ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

ASSESSMENT OF SUSTAINABILITY OF RURAL WATER SUPPLY SCHEMES:
The Case Of COWDO
IN MESKANENA MAREKO WOREDA

KEBEDE WOLDIE LIBASIE

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List of Acronyms

BoWMERD	Bureau of Water, Mining and Energy Resources Development
COTECH	Community Technicians of Hand Pumps
CSA	Central Statistical Agency
DPPC	Disaster Prevention and Preparedness Commission
EA	Extension Agents
ESA	External Support Agency
FGD	Focus Group Discussion
HHDs	Households
HP	Hand Pump
HDW	Hand Dug Well
NGO	None Governmental Organization
NGDO	Non-Governmental Development Organization
PA	Peasant Association
RWSS	Rural Water Supply System
SNNPR	Southern Nations, Nationalities and Peoples Region
VLOM	Village Level Operation and Maintenance
WC	Water Committee

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Abstract

This study reports both theoretical and empirical findings on sustainability of rural water supply schemes developed by Rural Community Water Development Organization (COWDO) in Guragia Zone, Markanera Maroko Woreda in nine peasant associations.

Descriptive statistics on major household characteristics (household size, age, sex, marital status and income) and key aspects or checklists of sustainability (bases for water delivery, community participation, the role of local institutions in water development and management and institutional support and technology) and rural water supply coverage were discussed.

The study has shown that sustainable service of rural water supply schemes is achieved when external support agents (ESAs) have a package of sustainable community management of the systems during implementation and after hand-over of systems developed.

As revealed by the study, the implementing local NGDO (Non-government Development Organization) has managed to address the safe water supply need of about 35% of the total population of the nine peasant associations in its development endeavor. It has also strived to make the water supply schemes sustainable through training community technicians of hand pumps, provision of education on rudiments of personal hygiene and environmental sanitation, introducing cost sharing and cost recovery concept and other soft ware aspects of sustainable RWSS (Rural Water Supply system). However, there are some issues like lesser women participation in the development endeavor, inadequacy in equipping the community-level hand pump caretakers, capacity building aspects...etc. which the implementing organization needs to give due consideration.

It is therefore, suggested that, among others, the implementing organization should properly address the issue of women's participation in water management, upgrade its support in capacity building of local institutions, properly equip community-level caretakers...etc, in order to achieve sustainability of the developed rural water supply systems.

Key Words and Phrases

Sustainability, Rural Water Supply, Community Management, Community Participation,Cost Sharing,Cost Recovery, Hand Dug Wells Community LevelHand Pump Care Takers (Technicians),Capacity Building ,Rural Community Water Development Organization,Non-governmental Organizations,External Support Agencies,Water Committee,Hand Pump,Village Level Operation and Maintenance.

1. INTRODUCTION

1.1 Background

1.1.1 Rural water supply

Man in search of safe and adequate water for his existence has experienced all hardships; though the planet has enough water resources. Many parts of the world suffer from shortage of safe water supply. The shortage and thereby the suffering is more felt in less developed countries like Ethiopia. Although the problem is seen in both urban and rural areas of Sub- Saharan African countries, the latter bear the brunt of the lack of safe drinking water.

The problem of lack of safe water is aggravated by the lack of knowledge of the population about related issues of personal hygiene and environmental sanitation. Studies indicate that, water-borne diseases cause 80% of the death in the rural population of developing countries. (WHO annual report, 1997)

Lack of safe water supply forces the population to resort to traditional water points[1]; which are hosts of several disease-causing organisms.

The lack of safe water supply has other chain of negative consequences such as the workload on women and children in fetching unsafe water from mostly distant traditional water points. As a result, most children of the peasantry miss the opportunity of attending school; and, women spend 10-50% of their daytime for fetching water for household consumption from polluted water points. (Ethiopian Water Resources Management Policy, 1999 VII).

The problem is given due consideration now a days; and as a result, there are water development endeavors to address the problem. Nonetheless, the coverage is still very low. Presently, the rural water supply coverage in Ethiopia is less than 24% (Ethiopian Water Resources Management Policy, 1999, VII). The coverage reflects a much worse situation considering the unreliability of the water supply systems. What could be seen as a deplorable condition is that, even when there are few developed water sources, schemes to which large sums of resources of capital has been channeled, these sources could not give sustainable service.

Such a failure is largely caused by the supply driven approach of the ESAs (External support Agencies). The supply driven approach promoted by external support agencies in the past has shown an overemphasis in mere provision of facilities rather than an effective complementary partnership with communities. This has made communities to expect free services and have lesser sense of ownership. The result is unsustainable rural water supply schemes.

The fact that rural water supply schemes built by both governmental and non-governmental organizations are not giving sustainable service makes the fact clear that supporting agencies are required to change their role from providers of services to facilitators, coordinators and supporters. This can be achieved by developing **management capacities** of the local people to manage rural water supply. Community management of RWSSs is a broader and long lasting form of community participation. (European

[1] Traditional water points are those water sources like rivers ,ponds and unprotected springs.

Commission, 1998,62) The new approach to RWSSs is based on primarily two principles developed and endorsed at the 1992 International Conference on Water and Environment in Dublin; that RWSS projects should focus, to a great extent, on demand and sustainability. There must be a balance between the economic value of water to the users and the cost of providing services and prices charged for these services. In conventional RWSS projects, these elements are not in balance. Demands for services should come from the communities.

The supporting agencies, beside developing water resources, should facilitate community management of RWSSs, or assist communities to have lasting decision making capacity on matters pertaining to water resources. Enabling communities to manage their water supply schemes is indispensable in determining whether a given RWSS is sustainable or not.

1.2. The Problem

Consumption of water from traditional water sources can have a significant negative impact on health. In order to alleviate this problem many government agencies and NGOs attempt to provide safe water to communities. The success of these agencies, however, depends on the nature of their mode of intervention of supply. One approach to the provision of safe water is the supply driven approach in which the supporting agencies overemphasize a mere service provision, rather than effective complementary partnership with communities making the latter to expect free services. Moreover, this nominally participatory approach did not produce efficient and sustainable services. Several schemes are seen lying waste soon after being handed over to the respective communities; or

when being run by centralized governmental institution or when a given NGO implements and leaves a developed scheme to the beneficiaries without a proper package for their sustainable service. As an evidence, for instance, in Southern Nations, Nationalities and Peoples Regional State, (SNNPR) 50-57% of the rural water supply schemes fitted with hand pumps were not operational up to 1997 (Sebsibe Alemneh,et al,2002,2).As a result, material, manpower and financial resources channeled to these development activities have not resulted in desired sustainable service. As indicated above, this is largely due to lack of a package for sustainable community management of the developed schemes; and thereby **unsustainable rural water supply schemes**. Even if some may claim to have such a package, it may simply be nominal and could be termed as quasi-development activity. Therefore, with the package for sustainable community management of schemes in focus, Rural Water Supply Systems have to be evaluated.

In Ethiopia, many NGOs are involved in rural water supply. In SNNPR alone, the region in which the study area is located, more than 40 NGOs are operating in rural water development endeavor. One such NGO is COWDO (Rural Community Water Development Organization) which is engaged in water development and supply activity in Guragie Zone, Meskanena Mareko Woreda.

COWDO has its own approaches in dealing with water supply. Its approach involves technical procedures ranging from site selections ,construction of wells, pump installation to chemical analysis of water. It also establishes water committees and involve in capacity building activities. It is not however clear to what extent these procedures have

brought sustainable water supply in the *Woreda*. This study, by examining different attributes, assesses the sustainability of COWDO's water supply schemes.

1.3 Objectives

The general objective of the paper is to assess the sustainability of the rural water development by Rural Community Water Development Organization (COWDO) in Guragie Zone, Meskanena Mareko Woreda (targeting nine peasant associations) and forward viable recommendations pertaining to the problems.

The specific objectives are:

1. **to identify the nature of water supply package of COWDO.**
2. **to assess the role of local institutions involved in water delivery and management.**
3. **to examine the level and nature of community participation in general and women's participation in particular.**
4. **to identify the institutional support required for the operation and management of water supply**
5. **to identify the extent to which the provision of services meets the needs of the target group and the constraints the NGO faces.**
6. **to foreword some suggestion that would improve the sustainability of COWDO's water supply.**

1.4.Methodology and Type of Data

The study focuses on nine peasant associations of Meskanena Mareko Woreda in Guragie Zone.The study population is all households of the nine peasant associations namely, Yeteker, Mikaelo, Wurib, Gideyna Aborat, Mirab Embor, Misrak Embor,Mirab Miskan, Misrak Miskan and Agode Lobrera benefiting from water supply system.

The sample frame, which consists of 2291HHD beneficiaries, is obtained from COWDO's archives. The list has been recently (January 2003) consulted and verified for its completeness. A random sampling method was used to select 120 households from the sample frame. The unit of analysis is household heads. Data were collected in a survey method and focus group discussion (FGD). A structured questionnaire has been prepared for the data to be collected from the sample. Broadly, the questionnaire used for the collection of the data attempts to elicit information on the nature of water supply package of COWDO, the role of local institutions involved in water delivery and management, the level and nature of community participation in general and women's participation in particular, the institutional support and the extent to which the provision of services meets the needs of the target group and the constraints the NGO faces.. A focus group discussion was held with Water committee members, community technicians of hand pumps, COWDO staff, "*Edir*" leaders and PA chairpersons. Three extension agents have participated in data collection. Secondary data from the existing documents of relevant bureaus at regional and zonal level have been collected. The data has been analyzed both qualitatively and quantitatively by computing summary measures.

Additional information with regard to prevailing experiences has been collected from relevant governmental and non-governmental organizations.

Relevant articles and documents have been investigated from Internet to get information on participation of communities towards achieving sustainable rural drinking water development.

1.6 Organization of the paper

The paper brings forward first the background, in which the general view of the core issues of the paper is discussed; and passes to the statement of the problem. Then, the general objective and specific objectives are stated to be followed by methodology and type of data.

The second chapter treats review of the literature where concepts pertinent to rural drinking water development and sustainability and community management of schemes are presented.

Chapter three gives description of the study area where physical environment and demographic background of the study area are discussed.

In chapter four, the hitherto coverage, distribution and type of safe water supply package, introduced by the concerned NDGO sample population characteristics and COWDD's constraints.

Chapter five examines the performance of the concerned local NDGO, i.e. COWDO , the target group and relevant institutions. The examination or assessment is done using elements of sustainable community

management as yardsticks to measure the level of sustainability of the developed rural drinking water supply systems. All the data obtained from the sample survey and the focus group discussions are considered in the evaluation of the role of different stakeholders.

Conclusion and recommendation are presented in the final chapter, chapter six, followed by references and annexes.

2. REVIEW OF THE LITERATURE

2.1 The Issue of Sustainability and Sustainability of Rural Water Supply Schemes

In the early 80's, it became clear that in the water supply sector, the customary supply driven approaches to water supply were not sufficient since too many of the projects based on this principle had proven unsustainable.

Today, the development endeavor of government and NGDOs (Non-Government Development Organizations) in countries of Africa, especially those south of the Sahara, is found to be futile if the development activity does not have a participatory nature in order to bring sustainable development. In every development endeavor, the issue of sustainability is being given serious consideration nowadays. In connection to this, sustainable development is given several definitions by different institutions and writers.

World Commission and Environment Development has the most commonly quoted definition of sustainable development that reads as:

> "Sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

The other is that of Ecological Society of America, (1993), which defines sustainable development as:

"management practices that will not degrade the exploited system or adjacent systems"

Banuri and others on the other hand, in their book entitled "Sustainable Human Development from Concept to Operation", (1994) define sustainable development as:

"The enlargement of people's choices and capabilities through the formation of social capital so as to meet as equitably as possible the need of current generations without compromising the needs of future ones'"

The above definition emphasizes the need to cater for future generations; and sustainability is understood mainly within the rubric of environment. A different definition of sustainability is related to social and economic viability of projects. The definition of FAO in this regard reads as:

"A development which is environmentally non-degrading, technically appropriate, economically viable and socially acceptable" (FAO, 1997).

Allan Fowler, quoting Convay, (1997), defines sustainable development as follows.

"A development path that is resistant or resilient development has four essential components, productivity, ecological sustainability, stability and equity." (Allan Fowler, 2000, p.11)

A similar line of perception of sustainability that is very popular among NGOs refers to the implementation of projects.

NGDOs, which engage themselves in alleviating the poverty of a specific community, need to give due consideration of their development initiatives to benefit the target group sustainabily. Their approach (NGDOs), to sustainability should be integrative and, more importantly, must focus on building the capacity of communities and themselves.

> "NGDOs' interventions are meant to make a difference in that their achievements are maintained without them. However, the results of an array of assessments of their impact show that sustainability is a major weakness in performance" (Allan Fowler, p3, Fowler, 1999b, Okley, 1999b)." and "priority must be given to the generation of systems which will be sustainable and which will be used." (IRC, 1988,p.29).

In rural water supply, a key issue of sustainability is community ownership and management.

In sustainable community management of RWSSs, the community takes the final decision on important aspects of planning and implementation of water supply systems. The responsibility of operation, repair and maintenance of constructed systems also rests on the community (European Community,1998,46). Currently, the principles of communities' involvement in water supply projects are widely accepted among NGOs. As a result, the developed water supply systems are the property of the specific community and not of the donor agency or the government.

Sustainable community management of rural water supply schemes is defined as a broader and deeper form of community participation in which the communities take the responsibility of managing the water supply systems themselves." (European Commission, 1998,46;Sebsibe Alemneh, 2002,7)

Involvement of a community in the supply of local construction materials and provision of free labor in construction of schemes should be accompanied by involvement in decision-making about siting, collection of tariffs, operation and maintenance of schemes and other aspects of sustainable community management. (European Commission, 1998,46,)

2.2. Key aspects of Sustainable Community Management of rural drinking water supply systems[2]

Sustainable community management of rural drinking water supply systems includes the following elements.

1. Demand driven approach in identification of user groups
2. Women's participation
3. Cost-sharing and cost recovery
4. Community awareness raising and education
5. Water resource and baseline survey
6. Repair and maintenance service
7. Water users management body and structure
8. CBOs and Conflict management
9. Management capacity building management procedures of water committees
10. Technology
11. Institutional support

[2] European Commission; Towards Sustainable Water Resource Management, 1998,62 ; Sebsibe Alemneh, Guide lines to Sustainable Rural Water supply,2002,7

Demand- driven provision

Demand is a key aspect for sustainability of community managed RWSSs. The hitherto approach was supply driven approach where the ESA (External Support Agency) would focus on mere provision of services to a given community. An overemphasis on service provision rather than on effective complementary partnership with communities by public sector and several NGOs has made communities to expect free services; and ,on the side of ESAs, insufficient will to demand payment for services. The new approach, the demand driver approach[3] on the other hand, focuses, to a great extent, on demand and sustainability. The approach underlines the fact that there must be a balance between the economic value of water to users, the cost of providing services and the prices changed for these services; and WSSs should be managed by the community themselves for sustainability.

In identifying safe drinking water supply projects, user groups should feel the need for safe drinking water supply. The logic here is, that if there is real demand for water supply from the community then that indicates that water, to users, has an economic value; **or if water is a felt need of the community, then this is an indication of willingness to share and recover costs of a system to be developed .** The fact that there is a real demand for supply of water will facilitate the management of the water supply schemes by the users themselves, which in turn enhances sustainability. One way of ascertaining this is to venfy that the community has applied for the development of the schemes. (IRC, 1988,57; DFID (Department for International Development), 1997,63).

Providing services which people can afford is an obvious pre-condition for cost recovery. Being able to pay for something and being willing to do so, however.

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[3] The principles of demand-driven approach of RWSSs state that

- Water is an economic, as well as a social good and should be managed accordingly, and
- Water should be managed at the lowest appropriate level with users themselves involved in the planning and implementation of projects.(DFID (Department for International Development)

do not always go hand in hand. From an economist's point of view demand is only real (or "effective") when it is accompanied by willingness to pay, in cash or kind for the goods or services offered. From this point of view, "willingness to pay" and "demand" essentially mean the same thing. Both, however, need to be distinguished from the idea of "felt need". Acceptance of free or heavily subsidized services, which meet people's felt needs, does not prove that there is effective demand for them. **Felt need only turns into demand when people are prepared to use their own resources to obtain what is offered.**

Resources are always limited and choices have to be made as to how much people are actually willing to pay for better water and sanitation services. In investigating demand and willingness to pay, it is important that a broad-based approach is taken. Research has indicated that the range of influencing factors is wide. A list of those which have been identified as among the most important is discussed in the box below.

FACTORS INFLUENCING WILLINGNESS TO PAY

- Service level
- Service standard
- Perceived benefits
- Relationship to production
- Level of income
- Price
- Relative cost
- Opportunity cost of time
- Characteristics of existing sources
- Reputation of service agency
- Community cohesion
- Policy environment
- Socio-cultural factors
- Perception of ownership and responsibility
- Transparency of financial management
- Institutional frame work

(Briscoe and de Ferranti, 1988)

Women's participation

The central role played by women in the provision, management and husbandry of water, primarily in the domestic and household context, has gained widespread recognition in recent years; especially since the UN Decade (1980-1990) for Women (European Commission, 1998,47). Gender issues need special consideration in relation to water management and use.

