation, population consideration) (document review)
2. Do you have any selection criteria for scheme technology? (standard) Is the implementation of the scheme as per the design? (document review)
Community Empowerment
1. What are your strategies to ensure long-term sustainability of the water schemes you installed?
2. How are the communities empowered to run the schemes? (technical aspect, financial aspect, organisational aspect)
Management of Water Service
1. What are the present water management strategies of the schemes you have constructed? How do you see it?
2. How do you handle issues related to O&M of the water schemes and availability of spare parts?
3. Do you visit the WATSANCOs?(no. visits and supervision per year)
4. What efforts do you put in place to make the water supply systems sustainable? (including those developed by you and others) (type of support: spare parts provision, maintenance, capacity building, fund granting)
5. Explain the performance of water schemes in the villages you have constructed so (considering: quality of water, quantity of water, satisfaction and reliability to users) Do you have water quality test records of the schemes you installed?(initial testing and evidence of regular testing) (document review)
6. How do you handle sanitation issues in the project area?
7. Give your comments on what should be done for the water service delivery to be sustainable?

KAP survey: community key informants

General Details						
1. Woreda						
2. Kebele						
3. Specific location						
4. Coordinates	E			N		
5. Date of interview						
6. Name of investigator						
7. Water source used						
8. Interviewee background information						
Name:						
Sex		Age		Educational qualifications		
Water point no.						
Position in household/community						
1. Briefly explain how you have been involved in each of the three phases (problem identification, implementation and O&M of water and sanitation service delivery?						
2. What was your experience of this? Did/do you feel that your views are respected and taken into						

account?
3. How do you understand your role and the role of others in ensuring the sustainability of the water supply system?
4. How do you perceive yourself and others to perform in these roles?

KAP survey: planners and service providers (NGOs, Woreda Admin, sector offices)

General Details					
1. Woreda					
2. Date of interview					
3. Name of investigator					
4. Name of organisation					
5. Interviewee background information					
Name:					
Sex		Age		Educational qualifications	
Religion: ☐ Protestant ☐ Orthodox ☐ Catholic ☐ Muslim ☐Traditional ☐ Other					
Position in the organisation					
Service years in the organisation					
Past experience					
No. years position held					
1. Can you briefly explain your (individual) role in providing water and sanitation services? (decision making, implementation, O&M, capacity building, collaboration with stakeholders)					
2. What are the skills and knowledge that you bring to your work? (professional background, experience, trainings received)					
3. What are the links that you have with others (within and out side your organisation) in doing your work (leadership diagram/organigram?)					
4. How do you interact with water users at your work? What is their role? How do they full fill it?					
5. What motivates you about your work? What do you like doing?					
6. What demotivates you about your work? What do you not like doing?					
7. What do you see as the main blockages of your work? • In your role and skills? • In the roles and skills of others? • In the overall working environment?					
8. How do you know that are you are performing efficiently? How are you assessed?					
9. How do you use information at your work? What info is most important to you? Where do you get it?					

Institutional mapping and stakeholder analysis

Objectives: • To identify the different stakeholders in water service provision • To analyse their roles, mandates and influence • To analyse the potential of institutions/stakeholders to play a role in improved water governance
Depending on the situation on the ground, a workshop or an interview or both will be conducted to

answer the following questions in the two operational Woredas.
1. What are the different stakeholders involved in R-WaSH activities? (primary, secondary, tertiary)
2. What are the roles and responsibilities of these stakeholders in R-WaSH activities? • Which tasks are performed by which actors? • What activities do the actors do in the process of performing their tasks? • Gaps and overlaps? • Is there a coordinated effort by relevant stakeholders to integrate their tasks? • What factors are there affecting positively and negatively their task performances? • What information is held by which stakeholders that helps them to perform their tasks? • Is information being shared? And how? • Who has most power/influence?
3. Are the development, rehabilitation and O&M of rural water supply and sanitation activities part of the scope of the institution's current activities? How do you explain your scope of activities?
4. How do you see your institution's commitment on the need for moving towards sustaining the rural water supply and sanitation activities? Do you have strategic and annual plans? (can you give us a copy?)
5. Will there be a possibility of negatively affecting the interests of others while you are undertaking the intervention (on new to develop one and existing schemes)? Whose interest will be affected? How?
6. What do you think should be done to bring a positive change in R-WaSH interventions? (working together?)
7. Do you have the necessary resources (financial, human, knowledge base, leadership, organisational capacities) needed to implement the intervention and achieve positive changes? What is you are lacking? (document review)