Given the existing power structures within families and communities in many rural parts of the world, a targeted effort will be needed to enable women to take a meaningful role in the consultation and decision-making process related to water and waste disposal.

Because of their domestic roles, women are also logical key candidates for educational activity concerning water use and hygiene behavior.

Women in almost all-rural Africa, shoulder the burden of fetching water from distant water points for household consumption. In many traditional cultures, Women's only perceived role in water resources management is haulage and storage of domestic supplies. Thus, issues such as siting and ownership of installations; knowledge of operation and maintenance procedures and relevant skills; and membership of water committees or similar bodies are normally confined to men. Absence of women from decision- making in water resource management and service delivery is both inequitable, and severely hinders the possibility of realizing sustainability. Projects should target women and lessen their burden. Moreover, their participation in projects is of paramount importance in making development endeavors sustainable (Jennifer McCracken,et,al 1996,18). A water resource scheme reduces the work load of women in rural areas and allows them to spend more time for household and other

responsibilities. Fortunately, nowadays, the role of women in community water supply programs is gaining more and more recognition.

Water supply projects should give the participation of women high priority since they are the ones who bear the brunt of lack of safe water supply . It is meaningless for water projects not to reduce the hardship, among others, of women and children.

When involvement of women in all components of a given project is realized, it makes projects and their endeavors so close to their goals of bearing fruit and thereby benefit the community sustainabily.

Cost-sharing and cost-recovery[4]

Demand takes into account the balance between the economic value of water, the cost of providing services and the price charged for these services.

The issues of cost sharing and cost recovery are crucial in the process of enabling the community to manage their systems after completion. It must ,however, be clear that does not imply total financial responsibility of the community. But, it is to indicate that some contribution from users is needed to establish commitment; which, of course through time should increase to reach the intended level of making the developed systems sustainable. (Phil Evans,1992,41;Sebsibe Alemneh, 2002,9)

[4] Cost-sharing implies the share of costs among the communities and other stakeholders to develop sustainable water supply system; while cost recovery refers to the revenue collected or the cost of water supply systems recovered from the water sales.(Sebsibe Alemneh,et al,2002,12)

Regarding cost recovery, the communities are expected to pay a monthly fee for water use . The most common kind of water charge is a flat rate charge. This flat rate charge has the benefits of certainty over the level of revenue and ease of administration and collection. A flat rate charge could be set when the provision of water supply is from a hand dug well fitted with hand pumps.

The provision of improved water supply is neither cost free nor is sustainably provided unless the costs are recovered. These costs comprise.

1. operation costs
2. repair and maintenance cost
3. replacement and/or rehabilitation costs

NGDOs and governments can not extend their support beyond the construction phase of water supply due to man power and budget constraints. Therefore, community financing of investment and running costs of safe drinking water supply is indispensable for different activities such as repair and maintenance[5] replacement/rehabilitation.

The principal arguments put forward to justify greater user payment are summarized in the box on page 26.

[5]Today, all the stake holders in the "East Kilimanjaro Water Supply Project" of the rural water supply sub sector of Tanzania,(a project jointly implemented by GTZ and the relevant government department of Tanzania),agree, among other issues, that cost for operation and maintenance of schemes to be borne by users. (GTZ Water and Waste Sector In English -Speaking Sub Saharan Africa, Part4,1)

WHY USERS SHOULD PAY FOR WATER AND SANITATION SERVICES

- Available capital funds are inadequate to achieve full coverage
- Available public funds are inadequate to meet recurrent costs
- State intervention and control has proven to be inefficient and ineffective
- Social and economic benefits of improved water and sanitation are too indirect to justify free services
- Subsidies disempower users by denying them choice
- Subsidies discourage cost-effectiveness and the development of low-cost solutions
- Evidence of demands and willingness to pay is strong with many poor people alread paying high rates for services
- Properly regulated user charges would mean the poor would pay less and get better service
- Payments increase sense of value and commitment among uses
- User payment maximize the use of available resources
- User payments improve quality and standards of service

(Briscoe and de Ferranti, 1988).

Community Awareness raising and education about safe water, personal hygiene and environmental sanitation

There is usually a higher demand for water supplies than for environmental sanitation, although sanitation is more essential to disease control. Therefore, education about the linkages between unsafe water, inadequate excreta disposal, and disease should be integrated to water supply schemes of rural communities (Gebre Amanuel Teka, 1977,23).

Regarding community awareness raising and education about advantages of safe water, personal hygiene and environmental sanitation, the Grokwe[6]

[6] Since independence in 1980, the government of Zimbabwe has placed considerable emphasis on improving the well-being of the rural population using a national integrated Rural Water Supply and Sanitation programs as part of its strategy. The two districts proposed to EC funding Gokwe North and Gokwe South, had a combined population of 430,000 who regularly suffered from diarrheal infections, and from eye and skin complaints. The primary causes were poor sanitation and hygiene practices, coupled with the use of unsafe drinking water. The paucity of supply of water was an encouragement to lack of hygiene in the household.

During a three-year implementation period, the project achieved its objectives of provision of new domestic water points to 50% of the population; introduction of a three-tier maintenance system for the water points by village- level caretakers, facilitating the construction of latrines in 20% of the households; educating all the communities in health and hygiene; and strengthening the process of decentralized planning and implementation of water and sanitation programs.(European Commission,1998,63)

Integrated Rural water supply and sanitation project in Zimbabwe can be considered as one experience in this area; where the provision of hygiene education has been incorporated in the project activities.

It is nowadays regarded as axiomatic that public health benefits are unlikely to be gained from basic water supply and sanitation service schemes in rural areas and low income urban communities unless their installation is accompanied by programs of hygiene or health education. This is one of the critical items of 'software'[7] in rural water supply now given emphasis alongside appropriate 'hardware'[8].

Experience has shown that population of the rural areas and especially those low-income communities frequently ignore the need for safe waste disposal as a health protection measure.

Hygiene education is needed to correct this situation. As a result of insanitary storage practices, lack of hand washing, poor excreta disposal, water that was safe at the point of collection frequently becomes contaminated (Boot M.T, 1991, 24). Education programs in personal hygiene and environmental sanitation may need to be biased towards women, given their special role in household water management and use.

In order to address the population with the rudiments of hygiene education, a curriculum, which helps, as a guide in the process of extending the education should be prepared. The curriculum should focus on popularizing the advantages of safe drinking water towards health, economic life, and environmental sanitation.

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[7]The software aspects of RWSS include such issues like capacity building of WCs establishment of water users management body, suppose for legal recognition of WCs etc.

Water resource and baseline survey

From the External Support Agency, what could be taken as one having paramount importance is conducting water resource and base line survey.

Inputs of experienced expertise of hydrogeology, geophysics, engineering, development planning and sociology are vital in the course of water resource potential assessment, well site selection, and depth to ground water and to choose the right hand pump option. If assessments such as, ground water resource and depth to ground water is not well identified, the result mostly would be dry wells and thereby unsustainable schemes (Sebsibe Alemneh 2002,18).

Repair and maintenance service

As one element of sustainability, members of the community should be trained to promptly repair and maintain their water supply schemes. This element, nonetheless, seems to have been given lesser attention by several NGDOs.

As indicated in previous pages, about 50% of RWSSs built in SNNPR are not giving service due to lack of repair and maintenance facility nearby. The reasons, among others, for the failure of proper service provision of the schemes are absence of skilled care takers or technicians from the community who should properly and promptly repair and maintain whenever hand pumps fail to be operational.

Such a dire problem can be reduced through training village-based community hand pump technicians or village-level care takers. Trainees are members of the community, i.e. should be selected from and by the users and be given theoretical and practical training based on a training

[8]The hardware aspect of RWSS include such issues like physical work and the technological inputs.

curriculum. These technicians are meant for prompt repair and maintenance of broken hand pumps. The technician would not provide free service, but serve the community with modest payment, as they themselves are users of the developed schemes (Phil Evans,1992,41).

The initiative of an NGO in Visakhapatnam District in Andra Pradesh, South India[9] can be a good example in this case, where the extensive break down of hand pumps led to an NGO initiative in the early 1990s to transfer maintenance responsibilities from the district government to local communities.

Water users management body and structure

Water committees serve as water users' management body. Members of a water committee are elected from and by the water users during the initial period of intervention. The committees are responsible to mobilize resource for construction, operation and management of hand dug wells

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(European Commission 1998,53)

[9] The extensive break down of hand pumps led to an NGO initiative in the early 1990s to transfer maintenance responsibilities from the district government to local communities. Oxfam, the British NGO, Water Aid, and Viswasamaya, a 15-member local NGO network were involved.

The local NGOs worked with communities to establish water and sanitation committees, to be responsible for establishing a water fund to pay for hand pump repair .This required reversing the previous local understanding that the government was exclusively responsible hand pump maintenance. Village mechanics were trained by government mechanics to carryout repairs, and in an interim period, were paid a stipend for repair work by the NGOs. Eventually, they are expected to become self -employed, remunerated by the water committees.

Within three years, 400 water committees were formed, and 50 had raised local funds. In 1996/97, 2.000 pumps were repaired. The community infrastructure for repair and maintenance is now on place. (European Commission,1998,63)

and pumps and collecting and managing water fees. Several NGOs, both local and international[10], invariably make sure that water committees are established on the inception of projects.

In the South India case considered above, local NGOs worked with communities to establish water and sanitation committees to be responsible for establishing a water fund to pay for hand pump repairs. The village mechanics were remunerated by the water committees and within three years, 400 water committees were formed.

CBOs and conflict management

CBOs like "Edirs" in Ethiopia can play an important role in facilitating election of Water Committees and overseeing the responsible group of beneficiaries control corruption. Regarding the role of CBOs, Marlin Falkenmark remarks that "It is essential to create a sense of local ownership, as social aspects have to be considered already at its planning stage. A community survey should cover traditional water use pattern, traditional social beliefs and attitudes, community structure and decision making,..etc.. Efforts have to be made to use the CBOs for facilitating education of the public in acceptance, use, maintenance and benefits from the new facilities."

There are different types of conflicts that arise in water supply.These are conflicts between different group of a community, financial problems, lack of transparency and unethical leadership regarding water use from

[10]A UK based NGO, WaterAid, operates in twelve countries of Africa and Asia. It focuses on water supply, sanitation and hygiene promotion. In Ethiopia, it has been, up to 2002, implementing 15 rural water supply and sanitation projects in Oromiya, Tigrai, Amhara, and SNNPR Regional States. In all its RWS projects, WaterAid makes sure that a water committee composed of three men and four women is established at village level. Moreover, a training about repair and maintenance of schemes is given to thee female and

community managed supply systems. It is here, that the role of CBOs is sought to settle conflicts on water use. If such conflicts are not handled carefully, the sustainable management of the RWSSs is threatened.

In southern parts of Ethiopia, such community based-organizations like "Edir" "Leka" or "Mahaber" could be used to establish linkage with water users. The "Edirs", since they are so influential in most matters, can put sanctions or pressures against members who are not ruled by their decisions. "Edirs" could intervene when conflicts related to improved water supply and sanitation services arise and when the case is beyond the capacity of the water committees. "Edirs" could handle the cases of embezzling water committee members and non-payers of water fees.

Leadership/management capacity building and management procedure of water committees

In all new water user organizations, there is an acute training need in simple management practices such as book keeping, budget planning ,public relation skills, and legal issues. Such experiences are better learnt from other similar water user associations through on the job training.[11]

The task of leadership in water supply entails also holding regular users assembly, conducting regular meetings, managing repair/maintenance

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two male members of each user group.(GTZ Water and Waste Sector In English -Speaking Sub Saharan Africa, Part 5,9)

[11] During the process of establishment of Uchira Water user Association in Tanzania, key steering water committee members were sent to four different water user associations to share their experience. The accountant was send to Ismany and Mikumi Water users associations for sharing and learning on the job accounting practice used in these associations.

The positive effect was that people suddenly understood that what they are trying to do was already successfully done by others .This seems to fortify their spirits. It was a suggestion of such committee

activities, facilitating election when the terms of services terminate and other water scheme related activities.

The water committee or the management structure, which is responsible to manage the schemes on behalf of the community, needs also its own by-laws with which it is ruled by. A by-law[12] can be developed by the NDGO and be endorsed by the community. Moreover, the by- law should clearly state the roles and responsibilities of the WCs and specify the relationship of the NDGO and the WCs as managers of the water supply systems.

Besides the development of a by-law, the leadership or management skill of the WCs should be given due consideration as one way of community capacity building.

Technology

In order for rural water supply to be sustainable, appropriate technology must be used.

The fact that the hand-pump types are Village Level Operation and Maintenance (VLOM) is invariably a point of no debate. Where the technology deployed is remote from the users' capacity to maintain, operate or pay for it ,prospects of sustainability of services are equally remote.

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members to create a kind of umbrella structure of all autonomous Tanzanian water user organization as a forum of exchange of experience and for mutual support.

[12] In Tanzania, the procedures which leads autonomous water users associations consists of three major steps: 1.Elaborate and draft the regulatory document(by-law)for establishment of the association
2.Arrange transfer of ownership to water user entity
3. Support WCs during registration process

Various brands have their own strength and Achilles' heels. Therefore, it is experience with a number of them that can ultimately lead to a wise choice of a better type.

Marlin Falkenmark, regarding the appropriate technology for rural water supply schemes remarked as "Over the last 15 years village level operation and maintenance type hand pumps has become a key consideration for hand pump design. According to the World Bank, VLOM type pumps can be repaired and maintained easily by village level caretakers requiring minimal skills and few tools. Spare parts are easily available in markets and are cost effective."

Institutional support

One way of enhancing the sustainability of Rural Water Supply Schemes (RWSSs) is the provision of institutional support to their management bodies.

Problems that are beyond the community level need to be addressed by supporting agencies like regional and local governments and relevant government bureaus and banks. Studies indicate that lack of backing of local community management body is an important reason for the failure of improved water supply schemes. (European Commisson,1998,42)
Legal recognition of the user groups, as one institutional support, assures the realization of their full capacity as self-help associations. It also to facilitates resource recovery of the system through direct and legal partnership with external support agencies and acquisition of loan whenever need arises. Sustainable community management requires

partnerships allowing scope for shared responsibilities among community level water management bodies, local government units and government departments for water development.

CHAPTER 3. The Study Area

3.1 Physical and Demographic Characteristics

3.1.1 Physical Environment

Location

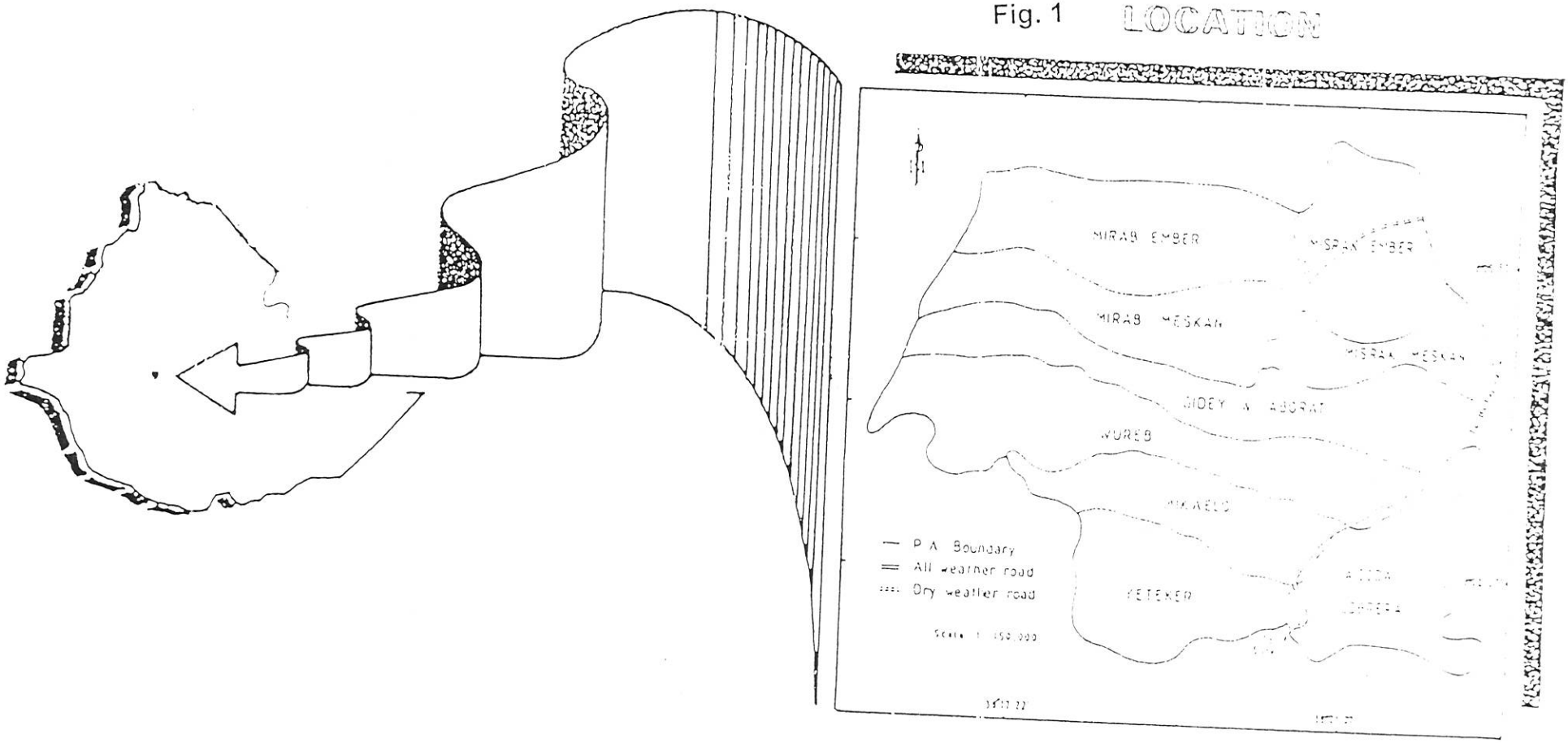
The study area is located in central-southern part of Ethiopia. It is found in Southern Nations, Nationalities and Peoples Regional State; Guragie Zone; Meskanena Mareko Woreda. It is in close proximity to and about 12kms from Butajira town in South-west direction. It is composed of nine peasant associations, namely Gidayna Aborat, Wourib, Mikaelo, Yeteker, Mirab Embore, Misrak Miskan, Mirab Miskan, Agode Lobrera and lies between $8^0$01'00" and $8^0$07 '30" latitude North and $35^0$15'30' and $38^0$23' 00" longitude East having an area of about 112km^2. It is the target area of Rural Community Water Development Organization (COWDO) which has been active in water development activity in the area for the last seven years.

The study area is accessible via Almghena town on 145 km all weather road or via Ziway on 190 km all weather road to the town of Butajira.

Topography

The western part of the study area is bounded by the western rift escapement of high land volcanic area associated with major faults trending N-N-E (North-North-East). It has elevations ranging from 2200-3100 meters. The eastern part is bounded by volcanic complex of craters, cones, vents and other volcanic remnants trending N-N-E. The major part

Fig. 1 LOCATION



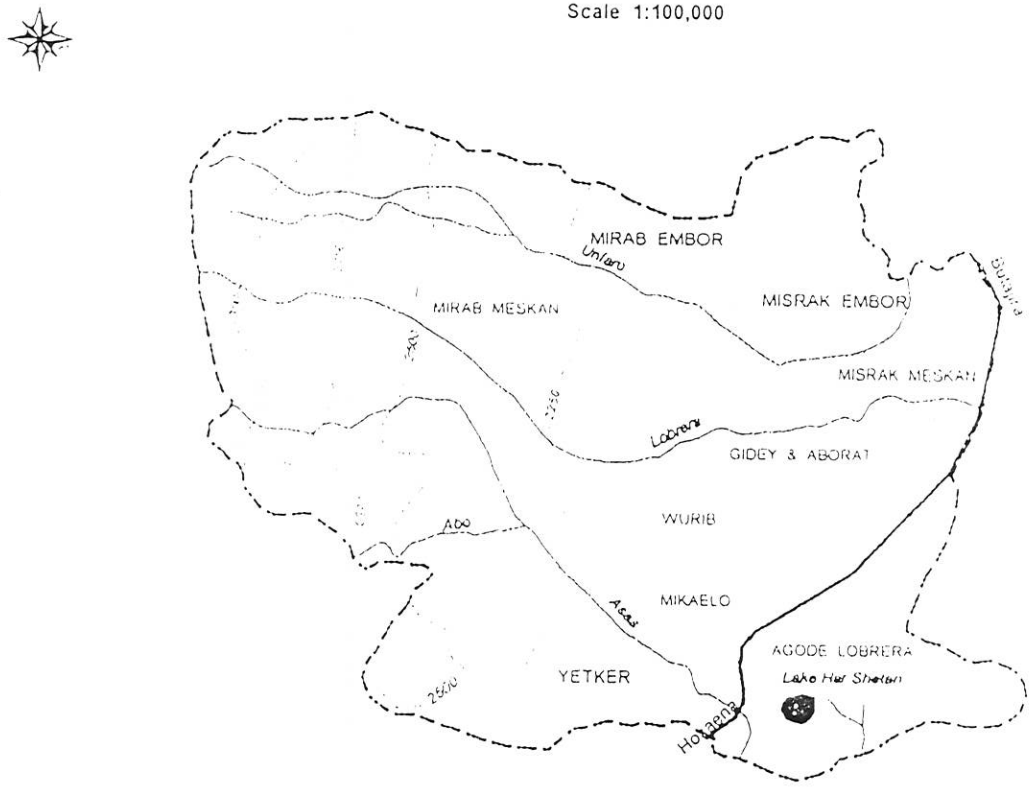
Source: COWDO

38 17' 22

38 21' 07"

Fig. 2 TOPOGRAPHIC MAP OF THE STUDY AREA

Scale 1:100,000



LEGEND

All weather road

Stream

Lake

Contour

Peasant Association boundary

8 05' 52"

8 02' 37"

38 17' 22"

38 21' 07"

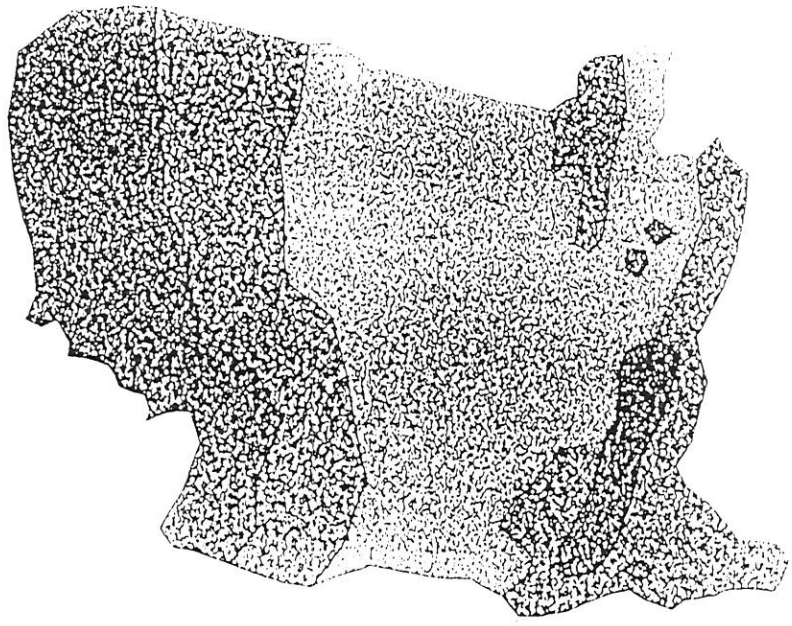
38 24' 52"

Source: COWDO

38 21' 07"

Fig. 3 HYDROGEOLOGICAL MAP OF THE STUDY AREA

Scale 1:100,000



LEGEND

High productive

Medium productive

Low productive

Hydrogeological contact

38 17' 22"

38 21' 07"

Source: COWDO

of the study area has relatively low, undulating and rolling topography having an average elevation of 2650m. a.s.l. This low-lying area is the down thrown part of major fault system (floor of the escarpment).

Climate and vegetation

According to Makin, Metal (1975), the southern part of rift valley in Ethiopia may be classified into three eco-climatic zones. They are humid to dry sub-humid lands, dry sub-humid lands and semi-dry lands. The study area and its vicinity can be classified as humid to dry sub-humid lands. This means that the annual rainfall ranges from 1000-1100 mm. and the mean seasonal temperature ranges from 15^0 to 20^0c.

The main vegetation type covering the study area are tropical wood land and thorn bush, eucalyptus trees, scattered shrubs and low acacia. Grasses are mainly seen covering the area in the vicinity of the escarpment.

Drainage

The study area lies in the lakes basin having the western escarpment of the rift valley, which is trending N-N-E. It is the major surface watershed. The drainage patterns are generally parallel and angular to sub-angular and which are flowing to west-east direction having 3^{rd} stream order. All the streams flow from the gully traversed face of the western escarpment as the area is the down-thrown part of major fault system (floor of the escarpment).

About 90% of the study area is flat flood plain while the remaining about 10% is part of the Guragie mountains.

The gully traversed face of the slope of the Guragie mountains or the western escarpment of the great rift valley is the source of all streams of study area. All rivers begin and end their journey in the rift valley.

Hydrogeology

The Hydrogeology of the study area is classified into three aquifer systems with their relative productivity.

a. The high productive: It consists of intergranular aquifer from ignimbrite and/or tuff and is located in the western part of the target area along all the highland rift escarpment. There is high fracturing and faulting density which gives a high permeability and productivity. Several springs emerge locally along major fault line at the foot of the escarpment and its vicinity could be locally developed by implementation of hand dug wells.

b. The medium productive: It consists of fissured aquifer from ignimbrite and is located in the central and lowest part of the target area. Shallow ground water ranges from depth of 6 to 30m depending on topography. It has an extensive and continuous ground water flow system with a porosity between the individual grains.

c. Insignificant productive: In this area, aquifers were registered in the highland areas. There is no permeability of the western highland rift escarpment and the recent basalt and/or scoria domes. In addition to this, the topographic nature does not favor for ground water development. The

highland escarpment zone, along the fractures and faults are the main recharge areas. The foot of the escarpment and the central plains are low land areas. The recharge system, in the central low land area is mainly accomplished by base flow from streams, fractured and faulted zone of the highland escarpment and from direct perception.

Ground water movement of the study area is generally supposed to be towards the east. Between the months of June and August, ground water table at the low and central part of the area rises up and ranges from some centimeters to one meter[13].

3.1.2 Demographic Background

Population and Its Growth Trend

The project area consists of nine peasant associations (kebeles) covering an area of about 112 km^2.

The likelihood of the population of the nine peasant associations is based on agricultural activities. According to the 1994 population and housing census results, the population size of the study area has grown from 16,000 in 1984 to about 33,000 in 1994, which is almost double that of 1984.

Women account for about 50% of the total population. Moreover, 50% of the population is aged 19 years old or below and more than 20% is aged 29 years or below (CSA Report 1994). This age structure coupled with the early age marriage implies a rapidly increasing population.

Table 1. Population distribution and growth trend of the study area

SN		Peasant Association	1984	1994		
			Total	Male	Female	Total
1.		Misrk Embor	2,183	1,688	1,731	3,419
2.		Mirab Embor	1,867	1,561	1,593	3,154
3.		Mirab Meskan	1,954	1,339	1,264	2,603
4.		Misrak Meskan	2,270	1,524	1,522	3,046
5.		Gidayina Aborat	1,562	2,776	2,760	5,536
6.		Wurib	1,510	2,277	2,241	4,518
7.		Yeteker	1,774	2,001	2,003	4,004
8.		Mikaelo	1,053	1,822	1,759	3,581
9.		Agodie Loberera	1,960	1,444	1,442	2,886
		Total	**16,133**	**16,452**	**16,315**	**32,747**
		Population Density	144/km^2			291/km^2

Source: COWDO's archive

[13]Sebsibe Alemneh,Hydrogeology of Meskanena Mareko Woreda (1996,p14)

CHAPTER 4. COWDO's Water Delivery System, Coverage ,Constraints and Sample Population Characteristics

4.1 The Coverage

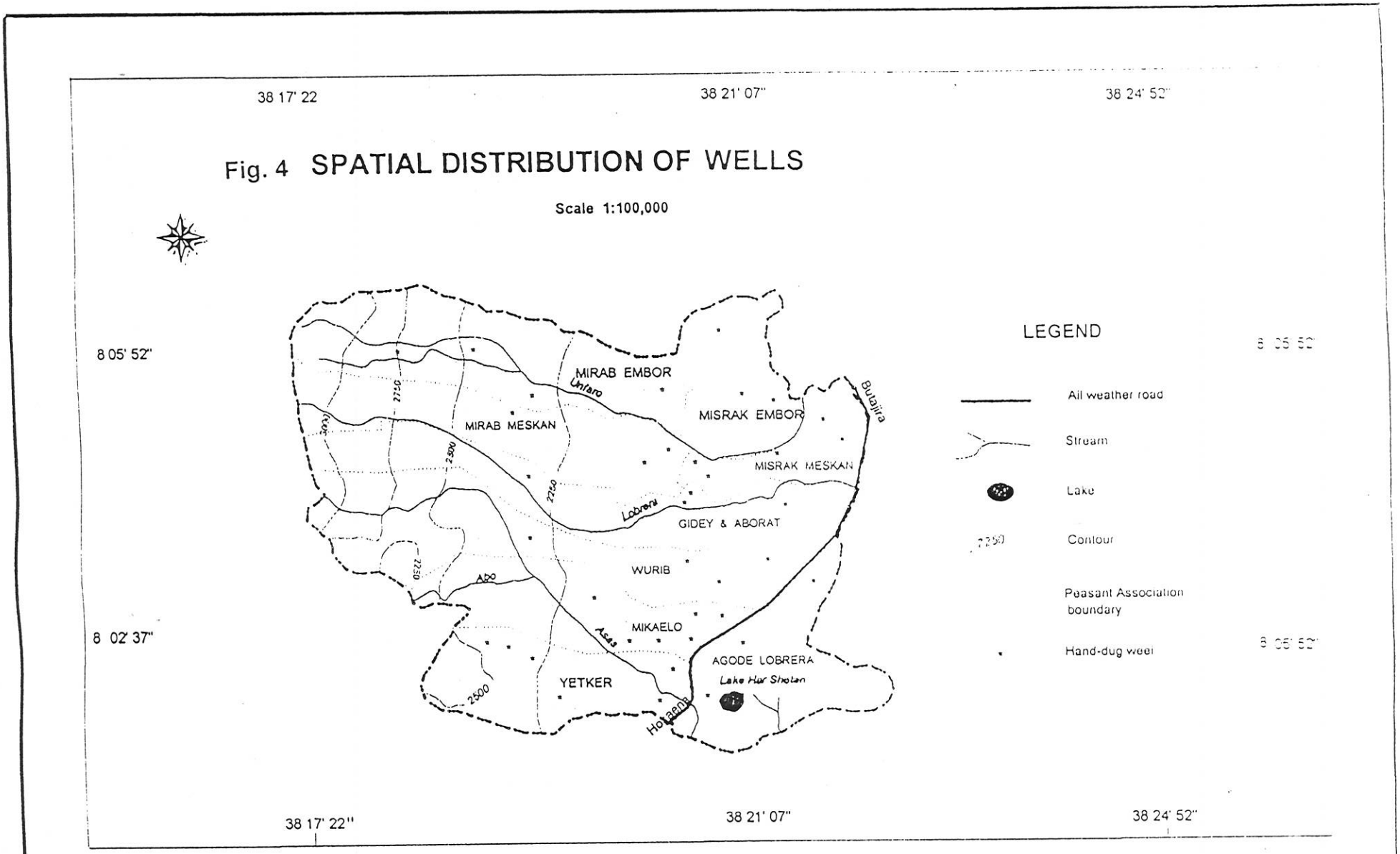
COWDO, till January 2003, in its five phases of water and sanitation projects, has constructed 37 hand-dug wells equipped with hand pumps in the nine peasant associations under consideration. All the phases of the project were funded by GAA (German Agro Action) ; Eropean NGO. With this amount of developed water supply schemes in the area, out of the estimated population of more than of 33,000, it was possible only to address the safe water supply needs of only about 11,455 people. Out of the total households of 6546, only 2291 households have benefited from the development endeavor.

Table 2. PA level distribution of served HHDs

S.N	Peasant Association	Total no of HHDs	HHDS served	HHDs served (%)
1.	Mirab Embore	686	240	35
2.	Misrak Embore	796	242	30.4
3.	Mirab Meskan	564	247	43.8
4.	Misrak Meskan	650	253	39
5.	Gideyna aborat	945	244	25.6
6.	Wurib	732	285	38.9
7.	Mikaelo	839	277	33
8.	Yeteker	694	245	35.3
9.	Agode	640	250	39.06
Total		**6546**	**2291**	**34.99**

Source: COWDO's archives

From the above table we can see that only about 35% of the population of the nine peasant association is being served by safe water supply.



Source: COWDO

Table 3. PA level distribution of wells

S.N	Peasant Association	No. of Wells
1.	Mirab Embore	4
2.	Misrak Embore	3
3.	Mirab Meskan	3
4.	Misrak Meskan	5
5.	Gideyna aborat	4
6.	Wurib	4
7.	Mikaelo	5
8.	Yeteker	6
9.	Agode	3
	Total	**37**

Source: COWDO's archives

In the last about seven years, 37 hand dug wells have been constructed in all nine peasant associations. Form the distribution map (fig 5), it can be seen that most

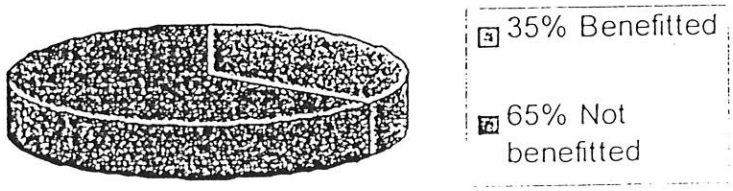


Fig. 5 Coverage of Water Supply

of the constructed hand-dug wells are concentrated at the central low land area, which, hydrogeologically Is classified as medium productive zone .