Organisational resource mapping

General Details						
1. Woreda						
2. Kebele						
3. Name of organisation						
4. Date of survey						
5. Name of investigator						
6. Interviewee background information						
7. Position in the organisation						
8. Service years in the organisation						
Human Resources	Sex: M/F Qualifications: Masters/Degree/Diploma/Certificate/High School graduate/elementary/non-formal education					
Position (technical staff)	Sex	Age	Quals	Service years	Responsibility	Remarks
Position (support staff)						

Remarks (turnover, individual carrying out different duties)					
Physical Resources					
Building structures equipment, materials, etc	Quantity	Functionality		Use	Remarks (how they use it, sharing?)
		F	NF		
Building blocks					
Offices					
Computers					
Photocopiers and printers					
Phone lines					
Generators					
Private water scheme					
Vehicles					
Field equipment/tools					

Information Resources			
	Yes	No	
Information desk?	☐	☐	
Information library?	☐	☐	
Documented minutes of meetings?	☐	☐	
Documented reports?	☐	☐	
Makes project presentations?	☐	☐	
Communicates management board decisions?	☐	☐	
Makes project team regular meetings?	☐	☐	
Makes video/audio and TV/conferences/radio?	☐	☐	
Websites and internet?	☐	☐	
Publishes magazines?	☐	☐	
Publishes brochures?	☐	☐	
Organises conferences?	☐	☐	
Organises exhibitions?	☐	☐	
Organises workshops?	☐	☐	
Working telephone?	☐	☐	
CD-ROM/floppy	☐	☐	
Documents	☐	☐	
Pamphlets	☐	☐	
Posters	☐	☐	
Drawings	☐	☐	
Maps	☐	☐	
Remarks			

WATSANCo resource mapping

General Details							
1. Woreda							
2. Kebele							
3. Water point no.							
4. Date of survey							
5. Name of investigator							
6. Interviewee background information							
Sex		Age		Educational qualifications			
Position in the WATSANCo: ☐ Chairperson (head) ☐ Finance head & secretary ☐ Cashier ☐ Scheme supervisor ☐ Purchaser ☐ Storekeeper ☐ Other (specify)							
Service years in the committee							
Human Resources							
Number of WATSANCo members		Male no.		Female no.			

Position	Sex	Age	Religion	Service years	Education	Active members
Chairperson (head)						☐
Finance head and secretary						☐
Scheme supervisor						☐
Cashier						☐
Purchaser						☐
Store keeper						☐
						☐
						☐

Other staff members								
	No.	M.	F.	Age	Education	Service years	Replacements (no. of times)	Remarks
Caretakers								
Technicians								
Guards								
Other								
Other								

Physical Resources	F=Functional	NF=Non-functional			
Equipment (mandatory for quality service delivery)	Type	Quantity	Number		Remarks
			F	NF	

Financial Tracking						
	1997		1998		1999	
Month	Income	Expenditure	Income	Expenditure	Income	Expenditure
Meskerem						
Tikimt						
Hidar						
Tahsas						
Tir						
Yekatit						
Megabit						
Miazia						
Ginbot						
Sene						
Hamle						
Nehase						
Total						

Monthly Recurrent Expenditure		
Expenditures	Amount in Birr	Remarks
Salary		
Petrol/electricity		
Transportation		
Expendable materials		
Per diem		
Maintenance		
Mechanics (big repairs)		
Spare parts		
Other		
Other		

Major income sources:

Comments

Water point mapping

1. Woreda		Date of survey	
2. Kebele			

3. Specific location							
4. Coordinates	E		N		Alt		
5. Climate	☐ kolla ☐ dega						
6. Nearby institutions (school, clinic, Kebele, church)							
7. Physical characteristics of area (plain, mountain, rocky)							
8. Name of investigator							
9. Water point no.							
10. Scheme type		Year of construction					
11. Number of population being served	In the beginning						
	Currently						
12. Number of households using the scheme							
13. Current status	☐ Functional (being used) ☐Non-functional/dry						
WP: Water Point	Functional WP		Non-functional WP				
14. No. of water points	FN faucets		FN faucets				
	NF faucets		NF faucets				

Access to adequate safe water supply from the water point, wet period (non summer)				
Options	Score	Hand pump score	Public stand post score	Spring score
Water point dry/non-functional, users go to unprotected water sources (river, canal, etc)	0			
Water point dry/non functional, users go to a nearby water point	25			
Water available intermittently, users go to another nearby water point	40			
Benchmark: adequate water throughout for basic domestic needs for regular users; other sources available for bathing/washing	50			
Adequate water for all domestic needs throughout, for regular users	75			
Ideal: In addition, capacity available for outside beneficiaries as well	100			
Reason for score				