According to COWDO's staff, the hydrogeologists with whom I had a discussion, due to low feasibility of developing the water resources and its special topographic characteristics, the western highlands areas, i.e. part of the western escarpment of the Great East African Rift Valley System; are devoid of hand dug wells.

Table 4 presents the absolute geographic positions taken by GPS (Global Positioning System) instrument, depth, yield and status of the developed hand dug wells and bore holes.

Table 4. Geographic position, depth and yield of water points

Peasant association and well No.	Position latitude	Position longitude	Depth/water table in meters	Yield (lit/sec)	Status	Year of completion
Mirab Embor						
I/2-well no. 2	08° 06' 45"	38° 18' 19"	16.3	0.3	Operational	1995
I/3-well no. 3	08° 08' 00"	38° 17' 19"	28	0.4	Operational	1996
Misrak Embor						
II/1-well no. 3	08° 05' 90"	38° 21' 72"	29	0.4	Operational	1996
II/2-well no. 4	08° 04' 30"	38° 18' 00"	17	0.3	Operational	1997
II/3-well no. 5	08° 05' 30"	38° 00' 50"	27.8	0.4	Operational	1998
II/6-well no. 6	?	?	28	0.5	Operational	1999
II/7-well no. 7	?	?	16.8	0.4	Operational	2000
II/8-well no. 8	?	?	28.7	0.4	Operational	2001
II/9-well no. 9	?	?	16.3	0.3	Operational	2002
Mirb Meskan						
III/1-well no. 1	08° 05' 46"	38° 18' 86"	27	0.4	Operational	1996
III/2-well no. 2	08° 05' 65"	38° 18' 30"	27	0.4	Operational	1997
III/3-well no. 3	08° 04' 00"	38° 17' 00"	20	0.3	Operational	1998
III/4-well no. 4	?	?	28	0.4	Operational	1999
III/5-well no. 5	?	?	32.4	0.5	Operational	2000
III/6-well no. 6	?	?	15	0.2	Operational	2001
III/7-well no. 7	?	?	17.4	0.3	New	2002
III/8-well no. 8	?	?	18.4	0.3	New	2003
Misrak Meskan						
IV/3-well no. 3	08° 05' 00"	38° 21' 20"	17	0.3	Operational	1998
Gidey and Aborat						
V/1-well no. 1	08° 04' 64"	38° 20' 68"	14/12	0.3	Operational	1997
V/2-well no. 2	08° 04' 85"	38° 19' 66"	14	0.3	Operational	1998
V/3-well no. 3	08° 04' 50"	38° 19' 50"	17	0.3	Operational	1999
V/4-well no. 4	08° 04' 30"	38° 18 00"	19	0.3	Operational	2000
V/5-well no. 5	?	?	18	0.3	Operational	2001
Wuib						
VI/1-well no. 1	08° 03' 79"	38° 20' 52"	17	?	Operational	1998
Vi/2-well no. 2	08° 03' 98"	38° 20' 10"	16.3	0.5	Operational	1999
Vi/3-well no. 3	08° 04' 74"	38° 18' 67"	17	0.2	Operational	2000
VI/4-well no. 4	08° 02' 25"	38° 20' 00"	17	0.2	Operational	2001
VI/5-well no. 5	?	?	25	0.4	Operational	2002
Mikaelo						
VII/3-well no. 3	08° 03' 38"	38° 19' 97"	10/08	0.5	Operational	1998
VII/5-well no.5	08° 03' 05"	38° 19' 00"	15	?	Operational	1999
VII/6-well no. 6	08° 02' 50"	38° 18' 35"	14.50	?	Operational	2000
VII/7-well no.7	?	?	87	0.6	Operational	2001
Yeteker						
VIII/2-well no. 2	08° 03' 37"	38° 18' 45"	22	0.5	Operational	1997
VIII/3-well no. 3	08° 01' 50"	38° 18' 30"	18.60	?	Operational	1998
VIII/4-well no. 4	08° 01' 55"	38° 18' 15"	29.80	0.5	Operational	1999
VIII/5-well no. 5	08° 01' 57"	38° 18' 00"	13	?	Operational	2000
VIII/6-well no. 6	08° 02' 10"	38° 17' 50"	19.80	0.4	Operational	2001
Agode Lobrera						
IX/1-well no. 1	08° 02' 92"	38° 20' 36"	6.80	0.1	Operational	1997
IX/2-well no. 2	08° 02' 46"	38° 20' 53"	66	0.3	Operational	1998
IX/3-well no. 3	08° 03' 00"	38° 21' 45"	?	?	New	2003

Source: COWDOs archives. The question marks indicate the unavailability of respective primary data yield/sec. and depth.

4.2 Intervention Modalities

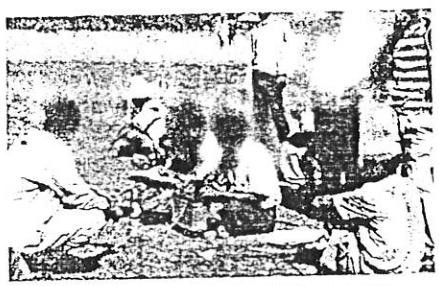
Rural Community Water Development Organization (COWDO) has five major intervention approaches in its development endeavor in a given water and sanitation project.

These five major activities are:

1. Construction of hand-dug wells/boreholes fitted with hand pumps and conservation and pollution control issues.
2. Training of Community Hand Pump Technicians (COTECHs)
3. Construction of pit-latrines
4. Provision of education on personal hygiene and environmental sanitation
5. Capacity building (Software aspects)

4.2.1 Groundwater development by hand dug well/borehole and conservation and pollution control issues

a. Ground water development by hand dug well/borehole



Before the commencement of water well development, well fields and site selection together with the communities aided by hydro geophysical method is a prerequisite.

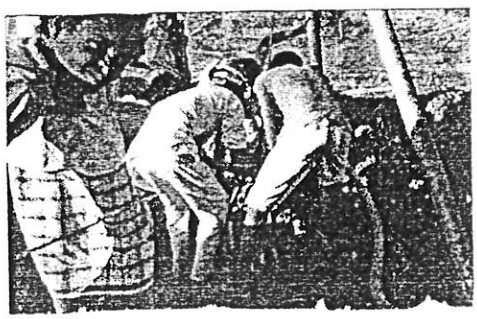
Before the conception of ground water development, COWDO makes sure that a group of beneficiaries are identified and organized under their respective WCs. Then COWDO conducts a feasibility study with the application of remote sensing, aquifer evaluation and well field selection aided by hydrogeophysical technique.

The specific site selection is conducted together with the communities. A site that is relatively easily accessible should be selected. The beneficiaries are responsible to provide a well field with a size ranging from $10m^2$-$16m^2$.

This provision of piece of land is one form of contribution from the beneficiaries.

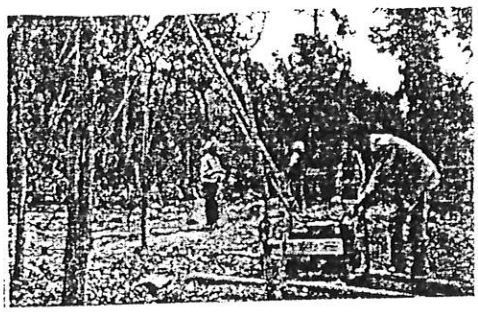
After the selection of well sites aided by hydrogeophysical technique, preparation of design works for either hand-dug wells or boreholes is done (Annex 5).

Construction of a hand-dug well has a number of component activities that include transportation of all the necessary construction materials to the project site, well digging, production of concrete rings, dewatering, the production of concrete slab and installation of hand pumps.



For reliable yield for the aquifer, hand dug well digging continues simultaneously aided by electrical dewatering (pumping water out of the well) pump.

A well having a diameter of 1.2 meter is dug until the predetermined ground water table is struck. A hydrogeophysical technique helps to know at what depth the ground water table is found.



This well digging in done by hired well-diggers .The cost of well digging up to the water table is covered by the beneficiaries.

Both blind and perforated concrete rings having a diameter of one meter are produced. These concrete rings are put in the well together with the appropriate fillings in space between the wall of the well and the concrete rings.

All the water that accumulates in the well during the process of well digging is pumped out of the well with the help of an electric pump and a generator.

The well is topped with a concrete slab that hold the pump in place. Normally, two concrete slabs having different width are produced. The slab with smaller width is put up on the larger one and helps to hold the pump.

Finally the hand pump with all its components that stand from bottom to the top of the well is installed. The type of hand pumps being installed and used by COWDO are Village Level Operation and Maintenance (VLOAM) hand pumps. The common VLOM type hand pump installed in the study area is Indian Mark II. The other less frequent type is called Afridev; the type that is mostly installed on deep bore holes. The pumping device is found few centimeters from the floor of the well. The head with the handle is what we find above the surface ground.

The average cost of all items and activities in contracting a hand dug well (from identification of well site to the chemical analysis of sample from a well) is about birr 26,000.

Bore holes are drilled by drilling machines. Boreholes are drilled only when the ground water table or the aquifer is found at greater depth (up to a depth of 80m.)

Whenever a feasibility study aided by a hydrogeohpysical technique indicates that ground water development is not feasible, COWDO secures a fund and rents a drilling rig. Follow up of the drilling process continues and when the acquifer system is reached, the hand pump, with all its components is installed.

Before handing over the developed hand-dug wells to their respective user groups, COWDO sends water samples to the legally recognized government research institute (Luis Pasteur Research Institute) for chemical analysis and thereby determination of potability.

b. Conservation and pollution control issues

The other issues that are taken care of by COWDO are the issues of conservation and pollution control. According to the FGD with the senior hydrogeologist and head of the organization, it is understood that COWDO conducts seasonal ground water fluctuation survey. The fluctuation of the ground water level on average is 0.5m/year during dry seasons. According to the studies made by COWDO, in extreme cases, such as during severe drought periods, the ground water level goes down up to 1.5m.

Ground water management has been also set that the available ground water resource would not be over utilized by the communities beyond the potential yield of a HDW. Studies made on the average safe yield[14] of HDWs in the study area suggest that the of number of households that can

benefit from a HDW without depleting the water resource ranges from 35-50 HHDs; (35-50 HHDs/scheme).

Hence, COWDO has set the above water resource management in place. However, the study area is endowed which high potential/storage of ground water that can still be exploited by borehole system (machine drilled well where the aquifer or the water holding section of the ground can be penetrated deep for more yield) and meet the needs of 80-100 HDDs[15] per scheme.

Regarding population control, there are preventive measures that are being taken by the community and COWDO.

During and after hand over of systems, the community are informed that cattle should be kept out side about a 50 meter diameter distance from the schemes so that the waste from them will not pollute water from the wells. Moreover, the top ½ meter part of the well is cement plugged to prevent seepage from the area directly top of and around the well. Moreover, the ground water movement direction is considered in locating pilot pit latrines so as to minimize the risk of pollution of well waters.

The study area is not located in the vicinity of industries and is not expected to be exposed to toxic industrial wastes. Moreover, in order not to create a favorable condition for malaria, (as a breading place for the mosquitoes), the spill-over from the schemes is drained either to the constructed soak pit or to the backyards of nearby households to cultivate vegetables and gardening.

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[14] MSY (Minimum Supply Yield) or safe yield of a HDW in the study area is on average 4.5m^3 per day.
[15] MSY (Minimum Supply Yield or safe yield) of a borehole on average is 7-10m^3 per day .

4.2.2 Training of community Technicians of Hand Pumps (COTECHs)

The other intervention of COWDO is training of members of the community in repair, maintenance and installation of hand pumps. So far in its five project phases, it has trained 32 Community Technicians of hand pumps. This trainees are given a three months theoretical and practical training COWDO has developed training materials and a curriculum for the training(see annex 2).

Community Technicians of Hand Pumps (COTECHs) are given both theoretical and on job training.

These technicians or community level care-takes of hand pumps are assumed to repair and maintain promptly broken hand pumps at modest payments. The COTECHs are equipped with the necessary toolkit. This intervention is one building block in achieving sustainability.

According to COWDO staff, he curriculum is revised and up dated regularly to increase the efficiency of the training given. (refer to Annex 3.)

4.2.3 Construction of pit latrines

For the construction of pit-latrines, a suitable site is carefully selected (so that hand dug wells would not be polluted due to an erroneous location of the latrines) and a design would be prepared.

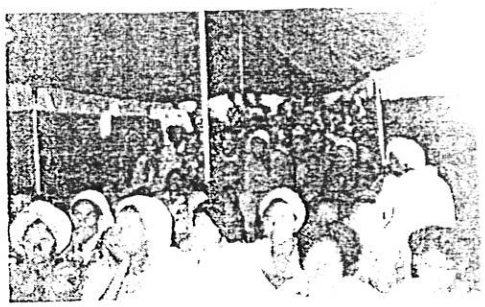
The pit latrine is constructed out of local material, which the beneficiaries are expected to contribute. COWDO largely focuses on construction of pilot pit latrines. It is up to the individual households to see, learn and be initiated to construct their own pit-latrines. COWDO has so far constructed 18 pilot pit-latrines together with selected households.

4.2.4 Provision of education on water and sanitation

The community is provided with education on the advantage of safe drinking water supply, personal hygiene and environmental sanitation. For this purpose, COWDO has developed a curriculum. (refer to annex 4)

Communities are provided with basic education on the benefits of personal hygiene and environmental sanitation.

Extension agents of COWDO have the responsibility of extending the education to the beneficiaries. This education on personal hygiene and environmental sanitation is supported by posters.



The education has been given for the last seven years in this specific project area. From COWDO's records, it has been found out that about 20 sessions are held in a given project period to acquaint more than 1800 adult beneficiaries on average with rudiments of personal hygiene and environmental sanitation.

4.2.5 Capacity building activities (soft ware aspects)

The following capacity building activities are accomplished alongside the above discussed project activities.

These activities are:

a) Establishment of WCs (Water Committees) and provision of management training,
b) Preparation of by-laws for appropriate management of systems
c) Introduction of cost-sharing and cost-recovery concept
D) Setting appropriate tariff
f) Provision of support for legal recognition of WCs.

After the registration of the beneficiaries, a water committee (WC) is established. This water committee is established to facilitate proper management of the developed water supply systems. A water committee of a given group of beneficiaries will have five to seven members with specific duties and responsibilities. The water committee is accountable to the general assembly of the community.

On a participatory workshop, the community unanimously fixing the water tariff (a flat rate charge of birr 1/month/household)

COWDO prepares a by-law by which the WCs are governed for sustainable use of the water supply systems. (refer to Annex 1) As one component of measures for sustainability of rural water supply

systems, it is imperative to enable the community to be able to share the cost of construction of water supply systems and through time recover their costs.

The cost sharing has to do with covering at least 10% of the construction of a hand-dug well fitted with hand pump, while the cost recovery issue has to do with making the beneficiaries pay a water fee per month per household.

COWDO organizes meetings with representatives of the beneficiaries to set a suitable water tariff.

COTECHs are assumed to repair and maintain a broken hand-pump promptly. These technicians are selected by and trained from the community. Since the COTECHs themselves are beneficiaries of the developed water supply schemes, they are expected to repair and maintain a broken pump at modest prices. None the less, a minimum repair payment rate should be established.

Hence, with consulations and discussions with both the COTECHs and the beneficiaries, COWDO establishes a payment rate for the technicians.

For best performance of WCs, i.e. solving problem related with water use and savings of a given user group, their legal recognition is given due consideration by COWDO. Hence COWDO provides support for the legal recognition of WCs.

4.3. Characteristics of the Sample population and Their Water Use

From the socio-economic data of the sampled households, the average size of a household is found to be 5.7 people. It has been found out that the minimum size of household size is two while the maximum size is 18 people. The average age of the head of the sampled households is 49. From the sampled households, 18% of households are headed by Women.

As can be seen in Table 5,92% of the respondents are married while 6.6% are widowed. The remaining 0.8% are single.

Table 5. Percentage distribution of marital status

S.N	Marital Status	Frequency	Percent
1	Married	111	92.5
2	Single	1	0.8
3	Widowed	8	6.6
Total		**120**	**100**

Regarding the households' income, all households are farming households and earn their livelihood from agricultural activities. The widely cultivated crop is Maize accounting to 46.95% of the total crop share. *Teff* is the second widely cultivated crop accounting to 36.93%, while the third widely cultivated crop, sorghum ,has a share of 11%. Other crops have a share of the remaining 5.09%. (Refer to Table 6)

Table 6. Percentage distribution of crop products

S.N	Agricultural product	Crop share (%)	Crop share (Quintals)
1	Teff	36.93	188
2	Maize	46.95	239
3	Wheat	3.92	250
4	Sorghum	11.00	56
5	Other	1.17	6
Total		**100**	**739**

When we see the percentage distribution of age, as can be seen in Table 7 below, the age group with the highest percentage (43.3%),is that from 26-35

years of age. The second and the third largest age groups are age group of from 46-55 and age group from 36-45 respectively. Age group from 46-55 accounts to 21.6% while age group from 36-45 has a share of 20%. Both age groups from 16-25 and age greater than 66 years account for 5% each.

Table 7. Percentage distribution of Age

S.N	Age class	Frequency	Percentage
1.	16-25	5	4.16
2.	26-35	52	43.3
3.	36-45	24	20
4	46-55	26	21.6
5.	56-65	8	6.6
6	> 66	5	4.16
Total		**120**	**100**

When we examine the percentage distribution of containers being used, as depicted in table 8 bellow, we see that 75.9% of the respondents use ***"Insra"*** (Clay-made container with an average holding capacity of 10-15 litters), while the other 18.3% use Jerrycans of various sizes. The remaining 5.8% use both.

Table 8. Percentage distribution of containers being used.

SN	Type of container	Frequency	Percent
1	*Insira*	91	75.8
2.	Jerrycan	22	18.3
3.	Both *Insra* and Jerrycan	7	5.8
Total		**120**	**100**

Invariably all respondents indicated that those who fetch water from either the previous unsafe water points or the developed schemes are women and girls. The present water points give service at two periods; the first period is from 7AM to 10AM, while the second period is from 4 PM to 6 PM in the afternoon.

The consumption pattern of the respondents is depicted in Table 9 bellow. The table shows that 68.3% (the largest percentage) of the respondents consume 3-4 *Insira* of water per day per household. Only 10% of the respondents consume

more than four *Insira* of water per day. Seventeen percent of the respondents consume 2-3 *Insira* of water per day while the remaining 7.5% use 1-2 *Insira* of water per day per household.

Table 9. Percentage distribution of water consumption per day per households (*Insira* of water)

SN	Daily water Consumption (*Insira* of water)	Frequency	Percent
1	< 1 *Insira*	-	-
2	1-2 *Insira*	9	7.5
3.	2-3 *Insira*	20	16.66
4.	3-4 *Insira*	82	68.3
5	> 4	10	8.3
Total		**120**	**100**

4.4 .COWDO's Constraints

What could be most urgent and an issue of that needs due consideration is the financial constraint that has negative chain effect on the performance of the implementing NGO. Though funding organizations are remarkably cooperative, what can be perceived from the assessment of activities of COWDO is that the NGDO in focus could have addressed the safe water supply need of most parts of the study area by now if its financial status were stronger.

The other constraint is the fact that COWDO does not own a drilling rig. In parts of the study area where ground water development by hand dug well is not feasible, COWDO has to rent a drilling rig, which is very expensive, to develop the water resource. The high cost of the rent hinders COWDO from developing water at the above mentioned less productive parts of the study area. Hence, since COWDO does not have its own drilling rig and the rent of such a machine is very expensive, the postponing of water development in the medium and low productive areas would have a negative impact on the rate of safe water supply coverage.

The other issue that often arises, is the late fund release from the side of the funding international NGOs. Delay in fund release had caused several problems that range from lack of commitment of employees to pending of project activities/projects.

CHAPTER 5. Sustainable Community Management of Schemes and COWDO's Activities.

Empirical Findings and Analysis

Analysis of Checklist of Sustainability

In this chapter, checklist of sustainability, which are grouped in four major themes are analyzed. The four major themes are the bases for water supply provision, community participation and water supply and management, local institutions and water supply management, and technology and institutional support

5.1 The Bases for Water Supply Provision

The long distance people travel to fetch water, from traditional water points and the consequent suffering from recurrent water-borne diseases are indications of the magnitude of the problem; and imply inevitable search for means of alleviating the problem.

Table 10. Percentage distribution of the average distance/time the respondents used to travel to traditional water points.

S.N	Average	Frequency	Percent
1	1/2 hr.	37	30.83
2	1 hr.	49	40.83
3	11/2 hr.	-	-
4	2 hr.	18	15
5	> 2hr.	16	13.3
Total		120	100

Table 10 above shows that 40.83% of the respondents used to travel a 1 hr. walk to fetch unsafe water from the traditional water supply points, while 30.83% of the

respondents used to travel a 1/2 hr. walk on average. The other 15% walk for 2hrs, while the remaining 13.3% used to walk for more than 2 hrs. to water points.

In identifying user groups, a given implementing agent has to recognize the demand-driven approach as a better approach regarding Rural Water Supply Schemes. This, as indicated in previous pages, facilitates sustainability of the developed systems.

Demand for the development of clean water supply from the user groups is so crucial in a sense that water supply schemes developed following the demand of a group of people are assumed to generate sense of ownership of the beneficiaries .It also facilitates sustainable use of the schemes. The demand from the community should be expressed through applying for water development. Hence, in the case of COWDO, table 10 shows that 98.33% of the respondents indicated that they have applied for the development of the water supply schemes. The focus group discussion held with COWDO staff also revealed that representatives of the community had contacted COWDO's project office to discuss their problems and the support they needed. Application is the most important indicator of demand and that the water supply provision is demand -driven.

Table 11. Percentage distribution of initiation for development of the water supply schemes.

S.N	Initiation	Frequency	Percent
1	We have applied for development of schemes	118	98.33
2	It was COWDOs initiation	1	0.83
3	I do not know	1	0.83
	Total	120	100

As indicated above, the fact that most of the people used to travel longer distance indicates that the area was suffering from lack of a nearby safe water

supply. The developed water points, on the other hand, are located at a central location for all user groups. The farthest beneficiary spends not more than 15 minutes to reach a developed water point.

After the development of the improved water supply point in their vicinity, the response of the beneficiaries as to whether they seldom turn to other sources due to various reasons, (shortage of water from the systems or, as in few instances, drying-up of wells), all the respondents indicated that they depend wholly on the developed water supply systems.

In this regard ,on one of the focus group discussions with Edir leaders, one Edir Chairman remarked as ***"How can we turn to polluted water points when we have our "Ambo water" at our village for us. Turning to the river water is just like turning to one's feaces."*** Such remarks are largely made as a result of improvement in awareness about health benefits of safe water .It is in view of such behavioral change that education on personal hygiene and environmental sanitation should be given to a community together with water supply facilities. Moreover, community awareness raising and education enhances the sustainability of a given rural water supply scheme.

Regarding the target group in focus, 90.08% of the respondents have participated in at least one session of awareness raising education provided by COWDO's extension agents. The remaining 8.3% have never attended such a session. This is an indication of the encouraging performance of the concerned NGO in this area of intervention. (See table 12)

Table 12. Percentage distribution of participation on awareness raising session

S.N.	Participation	Frequency	Percent
1	Participated	108	90.08
2.	Not participated		
	• due to household and farming activities	8	6.6
	• due to social responsibilities (religious)	2	1.66
	• due to old age, sickness	2	1.66
Total		120	100

Those who have never participated include the very old, sick and those who are not able to participate due to religious responsibilities. Those household heads with high mobility to and from rural/urban areas and those with too much household and farming responsibilities do not participate in such sessions and account for 6.6%.

All respondents who have attended the education session have indicated that they have in one way or another benefited from the provided education

Table 13. Percentage distribution of respondents most felt positive impact of the provision of education

SN	Most felt positive impact	Frequency	Percent
1	Family enjoy better health	62	51.6
2.	Lower medical expenses	12	10
3.	Increased involvement in other income generating activities	34	28.3
Total		108	90

As shown in table 13, a large proportion of the respondents (51.6%), indicated that the positive impact of provision of the education on personal hygiene and environmental sanitation is that their family presently enjoys better health status. Twenty eight percent of the respondents indicated that they have been able to involve in other income generating activities as a result of the impact of the education provided. The remaining 12% indicated that their medical cost is now reduced due to the health and hygiene education.

Alongside the education about personal hygiene and environmental sanitation, COWDO builds pilot pit-latrines for selected households. So far it has constructed 18 pilot pit-latrines with selected households.

When we examine the other important component of sustainability of RWSSs, resource survey, the discussion totally focuses on the responses of COWDO's

staff. From the focus group discussion with COWDO staff, it was understood that before the conception of ground water development, COWDO makes sure that a group of beneficiaries are identified and organized under their respective WCs. Then, COWDO conducts a feasibility study with the application of remote sensing, aquifer evaluation and well field selection aided by hydrogeophysical technique. The visits made around to see some water points and the remarks of the beneficiaries indicate that the long years experience of the hydrogeologists has made the feasibility study and thereby identification of best locations easy.

The specific site selection is conducted together with the communities. Beside the feasibility study, sites that are relatively easily accessible to all members of the target group have been selected so far. Hence, the issues of resource survey is has been given due consideration by COWDO.

As indicated in Chapter 3,one intervention approach of COWDO is training of Community Technicians of Hand Pumps (COTECHs). COWDO has so far trained 32 hand pump technicians in its project area. These technicians are selected from and by the community and are given a three months training. The COTECHs are trained to repair and maintain breaking hand pumps promptly. The teaching methodology, according to the FGD with COTECHs and COWDO staff includes lecture, participatory discussions and practical work. In the survey , 96.6% respondents have indicated that the hand pumps are giving good service due to the prompt repair and maintenance provided by the COTECHs. The remaining 3.3% indicate that the hand pumps are breaking frequently. The fact that large percentage (96.9%), of the respondents indicating that the COTECHs are repairing the schemes promptly implies that this aspect of sustainability of RWSSs is well take care of.

Focus group discussions with water committees, Edir leaders and COTECHs indicates that COTECHs are repairing broken pumps at modest price. This is so

because they themselves are beneficiaries of the water supply systems. Savings from the water sales are covering costs of repair and maintenance.

Besides giving efficient service to their community, some COTECHs are selling their technical ability to the adjacent Kebeles. The focus group discussion with WC members, indicate that it is not the payments to COTECHs ,but the cost of spare parts that has negatively affected the savings of WCs.

However, The focus group discussions with COTECHs further revealed that there is a shortage of toolkits. COWDO's staffs also admit the problem and attribute it to the financial constraint the organization finds itself.

The focus group discussion revealed that hand pumps fitted on bore holes (holes that have a depth ranging up to 87 meters in the case of the study area), break frequently than those of the hand-dug wells (having a depth not more than 33 meters in the study area). The average depth of HDWs in the area is 23 meters. The bore holes are located in Agode and Mikaelo peasant associations. The beneficiaries indicate that though these bore holes give good supply of water, it is relatively hard to pump water from these deep bore hole. It is understood that the relatively too much force applied on the handle and other parts of the pump causes the frequent breakage of such pumps.

Table 14. Percentage distribution of breakage frequency of Hand Pumps

SN		Frequency	Percent
1	Once in there months	15	12.5
2.	Twice a year	60	50
3	Once in year	22	18.75
4.	Once in two years time	15	12.5
5.	Not broken	8	6.25
Total		120	100

As far as spare parts supply is concerned ,building materials shop and a vehicle garage in Butajira town provide some spare parts. COWDO has identified the shops and motivated the owners to supply hand pump spare parts by providing the necessary information where to get the spares in Addis Ababa.

From the focus group discussion with COTECHs, it was indicated that, due to the small savings of most users groups (Edirs), there is seldom delay in repair and maintenance of broken hand pumps. Frequently breaking parts include the upper value and seel which cost on average birr 100 and birr 50 respectively .

For efficient management of water supply schemes, an efficient management body is required. That is why WCs are needed to acquaint themselves with appropriate skill of managing schemes; such as accounting, budget, public relations...etc. More over, such a management body needs a by-law by which it is governed.

Regarding the management capability and upgrading of WCs of a given locality, The discussion held with WC members revealed that there is an encouraging support from COWDO. COWDO, according to its staff at head office at Addis Ababa , plans a training to build capacity of WC members in the above mentioned skills like accounting and budgeting.

Moreover, a by-law for proper management of a given water supply system has been drafted by COWDO and endorsed by the beneficiaries. This has been done, according to the focus group discussion with COWDO's staff, on a workshop organized by COWDO. This by-law clearly states the duties and responsibilities of water committee members and the beneficiaries (refer to Annex 2).

All respondents know that there is a by-law, although only few (water committee members and Edir leaders) know detailed issues of the document.

5.2 Community participation in water supply and management

In this section, the focus is on community participation in general and women's participation in particular.

Regarding the level of participation of the beneficiaries, it has been found out that 98.3% (Table 15)of the respondents have participated in the development endeavor in one way or another. Their participation is in terms of monetary contribution, provision of food and drink to workers, provision of local construction materials and direct participation on the construction activities. The remaining 1.7 % have not participated; and as a result, are not allowed to use water from the developed schemes.

Table 15. Percentage distribution of type of participation.

S.N	Mode of participation	Frequency	Percent
1	Monetary contribution, provision of food and drink to workers, provision of local construction materials	113	94.6
2	Direct participation on the construction activities	5	4.16
3	No participation	2	1.66
Total		120	100

From table 15, we see that 94.6% of the respondents have participated in both provision of food and drinks for workers and monetary contributions. From the survey it is understood that monetary contribution, the provision of food and drinks, which is done in rounds, and provision of local construction materials are compulsory. The monetary contribution is done through Edirs. The Edirs of a given user group would settle the cost of well digging if the water committee of a given user group can not afford to cover such costs. Then, later the cost is distributed among members of the Edir. Four percent of the respondents have gone even as far as direct participation in construction of the hand-dug wells. Hence, level of participation of the community is a firm basis for the sustainability of the schemes developed.

In any rural water development endeavor, nowadays, women's participation is being given due consideration since experiences in this area has shown that their participation is indispensable for sustainable service provision of water supply schemes. Moreover, the consideration evolves from the fact that women are those who bear the brunt of lack of safe water supply in the household. This fact holds true in most rural populations of sub-Saharan Africa.

In the study area, it was found out that women and children (especially girls) are responsible to fetch water from distant and unsafe water points in the past. Currently, they are also the ones who fetch water from improved water supply systems.

Women participate by providing food and drink to workers and making monetary contributions.Direct participation in construction of hand-dug wells such a strenuous activities like pulling-up heavy items from well bottoms is not expected from women. On one focus group discussion, an elder remarked that ***"It is forbidden in our culture to let women be engaged in such strenuous works".***

However, regarding the participation of women in water committees (WCs), it was observed that 91.9% of the water committees (34 WCs) have only one woman as member of each water committee established. Only 8.1% (3 WCs) have two women members in their respective WCs (see table 16).

Table 16. Percentage distribution of Women members of water committees (WCs)

S.N	No. of WCs	No of women members	Percent
1.	34	1	91.9
2.	3	2	8.1
Total	37	40	100

Seventy two percent of the beneficiaries believe that the present number of women in water committees is enough while the remaining 28.3% suggests that the membership should increase. Those who suggest the increment in membership of women in water committees indicated that membership should increase by 2-4. Hence, it is seen that the level of participation of women in WCs is very low. ***From the focus group discussion with male beneficiaries, it is understood that the culture condones unequal status of women in most aspects of life of the community.***

All beneficiaries, however, believe that the implementing organization has made every effort to facilitate more participation of women in WCs; and the existing effort is satisfactory.

When we have a closer look at at one of the key aspects of sustainability of RWSSs,we find the issue of cost sharing and cost recovery. From the focus group discussion held with COWDO managing director, it is understood that the concept of cost sharing and cost recovery was introduced by COWDO.

As one form of cost sharing, at the inception, of application, the community is expected to contribute a 10 m^2-16m^2 of land for well site. The beneficiaries also cover cost of well digging until the water table is struck. After the water table is stuck, COWDO takes the responsibility of undertaking the remaining task.

Invariably all the beneficiaries have provided food and drink for the well diggers. (See table 17).The beneficiaries should also contribute local construction materials such as eucalyptus logs for fencing of the scheme. All these are taken as contribution or cost sharing by a given group of beneficiaries. Such contributions of the a given user group accounts to about 10% of the total cost of COWDO's rural water supply project.

Table 17. Average estimated contributions of beneficiaries per well

S.N	Taype of Contribution	Estimated (birr)
1.	Local Construction material	200
2.	Provision of food and drking to well diggers	130
3.	Monetary contribution for the cost of well digger	75-100/meter

With regard to cost-recovery, i.e. the monthly payment of a water fee for use of water from the developed schemes, (hand-dug well fitted with hand pump), 96.6% of the respondents are currently paying the water fee (a flat water tariff of birr 1/month/household). The survey shows that 95% of the groups have agreed with the flat water tariff of birr 1/month/household.(See Table 18.)

Table 18. Percentage distribution of suggested water fees

S.N	Respondents suggestion	Frequency	percent
1	Should be increased to birr 1.25	4	3.3
2.	The current fee (birr 1/month/houshold) is enough	110	91.6
3.	I can not afford the current fee	6	5
Total		120	100

Out of the total respondents, 91.6 % of the respondents believe that the current payment (birr 1/month/household) is enough . The other 5% indicated that it is

not affordable; while the remaining 3.3% suggest that the monthly water fee should be increased to birr 1.25 in order to have more reliable saving for covering costs of repair and maintenance. However, the WCs, the staff of COWDO and some members of the community with whom a FGD was held underline the need for increasing the current water tariff.

From the focus group discussion, it is understood that 4-8 households from each user groups, due to sickness and old age, are not paying the monthly water fee. The community never forces such people to pay. According to the survey, only 5% of the respondents delay monthly payment of the water fee. The remaining 95% are paying the water fee in time.

Table 19 shows the current savings (at the end of March 2003) of each WC in the study area. In the water and sanitation by-law, (see Annex 2)it is indicated that the collected water revenue should be deposited in bank ;and can only be withdrawn when the money is needed for water development issues.