Access to adequate safe water supply from the water point, dry period (summer)				
Options	Score	Hand pump score	Public stand post score	Spring score
Water point dry/non-functional, users go to unprotected water sources (river, canal, etc)	0			
Water point dry/non-functional, users go to a nearby water point (>250 metres)	25			
Water available intermittently, users go to a nearby water point (<250 metres)	40			
Benchmark: adequate drinking water for all regular users	50			
Adequate water drinking/cooking for all regular users; other sources bathing/washing clothes	75			

Ideal: Adequate water available for all domestic needs for regular users	100			
Reason for score				
Water predictability				
Stand post				
Options	Score	Summer score	Non summer score	
Supply unpredictable, don't know if water will come or not	0			
Know supply is every day, but exact time unknown	25			
Know supply is either in morning/afternoon, but exact time unknown	50			
Supply at scheduled times and fully predictable	75			
Water always available	100			
Reason for score				
Hand pump				
Options	Score	Summer score	Non summer score	
Supply unpredictable, don't know if water will come or not	0			
Know water will come at some time, but don't know when – maybe at night	25			
Know water will come at some time – maybe a few hours later	50			
Need to pump for a short while to get water	75			
Water always there in pump, and supply is hence predictable	100			
Reason for score				
Water quality (user perception)	Score	Hand pump score	Public stand post score	Spring score
Not used for any domestic use	0			
Used for domestic purposes, but with complaints (e.g., muddiness, bad smell)	25			
Benchmark: used for all domestic purposes without any complaints (even muddiness)	50			
In addition, CBO officials have certified that there are no quality problems	75			
Ideal: In addition, water quality has been certified by outside reputed agency	100			
Reason for score				
Testing of the water source for quality (to ask implementer)				
Question		Yes/No	Remarks	
Was the water from this water point tested for quality?			If yes, date	
If tested, was the water point reported for bad water quality?				
Are you aware which parameter is in excess in the water (EC, nitrate, fluoride, pathogens)?				
Any measures taken to overcome the quality problems?			If yes, specify	
Symptoms of fluoride contamination among users?		Hand	Public stand	Spring

(tick)	Score	pump score	post score	score
Visible evidence of skeletal fluorosis (bent arm and leg bones)	4			
Visible evidence of dental fluorosis (discoloured teeth)	3			
No visible evidence but complaints of joint pains	2			
No symptom of fluoride	1			
Stagnant water around the water point				
Options	Score	Hand pump score	Public stand post score	Spring score
No drain; large stagnant water pool and overflow, platform broken or dirt around water point	0			
Drain exists, but still stagnant water pool and overflow, platform broken or dirty	25			
Benchmark: good finished water point, clean environment, no visible pollution around the water point (no latrine, cattle yards, etc)	50			
In addition, cultivated grass and plants are present around the water point	75			
Ideal: in addition, fence around the water point, drain to a nearby home garden	100			
Reason for score				
Social barriers to access the water point				
Options	Score	Hand pump score	Public stand post score	Spring score
Stand posts are reserved for specific class in that area and access is limited to only those families.	0			
Stand posts are reserved for specific class in that area and access is limited to only those families. But some people with influence or influenced people are allowed	25			
Benchmark: all the points in the village are accessible to all class groups at least during the repairs of other water points, emergencies	50			
In addition, allow selected outside users to take water – when excess capacity is available	75			
Ideal: no restriction on water collection from all the points for all the people in the village	100			
Reason for score				
Financial barriers to access the water point: Are households able to pay for water. What sanctions if they cannot pay?				
Volume of water a household is allowed to take (does this depends on household size?) Is there a difference between the different households? (also social barrier)				

System of user payment for O&M of the water point				
Options	Score	Hand pump score	Public stand post score	Spring score
No system of regular user payment – and no payment	0			
There is a system of regular user payment, but no payments or payments are irregular	25			
Benchmark: there is a system of regular water payment and most pay regularly; OR they collect payment as and when needed for major repair and rehabilitation	50			
There is a system of water payment and all pay regularly – even to cover major repair and rehabilitation	75			
Ideal: in addition, payment is based on ability to pay (graded rate system)	100			
Describe the payment system: tariff per volume, fixed prices, or combined: payment for water use and separate contribute for O&M				
Reason for score				

Problem	Code	Hand pump score	Public stand post score	Spring score
Overcrowded (more than 10 families using it, in general)	1			
Overcrowded (more than 10 families using it, in dry period)	2			
Far away from households (>250m one way distance)	3			
Drop in yield in dry period (water table falls)	4			
Bad water quality (visible iron and manganese contamination and hard water (taste))	5			
Unsafe (side wall collapse, bottom cave-in and apron seriously damaged, etc)	6			
Other (specify)	7			

What is the repair situation of the water point?		
Has this water point required repairs over the past 12 months?	Yes/No	
Type of repair required	(Major: repairing collapsed walls, deepening, pump out of order more than one day, etc) (Minor: patchwork to the apron and walls, replacing pulleys, rope, bucket, pump repaired same day, etc)	
Who does the repair?		
Time between breakdown and repair		

Functionality of the water point (Hand pump)		
	Yes/No	
Is the hand pump functioning?		