Table 19. Savings of user groups (at the end of March 2003)

S.N	Peasant Association	Well No.	No. of beneficiaries	Saving (Birr)
1.	Yteker	3	36	310
1.	Yteker	4	34	167
2.	Yteker	5	20	410
3.	Yteker	6	40	100
4.	Yteker	2	22	638
5.	Agode	1	40	743
6.	Agode	2	145	300
7.	Micaelo	3	61	303
8.	Micaelo	5	10	160
9.	Micaelo	6	16	100
10.	Micaelo	7	-	350
11.	Mirab Meskan	4	24	400
12.	Mirab Meskan	1	14	50
13.	Mirab Meskan	2	29	192
14.	Mirab Meskan	3	41	380
15.	Mirab Meskan	6	40	50
16.	Mirab Meskan	4	-	-
17.	Gideyna Aborat	1	40	240
18.	Gideyna Aborat	2	14	416
19.	Gideyna Aborat	3	29	none
20.	Gideyna Aborat	4	29	277
21.	Gideyna Aborat	5	23	100
22.	Misiak Embore	3	25	None
23.	Misiak Embore	4	33	50
24.	Misiak Embore	5	25	350
25.	Misiak Embore	6	40	310
26.	Misiak Embore	7	31	112
27.	Misiak Embore	8	40	215
28.	Misiak Embore	9	37	50
29.	Mirab Embor	1	25	None
30.	Mirab Embor	3	21	300
31.	Wurib	1	17	100
32.	Wurib	2	10	100
33.	Wurib	3	8	100
34.	Wurib	4	22	350
35.	Misarak Miskan	1	30	325
36.	Misarak Miskan	3	17	150

Table 20. Percentage distribution of beneficiaries' perception on the fate of the collected fee

SN	Perception of beneficiaries	Frequency	Percent
1	Proper management	116	96.6
2.	Occasional embezzlement	4	3.3
	Total	120	100

As shown in table 20,based on their past experience, only 3.3% of the respondents feel that there might be occasional embezzlement. The remaining 96.6% feel that their money is in good hands.

Presently, the WCs deposit the water revenue in excess of the petty cash in Omo Micro Financial Bank located at Butajira town.

5.3 Local institutions and water supply management

The Community Based Organizations in the study area are called "Edirs" and Leka". The "Edirs" are self-help organizations of the community. They are primarily meant for facilitating funeral ceremonies. The "Leka", on the other hand, are religions ceremonial congregations held every Monday to observe the birth day of the prophet Mohammed. Serious social issues, which are beyond the capacity of "Edirs" are brought to the "Leka".

A focus group discussion, with "Edir" leaders, revealed that "Edirs" are involved in follow-up of water management of a given RWSS. The beneficiaries are being organized under the name of their respective "Edirs".

Ninety eight percent of the respondents indicated that "Edirs" manage most (about 95%) of the conflicts related to water supply. "Leka" is responsible to solve very serious social issues, which are beyond the capacity of "Edirs". This

involves less than 5% of the cases. About two percent of the respondents replied that "Edirs" should have no role in water management of the schemes.

The FGD with "Edir" leaders indicated that "Edirs" would take measure of purging corrupt WC members form "Edirs". They have also the power of alienating such corrupt members from the community.

Ninety eight percent of the respondents depend on "Edirs" to solve issues related to water use such as the case of non-payers of monthly water fee, corrupt WC members and the payment exemption of very old and sick members of the community.

Members contribute birr 4 - 5 per month per household to their respective "Edirs". Hitherto, it is from the savings of "Edirs" that a given user group would cover the partial hand-dug well digging cost. This indicates that local institutions are playing a positive and important role in water supply and management in the study area.

The other local institutions, Water Committees, serve as water users' management body in the study area. There are 37 WCs in COWDO's operational areas. A water committee is elected from and by the water users during the initial period of the intervention. The committee is composed of five or seven members with at least two of them being women; although this is not so in the study area. The committee is composed of a chairperson, secretary, treasurer, auditor/controller and one or two members.

The committee is responsible to mobilize resource for construction, operation and management of the hand dug wells and pumps; and collecting and managing water fees. The water committees are accountable to the general assembly of members.

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The committee is responsible to mobilize resource for construction, operation and management of the hand dug wells and pumps; and collecting and managing water fees. The water committees are accountable to the general assembly of members.

The water committee has the following responsibilities.

- It represents the beneficiaries in promotion of all water development project; plans drinking water development projects with COWDO.

- It bears the responsibilities of protecting and maintaining the completed drinking water supply systems.

- The committee is liable for undue interruption of supply of water; it has also responsibilities of urgently supplying with necessary spareparts and covering the perdiem of COTECHs who take part in maintenance of the malfunctioning water supply system.

- It animates and encourages the community to take part in the existing and new water development projects.

- It teaches rudiments of sanitation, demonstrate the benefit of sanitation.

- It animates the community to generate fund for acquisition of raw materials and trained manpower which in turn would promote the materialization of new water supply systems and maintenance of old ones.

- It allocates monthly collected fee for the promotion of additional drinking water developments, maintenance of the existing water supply systems and miscellaneous express ones.

The committee shall have the following members.

The community elects five water development committee members and the committee shall have at least two female members. The committee appoints the chairman, the secretary and the cashier and it is accountable directly to the community

The Chairman chairs the committee meeting; arranges meetings as may be necessary. convenes both community and committee meetings, represents the beneficiaries on cases of developed water supply system ,reports all the activities of the developed water supply system.

The secretary prepares and keeps minutes of meetings, keeps the record of beneficiaries of the developed water system, preside over the meeting in the absence of the chairman.

The secretary together the other committee members shall prepare agendas, checks the proper collection of fee and in due time deposition of collected fee in the bank.

The Cashier keeps a provident fund of birr 50, deposits the collected fee in bankand keeps spare parts and tools for pump maintenance.

The responsibilities of the members include animation of the community for general meetings and collection of fees with receipts from the beneficiaries.

The collected fee shall be withdrawn and deposited either with the tripartite consent of the chairman, secretary and cashier or two of the above three. As per the agreement of the community, the committee collects fee of birr one per single family on receipts. Any family that refuses to pay the fee will be automatically be denied the provision of drinking water from the hand-dug well and shall be forced to pay for what it had consumed in accordance with the relevant penal code. List of names of the beneficiaries of the developed water supply systems is attached with the regulation; and fees are collected according to same list of names.

The books of accounts and financial documents of the committee is audited annually by auditors designated by the committee; and the report is submitted to community and the council of state of the kebele.

The water committee makes sure that there are well-trained and efficient Community Technicians of Hand pumps (COTECHs) for prompt repair and maintenance of malfunctioning water supply systems. Moreover, the committee stores the necessary spare parts; and facilitates their constant supply.

For prompt repair and maintenance of hand pumps, the committee makes sure that the necessary tools and equipment are available. Once in a month, together with the Community Technicians of Hand Pumps, the committee inspects the developed water supply systems.

Whenever the water supply system fails to give service, the committee, in no more than 10 days time, facilitates the prompt maintenance and repair of the malfunctioning water supply system through covering costs of spare parts and perdiem of COTECHs. The committee, on its regular quarterly meetings, reviews the provision of potable water. Urgent meetings may be held as may be necessary.

The activities of the committee members is annually reviewed by the beneficiaries and council of state of the kebele; inefficient and corrupt members are replaced by new efficient ones.

The focus group discussion held with WC members revealed that the water bureau of the Woreda has not given legal recognition to most WCs. Legal recognition gives such local institutions the capacity or the mandate to have access to financial services and external agents, bargaining power and thereby decide about their future. None the less, the support from the PA administration is encouraging. Since the issue of having legal recognition is crucial for WCs, it was one that most repeatedly raised and discussed.

WCs of the study area are functioning under the umbrella of "Edirs". The structure is chosen since "Edirs" can control possible corruption among WC members.

5.4. Technology and Institutional support

From the field survey, it was understood that two types of hand pumps are being used/installed by COWDO. The first type and which is installed in 94.5% (35 hand dug wells) of the hand-dug wells is the Indian Mark II type. Afridev is the other type which is installed on the remaining 5.4% . The latter is invariably installed on deep bore holes. Both hand pumps are chosen by COWDO for the project area. Moreover, They are standardized by SNNRP for sustainable provision of service on HDWs up to 45m deep and 45-90m deep bore holes. A building materials shop in Butajira town supplies spare parts.

Ninety eight percent of the beneficiaries indicate that it is easy to operate the hand pumps (move the handle). The remaining 6.6% (those who are using water from deeper wells) understand why they should apply a relatively more force to move the handle. Hence no one has suggested a change in type of hand pump.

From the focus group discussion with COWDO staff, the peasant associations, as they are local government units, have shown special interest in the development endeavor. Moreover, the Meskanena Mareko Woreda administration council has written a letter of recognition of the WCs as representatives of the water users. Currently the WCs deposit the water revenue in excess of the petty cash in Omo Micro Financial Bank located at Butajira town.

The Bureau of Water, Mines and Energy Resources Development is the responsible agency to follow the development activities. According to the recent restructuring and decentralization process, there is a water desk in the Woreda council under the Rural Development office. This is assumed to bring decisions and actions regarding water works close to the target group.

As indicated in previous pages ,there is a complaint about lack of legal recognition of the water committees in the study area. The Water, Mines and Energy bureau is the relevant government agency to facilitate pertinent issues.

CHAPTER 6. Conclusion and Recommendations

6.1 Conclusion

As it is so common in almost all rural populations of Sub-Saharan Africa, the present beneficiaries used to travel long distances (1:30-2 hrs travel) to fetch unsafe water (2-3 ***Insira*** of water for household consumption) from traditional water supply sources like rivers and ponds. As a result of using unsafe water from polluted water points, the community in the study area was suffering from recurrent water-borne diseases like diarrhea, amoebic dysentery, skin and eye complaints, tuberculosis...etc.

The severity of the problem has made the community to look for alternatives. As a result, 98.33% of the respondents have indicated that they have applied to an implementing organization for the development of water resources, the COWDO. Community demand has thus initiated COWDO's activities. In addition, COWDO has made its own needs assessment.

COWDO has developed 37 water supply schemes in the nine PAs and has provided safe water supply for 30-50 households per scheme .As a result, households who have access to safe water supply has increased from none to 35%. However, compared to the remaining large number of unserved population of the study area, the constructed hand-dug wells are not enough.

Presently, according to the findings of the survey, 98.3% of the respondents are using water from the developed water supply schemes for drinking and sanitation purposes; i,e. they do not resort to river water for human consumption. This indicates the level of the positive impact brought about by the provision of awareness raising education on personal hygiene and environmental sanitation and the advantages of consumption of safe drinking water on health and economic life of the population.

The beneficiaries, as indicated above, have not resorted to polluted water sources even if there are hand-dug wells that are drying-up due to the effects of the present drought that hit most parts of the study area and although few shallow wells of some areas are not giving sufficient water

In its experiences of the last ten years, COWDO has developed trust and established good rapport with the community. This has enabled COWDO to mobilize resources for construction, awareness raising and sanitation activities easily.

Recognizing the indispensability of maintaining water pumps, COWDO has established village-based private maintenance and repair service delivery system. This has been accomplished through training members of the community in hand pump repair and maintenance. In addition to repair and maintenance service, the community technicians (COTECHs) provide service like digging wells, producing and installing concrete rings, operating generator and electrical dewatering pumps and installing hand pumps on payment. Some COTECHs are even providing their services outside COWDO's operational areas. As a result, over 90% of the HDWs fitted with hand pumps are operational and no single scheme is abandoned due to breakdown. The COTECHs are paid for their services from the water use revenue collected.

None the less, the study revealed that not all COTECHs are equipped with the necessary tools and toolkits of repair and maintenance. COTECH members invariably indicated that there is insufficiency in supply of toolkits; which COWDO staff,(the project officer and the project coordinator) admit, and attribute it to the hitherto financial constraint the implementing organization finds itself.

In conjunction to repair and maintenance issue, the types of hand pumps that have been installed are those known as VLOM (Village Level and Maintenance) type hand pumps. COWDO is installing two of such type of hand pumps named

Indian Mark II and Afridev. It is understood that ,after conducting series of hand pump tests, UNDP/World Bank has recommended, among others, Indian Mark II and Afridev as VLOM type hand pumps.

Only 4% of the hand dug well pumps are repeatedly breaking while the remaining 96% do not break frequently. Those, which break frequently, are hand pumps of deep bore holes.

Regarding investment cost of hand dug wells, it is understood that COWDO covers the digging cost of wells bellow the static water level (average ground water level) instead of encouraging user groups cover the whole digging cost.

On the other hand, regarding the concomitant issue of cost-recovery, currently all Water Committees (WCs) are collecting a flat rate tariff of birr1/month /household. The collected fee is channeled for repair and maintenance of broken hand pumps.

None the less, the savings of water user groups are invariably dwindling. This is because that the collected fee is hardly enough to cover costs of repair and maintenance of hand pumps. In most cases, a specific user group resorts to "Eidr" savings.

In connection to this, there is an understanding from both the community and COWDO, that the water tariff should still be increased so that the capability of the community in covering repair and maintenance costs can be enhanced. .

Considering the level of participation of the community ,the provision of plot of land for well site, provision of food and drink for the workers and monetary contribution ...etc, is encouraging. None the less, women's participation as members of water committees is very low. Only 8.1% of the total number of water committees have two women members. The remaining 91.9% of WCs have

only one woman as member per water committee. This is attributed to the cultural attitude of the area which discourages women to sit and discuss problems with their male counterparts in water committees and others.

As far as the role of CBOs in the study area is concerned , self-help institutions like "Edirs" and "Leka" are playing a positive role in handling cases of embezzlement and help the beneficiaries in covering , repair maintenance and digging costs. The expenses covered by "Edirs" will later be replaced from collected water fee. As a result, all beneficiaries support the intervention of "Edirs" in water supply and management issues. More over, the beneficiaries have endorsed and are ruled by the water supply and management by-law.

The institutional support, which the WCs should get from relevant government bureaus, is not encouraging. On the other hand, some para-statal institutions like the Omo Micro Financial Bank are showing some effort to create favorable conditions for the WCs.

6.2 Recommendations

The case study has provided information and experiences of COWDO and the water users with regard to community management of water supply systems. Both best practices and limitations are observed. Areas that need attention and /or further improvement are considered bellow.

1. COWDO should continue its support to communities based on the demand-driven approach to increase access to safe water supply. This implies an expansion of its interventions within the existing operational "kebeles" as well as new ones. However ,priority should be given to increasing access to safe water supply within the existing "kebeles"; as there are large number of (65%) unserved households.

2. The water users in COWDO's operational areas have realized the benefits of clean water, are aware of their responsibilities for their own development, have properly managed the improved water supply schemes ,and are willing to increase the water tariff further. To benefit from these enhanced awareness and capacities of water users, it is recommended, if cost recovery is beyond reach, the users should be encouraged to set a reasonable tariff that enables them to recover sufficient reserve fund for replacement and rehabilitation of schemes.

3. Since the community is aware of the benefits of safe water, further collaboration should mainly be with those communities who cover the whole digging cost of wells rather than COWDO covering cost bellow the static water level. Moreover, options for using the reserve fund as a revolving fund for income generation activities need to be investigated in the future .This would integrate water supply and water fee with other livelihood.

4. Gender is one area that is not properly addressed by COWDO. Women did not ,if at all only few ,participate as WC members. Those elected women WC members are only nominal participants in the WC management. But ,women are responsible for water haulage and management in the household. They also have significant role in family hygiene and sanitation practices. COWDO needs to design a strategy to involve more women in water supply management activities. One option of involving women in water and sanitation issue could be having hygiene and sanitation contact women who would be responsible for awareness raising education and follow up of hygiene and sanitation practices among fellow women.

5. The coverage of hand pump operated hand dug wells service is low. To increase the coverage in terms of households in the operational "kebeles" and other new ones, funding **agencies should continue their support**.

6. COWDO in the coming years, should concentrate more on enhancing management capabilities of water committees. Providing capacity building training could mainly do this. As can be learnt from similar projects in developing countries such as India, Tanzania, Zimbabwe...etc, the training could be based on adult learning principles using practical experience sharing among participants.

7. COTECHs (Community Technicians of Hand Pumps) should be equipped with basic tools for repair and maintenance activities. Preventive maintenance should also be planned.

8. There still remains a lot to be done in speeding up the process of giving legal entity to water committees. WCs should be legally recognized by the BoWMERD as future managers of the water supply systems. The responsibility for the improved water service management should be legally theirs.

9. Finally, more attention should be given for enhancing genuine partnership among government bodies, COWDO and users. The relationship of COWDO with the bureaus of Water ,Mines and Energy Resources Development (BoWMERD) of the region is not as strong as it should be. Mutual trust and respect, transparency and accountability, communication and information sharing, participation in planning, monitoring and decision making are some of the requirements to develop the partnership. In general, genuine partnership may help to unblock some of the bottlenecks, which stand against achieving sustainable water supply development.

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Questionnaire for Beneficiaries

Socio-economic characteristics of the house hold

Name of interviewee	Zone	Woreda	P.A.	HHD head	Age	HHD size	Marital Status	Income per year in kind or cash
				1.Female 2.Male			1.single 2.Married 3.Widowed	

1. Demand –drivenness in identification of user group

1. How many years have you lived in this area? _____

2.How did the water supply system materialized?

1. We have applied for the development of the schemes
2. The NDGO approached us
3. Government bureaus facilitated the development endeavor
4. I do not know
5. Other,specify_____

3.What is your major source water supply?

1.Developed water supply schemes

2Springs

3.Rivers

4.Unprotected wells

4. State the average estimate of distance you travel to fetch water from traditional water points. _____

5.Do you fetch water from the developed water supply point? 1. Yes 2. No

(If no, why?) _____

_____

_____

6.Do you totally depend on water from the developed water supply schemes?

1. Yes 2. No

2.Participation

2.1.Major aspects of community's participation

7.Have you participated in development of the water supply schemes? 1. Yes 2. No (why)? _____

_____

_____

8.In what ways have you participated?

1. Provision of local construction materials
2. Provision of food and drink to workers
3. Construction of the water supply schemes
4. Other,specify_____

2.1 Women's Participation

9. Are you or your wife a member of the water committee? 1. Yes 2. No.

10. How many women are members of the water committee of your specific water point?

1. Four 2. Three 3. Two 4. One 5. None 6. I do not know

11.Do you or your wife think that the representation of women in the W.C. is enough? 1. Yes 2. No.

12.If no,by how much should their membership increase? _____

13. What is the major obstacle regarding your full participation in water supply schemes development?

1. Burden of household activities
2. Social responsibilities
3. Religious/cultural reasons
4. Non-permitting husbands
5. Not interested

6. Other ,specify_____

14.Have you been given special encouragement to participate by COWDO? 1.Yes 2.No

15.Do you think the NDGO should have given you more participation opportunities? 1.Yes 2.No

3. Cost-Sharing and Cost-Recovery

16. Do you support the idea that users should pay water fee?

17. If No. why? _____

_____

_____

18.Do you pay fee for the water supply service? 1. Yes 2. No. (why) _____

_____

_____

19. How much do you pay?

1. Birr 0.50 per month/household
2. Birr 1 per month/household
3. Birr 2 per month/household
4. Other

20.Is the payment affordable? 1. Yes 2. No

21.Should it be increased? 1. Yes 2. No

22.If it should be increased, by how much?

1. By Birr 0.25
2. By Birr 0.50
3. By Birr 1
4. Other,specify_____

23. Do you pay the water fee in time? 1. Yes 2. No

24. If no, why?

1. Financial constraint
2. Due to fear that the collected fee could be embezzled
3. I can not see the reason
4. I do not want to answer

5. Other, specify_____

25. Do you think the collected fee is properly managed? 1. Yes 2. No

26. If no, why? 1. Due to rampant corruption among WCs,

2. Lack of management skill

3. I do not want to answer

27. Are there non-payers of water fee in your "Edir"? 1. Yes 2. No

4. Community Awareness raising and Education

29. Have you ever participated in education session about the advantage of safe water supply? 1. Yes 2. No

30. If yes, how many meetings have you attended?_____

31. If no, why?

1. Due to urgent farming activities
2. Due to other social responsibilities
3. Not interested
4. Other inconveniences

32. Have you benefited from the provided education on personal hygiene and environmental sanitation? 1. Yes 2. No

33. If yes, in what terms?

1. I and my family enjoy better health
2. My family is relieved of medical expenses
3. My family has now more time to engage in other income generating businesses.

34. What type of container do you use for fetching water?

1. "Gembo"
2. "Insira "
3. Jerrican
4. Other ,specify_____

35.For what purposes do you use the water ?

1.Drinking 3.Bathing 2.Washing clothes

4.Other,specify_____

36. How much container of water have you been consuming earlier per day? _____

37. Which member of the family fetch water for household consumption?

1. Women
2. Men
3. Girls
4. Boys

38.Do you get enough supply of safe water from the schemes ? 1.Yes 2. No

39. Do you presently consume more water than before on household level? 1. Yes 2. No (why) _____

_____

_____

40. In what ways has your daily life been positively effected by the provision of safe water?

1. Decrease in workload
2. Better health condition
3. Lesser workload and thereby better income
4. Other,specify_____

41. Is there a change in workload? 1.Yes 2.No;If yes ,in what terms?_____

_____

_____

42. Do you think the available water supply scheme/s is/are sufficient for your village?

1. Yes
2. No.

43. If "No", what do you think is/are the reason/s?

1. They are sparsely distributed
2. The available points do not give enough water supply
3. Too much users per water supply scheme/s
4. Other,specify_____

44. If yes, how much container of water do you fetch?

1. ½ container of water/day
2. 1 container of water/day
3. 2 container of water/day

4. Other,specify_____

5. Repair and maintenance service

45. Does the water supply scheme give efficient service? 1. Yes 2. No

46 .Does if break frequently? 1. Yes 2. No

47. If it breaks, does it break:

1. once in three months
2. once in six months
3. once in a year
4. Once in two years time
5. other ,specify_____

48. Do the water technicians repair the mal-functioning pumps promptly? 1.Yes 2. No

49 .If the water technicians do not repair the mal-functioning pumps promptly, what do you think is the reason?

1. Low payment
2. Insufficient tools to repair and maintain
3. Carelessness
4. Inefficiency
5. Scarcity of COTECHs
6. Other,specify_____

50.Are you willing to be trained as water technician 1. Yes 2. No (why) _____

_____

_____

6. CBOs and conflict management

51. For what purpose do you basically form "Edirs"? _____

_____

52. How do you manage conflicts related to water use?

1. Through intervention of the "Edir"

2. Through intervention of "Leka"
3. Through intervention of "Mahiber"
4. Other ,specify_____

53. Do you take other conflicts to "Edirs"? 1. Yes 2. No
54. If yes, state _____
55. Do you support "Edir's" intervention in water supply management
    1. Yes 2. No
56. If no, why? _____

7. Management capacity building of water committees

57. Have you participated in the endorsement of the by-law of water development and sanitation? 1. Yes 2. No
58. Do you agree with the development of users by-law? 1. Yes 2. No
59. If no, why? _____
_____

8. Technology

60. Can you operate the hand pumps easily? 1. Yes 2. No
61 If no, what do you think are the difficulties?
    1. Hard to move the handle
    2. Easily breaking parts
    3. Other, specify_____
62. Do you suggest a change in hand pump type? 1. Yes 2. No

The focus group discussion has been conducted with the following:

I. Water Committee (WC) members
II. COWDO staff (Project coordinator, project officer, extension agent)
III. Community Technicians of Hand Pumps (COTECHs)
IV. "Edir" leaders
V. PA Chairpersons

I. Water committee members

A. How were you elected?
B. How do you handle the case of non-payers?
C. How do you handle the case of those who are unable to pay water fee?
D. Have you experienced embezzlement so far?
E. How much many has been embezzled?
F. How do you solve such cases?
G. How many cases of embezzlement did you have?
H. Do you keep the accounts properly?
I. Do you think the P.A.(Edir) need more water supply schemes?
J. Does your WC have legal recognition?
K. Which institution gives the recognition?
L. Did you have on the job training about management and other skills?

II. COWDO's staff

a) Have you conducted base line survey and needs assessment of the area?
b) What instruments do you use?
c) Who approached the target group?
d) Do you give education on personal hygiene and environmental Sanitation to the target group?
e) Is there a curriculum for the education?
f) Do you training village-level care takers?
g) Do you have a curriculum?

h) How did the by-law for water development and sanitation materialized?
i) What type of hand pump do you install?
j) How have you chosen the present hand pump type?
k) Have you compared its advantages and disadvantages in relation to other types?
l) Do you have the intention of changing the present type with another one? If Yes, why?
m) How is COWDO's networking with Woreda water Bureau?
n) What are your constraints in the process of implementation of water
o) Supply projects?
p) Do you get support from the Woreda?
q) Is the process of legal recognition of WCs smooth?
r) What are the major obstacles in the process of legal recognition of WCs?

III. Community Technician of Hand Pumps (COTECHs)

a. How are you trained as COTECHs?
b. Is the training supported by training material ?
c. Have you been given both technical and theoretical training?
d. Do you think the training is enough?
e. Have you been equipped with the necessary toolkit?
f. What are your major problems?

IV. Edir Leaders.

a. How many cases of embezzlement have you considered?
b. How do you handle cases of embezzlement of WC.?
c. How do you handle the cases of non-payers?
d. How do you handle the cases of very poor members of your Edirs?
e. How many are they?

V. PA Leaders

a. How are you supporting the water development endeavor in your Woreda/Kebele?

b. Do you support the WCs in attaining legal recognition?

ANNEX-2

RURAL COMMUNITY WATER DEVELOPMENT ORGANIZATION (COWDO) BY-LAWS FOR WATER DEVELOPMENT COMMITTEE

Introduction

The major causes of water-borne diseases and epidemics in rural Ethiopia, the population of which accounts to about 86% of the total, are lack of safe drinking water and poor sanitation.

Thus, in its endeavor to alleviate the people of their suffering, Rural Community Water Development Organization (COWDO) has initiated projects that facilitate the provision of safe drinking water and sanitation to nine peasant associations in Meskanena Mareko and Silti Woredas. COWDO is being given full support by the community in its activities that include the construction of hand-dug wells and installation of hand pumps.

To enable the people benefit from a water supply systme with controlled-sustainaility, COWDO has trained Community Technicians of Hand pumps (COTECHs) in hand pump installation, maintenance and water and sanitation.

Besides the training of the aforementioned technicians, with full participation of the community, COWDO has hereby helped the formation of a responsible water supply system management body named after the "Edir" of beneficiaries; and issued its by-law that facilitates the materialization of water supply system with controlled sustainability.

Article - 1 Nomenclature

1.1 The committee, bearing the name of the individual peasant association, is named as "Kebele Water Development Committee." The water development committee is named after the "Edir" of the beneficiaries.

Article - 2 Objective of establishment

2.1 Whereas drinking water development projects for specific group to beneficiaries should acquire controlled-sustainability, the committee, therefore, is hereby established.

Article - 3 Responsibilities

The committee shall have the following responsibilities

3.1 Represents the beneficiaries in promotion of all water development project; plans drinking water development projects with COWDO.

3.2 Bears the responsibilities of protecting and maintaining the completed drinking water supply systems.

3.3 The committee is liable for undue interruption of supply of water; it has also responsibilities of urgently supplying with necessary spareparts and covering the perdiem of COTECHs who take part in maintenance of the malfunctioning water supply system.

3.4 Animates and encourages the community to take part in the existing and new water development projects.

3.5 Teaches rudiments of sanitation, demonstrate the benefit of sanitation.

3.6 It animates the community to generate fund for acquisition of raw materials and trained manpower which in turn would promote the materialization of new water supply systems and maintenance of old ones.

3.7 Allocates monthly collected fee for the promotion of additional drinking water developments, maintenance of the existing water supply systems and miscellaneous express ones.

Article - 4 Election and number of committee members

The committee shall have the following members.

4.1 As of the consent of the community, the committee may have at least 5.

4.2 The community shall elect water development committee members

4.3 The committee shall have at least two female members.

4.4 The committee shall appoint the chairman, the secretary and the cashier.

Article - 5 Accountability of the committee

5.1 The committee shall be accountable directly to the community.

Article - 6 Duties of members of the committee

6.1 **Chairman**

- Chairs the committee meeting; arranges meetings as may be necessary.
- Convenes both community and committee meetings.
- Represents the beneficiaries on cases of developed water supply system.
- Reports all the activities of the developed water supply system.

6.2 **Secretary**

- Prepares and keeps minutes of meetings.
- Keeps the record of beneficiaries of the developed water system.
- Preside over the meeting in the absence of the chairman.
- The secretary together the other committee members shall prepare agendas.
- Checks the proper collection of fee and in due time deposition of collected fee in the bank.

6.3 **Cashier**

- Keeping a provident fund of birr 50, deposits the collected fee in bank
- Keeps spare parts and tools for pump maintenance.

6.4 **Members**

- They animate the committee for general meetings. Collect fees with receipts from the beneficiaries.

Article - 7 Fee collection and accounts

7.1 The collected fee shall be withdrawn and deposited either with the tripartite consent of the chairman, secretary and cashier or two of the above three.

7.2 As per the agreement of the community, the committee shall collect fee of birr one per single family on receipts.

7.3 Any family that refuses to pay the fee shall automatically be denied the provision of drinking water from the hand-dug well and shall be forced to pay for what it had consumed in accordance with the relevant penal code.

7.4 List of names of the beneficiaries of the developed water supply systems shall be attached with the regulation; and fees are collected according to same list of names.

7.5 The books of accounts and financial documents of the committee shall be audited annually by auditors designated by the committee; and the report is submitted to community and the council of state of the kebele.

Article - 8 Repairing and maintenance of the supply system

8.1 The water committee makes sure that there are well-trained and efficient Community Technicians of Hand pumps (COTECHs) for prompt repair and maintenance of malfunctioning water supply systems.

8.2 The committee stores the necessary spare parts; and facilitates their constant supply.

8.3 For prompt repair and maintenance of hand pumps, the committee makes sure that the necessary tools and equipment are available.

8.4 Once in a month, together with the Community Technicians of Hand Pumps, the committee inspects the developed water supply systems.

8.5 Whenever the water supply system fails to give service, the committee, in no more than 10 days time, facilitates the prompt maintenance and repair of the malfunctioning water supply system through covering costs of spare parts and perdiem of COTECHs.

Article - 9 Committee meetings

9.1 The committee, on its regular quarterly meetings, shall review the provision of potable water.

9.2 Urgent meetings may be held as may be necessary

Article - 10 Reviewing activities

10.1 The activities of the committee members is annually reviewed by the beneficiaries and council of state of the kebele; inefficient and corrupt members shall be replaced by new efficient ones.

Article - 11 Effective date

11.1 This regulation shall come into force as of the date of same carried by acclamation and ratified by the committee members and the South-West Butajira Drinking Water Development Project.

Article - 12 Amendment

12.1 On its annual meeting, the committee, as may be necessary, makes amendments on this regulation and submit same for the approval of the community.

Members of the committee

Name	Signature	Date
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

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Annex 3

SYLLABUS FOR TRAINING OF COMMUNITY HAND PUMP TECHNICIANS(COTHECHs)
(Three months program)

S.No	Specific objectives	Contents	Time allotted in hours	Teaching methodology	Teaching aids	Evaluation
1	• They know the difference between hand dug and machine drill water wells • They know well alignment and its use • They know how to design hand dug well	• How to dig hand dug water wells. • How to estimate aquifer yield of hand dug well.	24	• Lecture • Discussion	• Real object • Pictures	• Oral Test • Group work
2	• They can understand the use of the hand pump and its mechanism • They know hand pump options • Parts of hand pump	• The purpose of hand pump	56	• Lecture • Discussion	• Real object • Pictures • Posters • Model	• Oral Test • Group work
3	• They know the mixture and mixing ratio of concrete casing production • They know the use of concrete casing • They can produce concrete casing	Concrete casing and its use	72	• Lecture • Discussion • Practical work	• Posters • Pictures • Real objects • Models • Field trip	• Oral Test • Group work • Project work • Performance evaluation

4	They can produce concrete slab for well lid and pump stand erection.	Concrete casing installation, slab construction and pump stand erection	80	▪ Lecture ▪ Participatory discussion ▪ Practical work	▪ Real object ▪ Pictures ▪ Posters ▪ Models ▪ Field trip	▪ Oral tests ▪ Group work ▪ Project work ▪ Performance evaluation
5	They can install hand pumps	Pump installation	40	▪ Lecture ▪ Participatory discussion ▪ Practical work	▪ Real object ▪ Field trip ▪ Posters ▪ Pictures ▪ models	▪ group performance evaluation. ▪ individual performance evaluation ▪ project work ▪ oral tests
6	They know the causes and the types of pump break down	Types of hand pump break down and causes	120	▪ Lecture ▪ Participatory discussion ▪ Practical work	▪ Real object ▪ Field trip ▪ Pictures ▪ Posters ▪ models	▪ Group performance evaluation ▪ Individual performance evaluation ▪ Project work ▪ oral tests
7	▪ They know the symptoms of hand pump break down /trouble shooting ▪ They can repair and maintain broken down pumps	Symptoms of broken hand pumps and their solutions ▪ Hand pump break down on the ground ▪ pump break down under the ground	120	▪ Lecture ▪ Participatory discussion ▪ Practical work	▪ Real object ▪ Models ▪ Posters ▪ Pictures ▪ Field trip	▪ Oral tests ▪ Group performance evaluation ▪ Individual performance evaluation
8	They can follow hand pump repair and maintenance program.	Pump repair and maintenance program ▪ types of repair and maintenance that could be done once in a month ▪ types of repair and maintenance that could be done once in a year	16	▪ Lecture ▪ Participatory discussion ▪ Practical work	▪ Field trip ▪ Real object ▪ Models	▪ Project work ▪ Group performance evaluation ▪ Individual performance evaluation