Is the apron around the tube well intact?		
Is it working without noise?		
Is the top of the hand pump above ground (water tank) free from corrosion?		

Leakage – pipe schemes (non-revenue water (NRW) or unaccounted for water (UfW))			
Level of leakage	Score		
Severe leakage, fully affects supply (NRW very high)	0		
Frequent leakage, partly affects supply (NRW above acceptable limit)	25		
NRW slightly higher than acceptable limit, does not affect supply	50		
NRW at acceptable/design limits	75		
NRW below acceptable/design limits	100		
Reason for score			

Quality of water source

Nature of contamination	Surface water source present? (Y/N)	Groundwater source present? (Y/N)
Agricultural (chemical) waste		
Sediments from erosion		
Human faeces		
Animal faeces		
Leaves, dust, etc		
Natural rock strata (e.g., fluoride, iron, manganese, calcium, etc)		
Any other (specify)		
Comments and observations		

Source protection mesures (pollution) : What measures have been taken to limit pollution?

Options	Surface water Y/N	Groundwater Y/N
Silt barriers or traps?		
Direct discharge from polluting sources prevented?		
Natural (vegetative) barriers constructed?		
Chlorination at the source?		
Fencing to prevent animals from contaminating the source?		
Catchment control (with people's participation)		
Prevention of discharge from chemical fertilisers		
Control people's behaviours that contribute to pollution?		
Remarks		

Nature of protection for the water source

Options	Score	Hand pump	Public stand post score	Spring score

		score		
Beneficiaries not aware of the need for source protection or conservation	0			
Beneficiaries aware of the need, but no action taken	25			
Benchmark: beneficiaries aware of need for source protection; source protection is part of village (environment); action plan and hand pump committee established	50			
In addition, committee reviews source protection measures every year	75			
Ideal: in addition, committee has repaired source protection measure as required (with help of NGO or relevant government line agency as required)	100			
Reason for score				
Conservation of water source Were any measures taken to conserve surface water? ☐ Y ☐ N				
If yes, what measures were taken?				

Options	Surface water Y/N	Groundwater Y/N
Afforestation of catchment area?		
Surface water recharge structures check weirs, control weirs, check dams		
Diversion upstream or artificial recharge		
Participatory watershed management (control of open grazing, upstream over-abstraction, etc.)		
Any other? Specify		
Remarks		

Water Scheme mapping

1. Woreda		Date of survey					
2. Kebele							
3. Specific location							
4. Coordinates			N		Alt		
6. Climate	☐ kolla ☐ dega						
7. Nearby institutions (school, clinic, Kebele, church)							
8. Physical characteristics of area (plain, mountain, rocky)							
9. Name of investigator							
10. Water scheme No.							
11. Year of construction							
12. Installing organization							
13. Number of population being served	In the beginning						
	Currently						
14. Number of households using the scheme							
15. Depth							

Design population		Service life span	
Type of scheme technology			
Water source			
Current Status	☐ Functional *(being used)*	☐Non-functional	
Number of water points		Functional WP	Non-functional WP
Reservoir Quantity		Capacity (in lit or m3)	
Reservoir type	☐ Concrete ☐ Steel ☐ Plastic		
Reservoir status	☐ Well functioning ☐ Severely leaking ☐ Non-functional		
Power source	☐ Generator ☐ Electricity		
Pump properties	Head	Power	
Pump type	☐ Mono pump ☐ Submersible		
Pump power			
Discharge rate			
Scheme brand			

Check points	**Yes**	**No**	**Remark**
1. Reservoir head well covered?	☐	☐	
2. Scheme well fenced?	☐	☐	
3. Scheme pipe system severely leaking	☐	☐	
4. There is scheme guard?	☐	☐	
5. Power house well constructed?	☐	☐	
6. WaSHCo office near by?	☐	☐	
7. Has water meter?	☐	☐	
8. Hand pump working well?	☐	☐	
9. Metal works corroded?	☐	☐	
10. Distribution pipeline leaking?	☐	☐	
11. Water treatment plant available?	☐	☐	
12. Irrigation activities using the scheme?	☐	☐	
13. Latrines close to the scheme?	☐	☐	
14. Scheme close to settlement area?	☐	☐	
15. Scheme area flood prone?	☐	☐	
16. Cattle trough around the scheme?	☐	☐	
17. Washing and bathing near the scheme?	☐	☐	
18. Land slide problems around the scheme?	☐	☐	
19. Scheme close to a water body?	☐	☐	
20. Spring area well protected?	☐	☐	