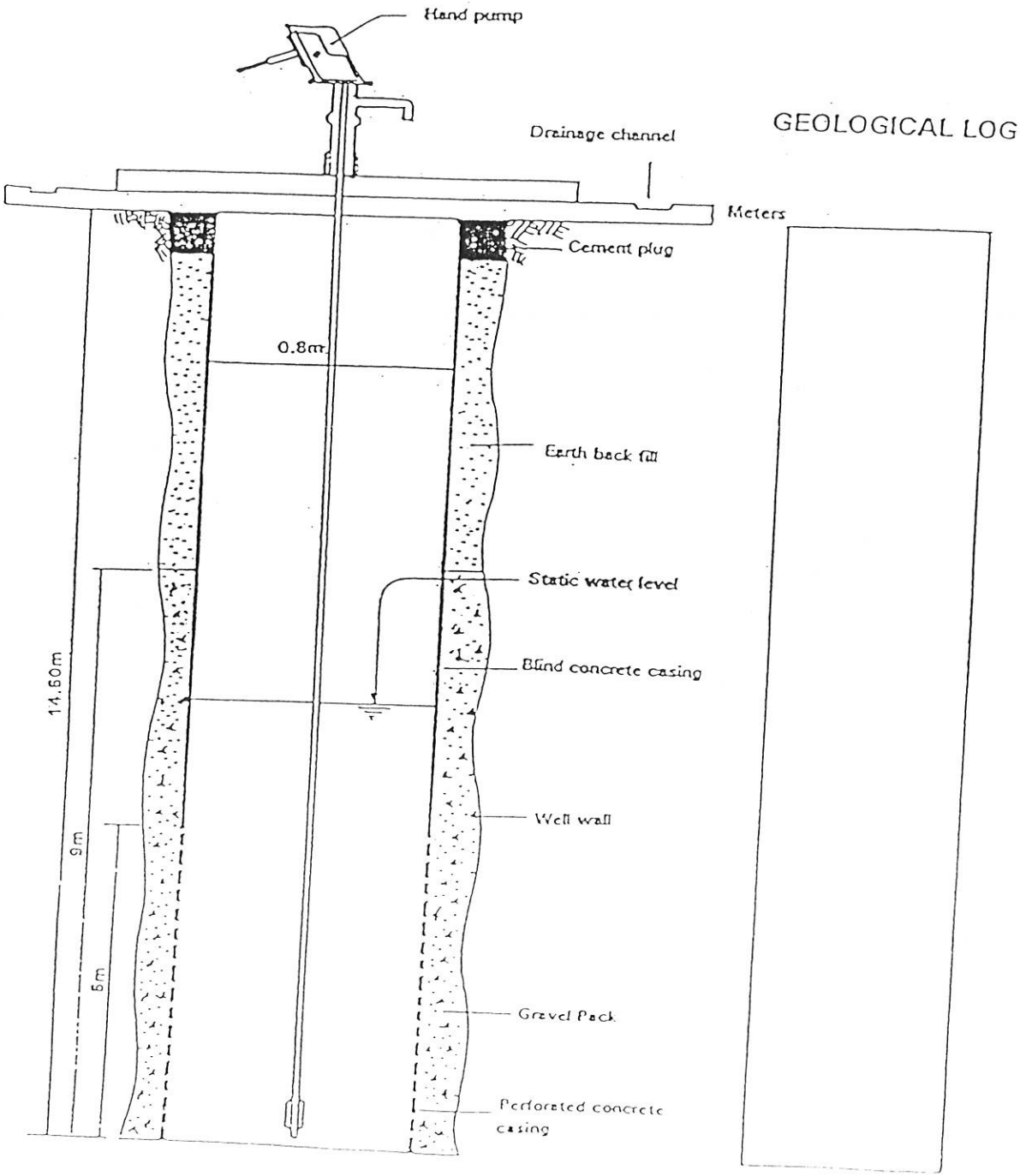
Annex 4

Syllabus for the Education in Advantage of Safe Drinking Water Supply Personal Hygiene and Environmental Sanitation (Two Months Program)

S.No	Specifie objectives	Contents	Time allotted in hrs.	Teaching methodology	Teaching aids	Evaluation
1	They know different types of sources of dinking water	• Sources of drinking water	16	• Lecture • Discussion • Participatory	• Real objects • Pictures • Posters • Texts	• Oral exam • Observation • Group discussion
2	They understand the benefit of safe drinking water towards health and house hold economy, how to store safe water and about water born diseases	• The benefit of safe drinking water for health economic growth	96	• Lecture • Discussion • Participatory • Follow-up	• Real objects • Demonstration • Picture • Texts • Posture	• Oral exam • Group discussion • Observation
3	They know the methods of personal hygiene and environmental sanitation	• Environmental sanitation	48	• Lecture • Discussion • Participatory • Follow-up	• Real objects • Texts • Demonstration • Posters • Pictures	• Observation • Group discussion
4	They know the benefit of health and apply how to preserve food, house and furniture hygiene	• Food preservation • Organizing household furniture	160	• Lecture • Discussion • Participatory • Follow-up	• Demonstration • Pictures • Texts • Posters	• Observation • Oral exam • Group discussion
5	• They understand the importance of pit latrines towards health. • They know the proper use of pit latrines	• Importance of pit latrines towards health • Proper use of pit latrines	96	• Lecture • Discussion • Participatory • Follow-up	• Picture • Real objects • Demonstration • Texts • Posters	• Observation • Oral exam • Group discussion

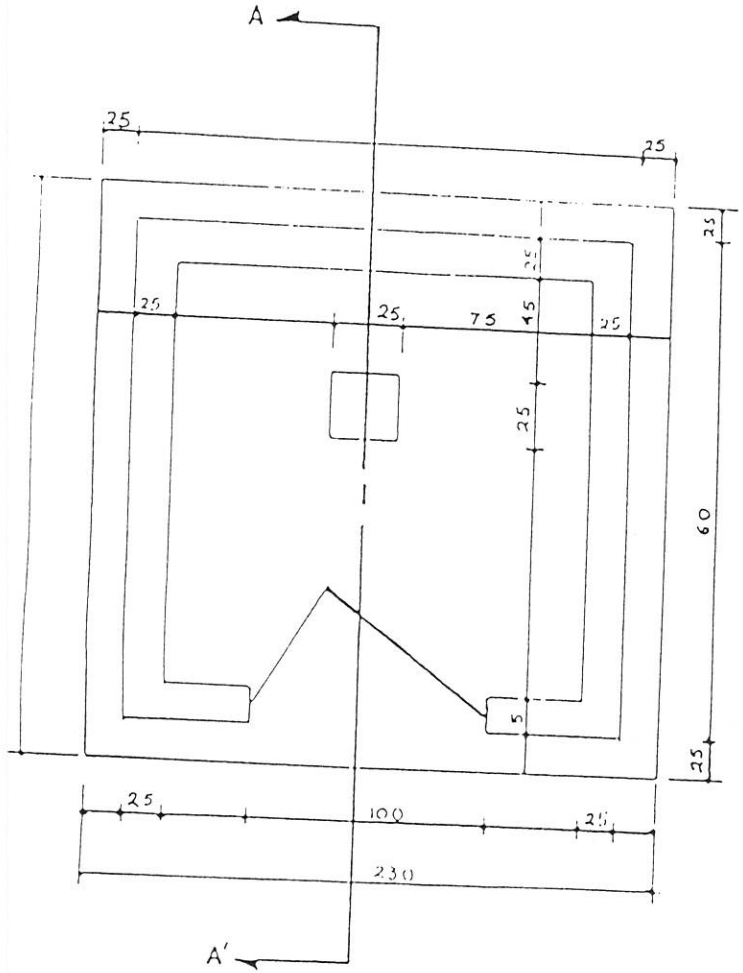
Annex 5

DESIGN OF HAND-DUG WELLS
(SECTION)

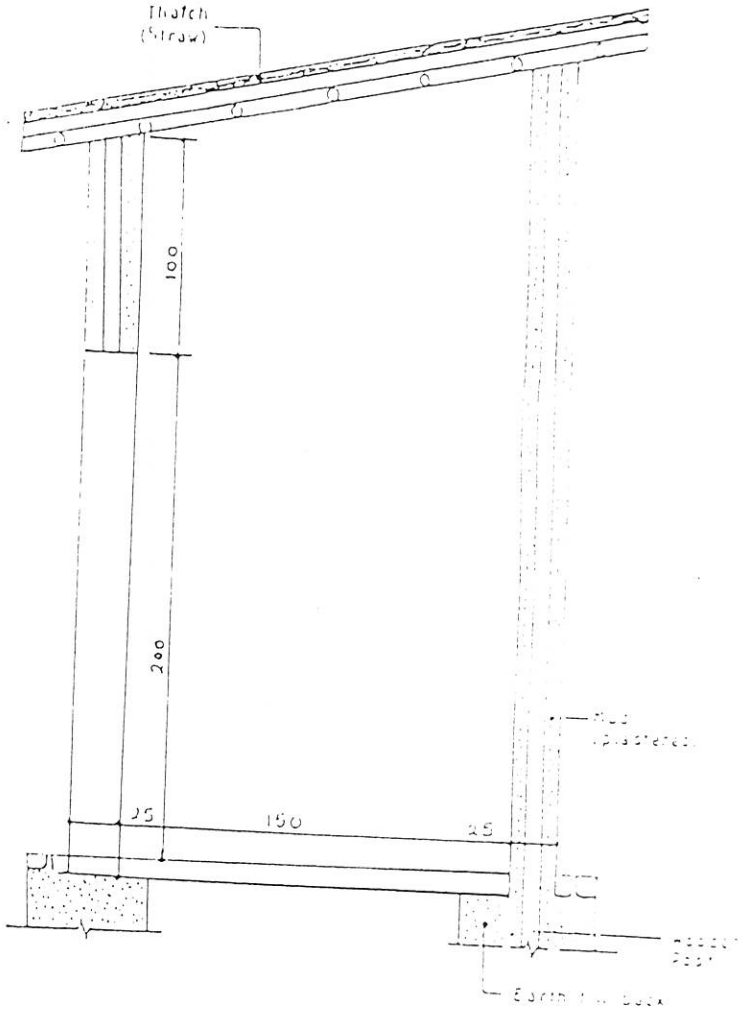


Vertical scale 1:100

Annex 6



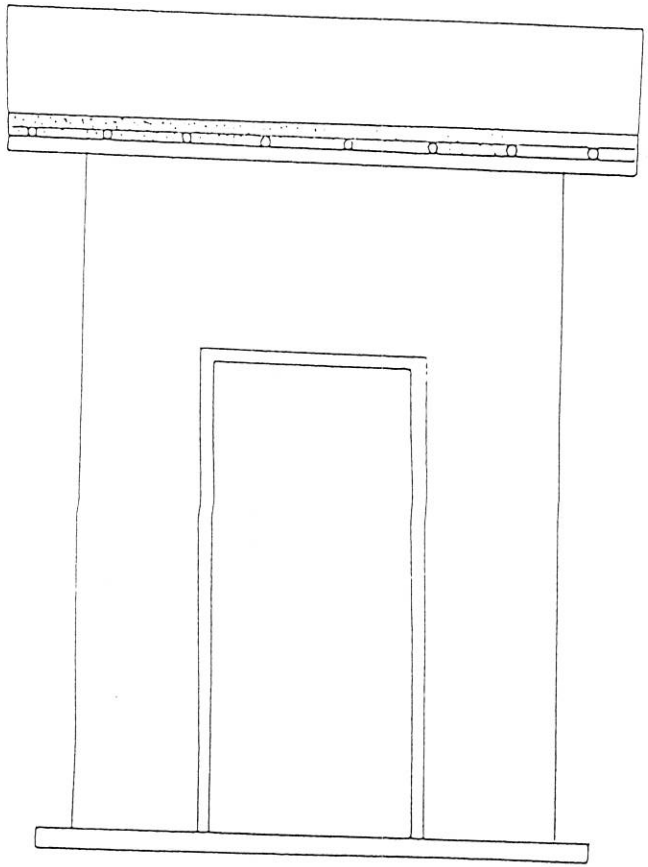
FLOOR PLAN



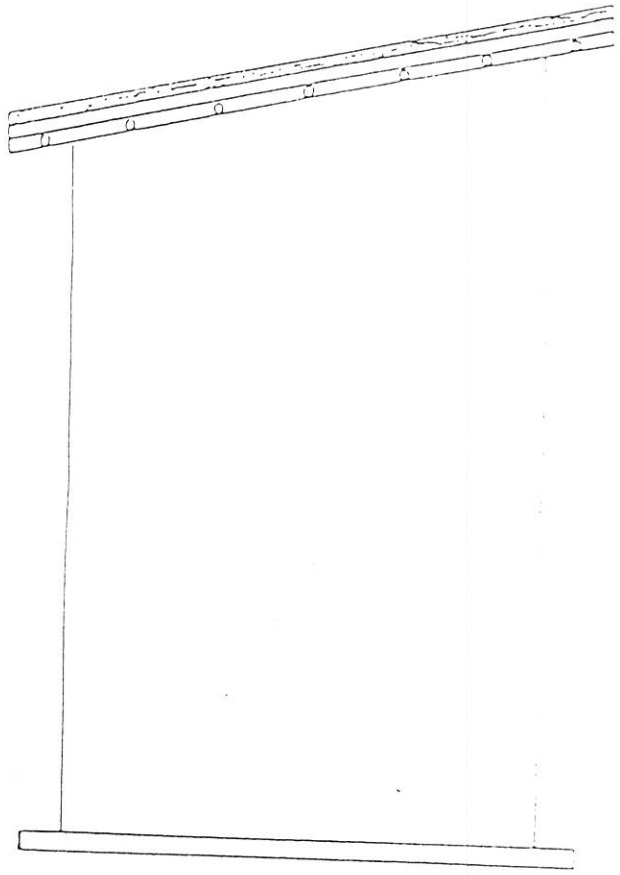
SECTION A – A'

SCALE = 1 : 30

PIT - LATRINE



FRONT ELEVATION



RIGHT SIDE ELEVATION

SCALE : 1 : 30

Annex 7. Background of The Implementing Organization

Name:Rural Community Water Development Organization

Legal status:

COWDO is a local NGO registered under the Ministry of Justice having NGO registration Number 274 and made a general agreement with Disaster prevention and Preparedness Commission (DPPC).

Establishment and Structure:

A group of high level professionals who have worked in the rural communities of Ethiopia for long periods of time in water resources studies and development activities, observed that the destitution of rural communities of Ethiopia, particularly the high death rate due to water borne diseases, malnutrition and food insecurity are mainly caused by lack of knowledge and economic inability to utilize their water resources; both ground water and surface water. Such observation created great burden and compassion in the group who were moved for the conception and formation of COWDO. The organization was founded is 1992.

The organization is governed by a board of directors. There is a clear structure of COWDO and assignments and responsibilities for all staff. All activities are managed by the managing director. The project coordinators are responsible for the activities at the project sites.

Objectives of the Organization:

The central objective of COWDO, is aimed at making them use safe water for drinking and sanitation purposes in appropriate technology and hence bring about a self-reliant community. This is to come up with a development goal of improving the living condition of the rural communities.

Field of Operations:

COWDO is a sector specific and rural centered NGO focusing on water supply and sanitation activities. COWDO, since its establishment has undertaken relatively short and long term project activities in the rural communities.

Personnel situation :

COWDO presently is staffed with qualified professionals and skilled workers that are employed both in Addis Ababa and at project sites having a total number 16. COWDO's staff at the project office has a day to day contact with head office at Addis Ababa.

COWDO's staff by qualification

No.	Qualification	Number of employees	%
1.	M.Sc./Ph.D.	2	12.5
2.	BA/B.Sc.	1	6.2
3.	Diploma (12+2)	2	12.5
4.	Grade 12 complete	7	43.8
5.	Under grade 12	4	25.0
Total		16	100

Financial Situation :

Funding is mainly on project by project basis. Projects in a given target area will be identified and the detail proposal will be prepared and submitted to potential foreign donors. The water development endeavor has been supported by German Agro Action (GAA), a European NGDO. COWDO has tax exemption entity by the government of Ethiopia regarding the import of any item included in the project agreement.

Apart form COWDO's acceptable and computerized financial management , COWDO has also established an external and chartered auditing system.

Offices, logistic support and equipment:

COWDO has rented houses for its head office in Addis Ababa and a project office at project site level. The project offices are equipped with cost effective office furniture and logistics support for a given project. COWDO is also equipped with some scientific instruments such as electrical geophysical equipment and mirror stereoscope.

Internal monitoring and evaluation and reporting:

COWDO has its own formal and informal internal monitoring and evaluation systems which could range from in weeks to an end of a project period. In a year, quarterly basis internal monitoring and evaluation system is formal for COWDO. However, there is also regular monitoring and evaluation of mid-term and at about the end of project period. Depending on the need of a partner, COWDO presents reports based on partners' reporting format. Quarterly basis in reporting is formal in COWDO

Cooperation and co-ordination with other organizations :

COWDO's records show that whenever requested, it has shown its cooperation to share its experience with other relevant government and non-government agencies. Annual plan of operation and quarterly reports are submitted to government and regional bureaus. This structure allows duty free import of vehicles which are included in project documents.

The relationship between head office and project offices:

Except few important responsibilities, such as approval of financial issues, overseeing project properties, monitoring and evaluation, the project office at project site level has the power to decide and manage both financial and project activity issues. Therefore, the degree of autonomy of its staff at project office level goes as far as having the power of passing decisions on several aspects of project activities.

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SCHOOL OF GRADUATE STUDIES

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WATER SUPPLY SCHEMES:
THE CASE OF COWDO
IN MESKANENA MAREKO WOREDA

By
KEBEDE WOLDIE LIBASIE

Approved by Board of Examiners:

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4. External Examiner	Signature 14/07/2003