

ISSUES REGARDING SUSTAINABILITY OF RURAL WATER SUPPLY IN ZAMBIA

BY

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SUMMARY

The purpose of this dissertation was to identify factors that contribute to the sustainability of rural water supply facilities (WSFs). Twenty-four interviews were conducted: 16 from rural communities and 8 from water supply agencies. Key findings are that in order to achieve sustainability of WSFs, there is need to ensure that (1) there is an effective community organisation; (2) communities have the ability to operate and maintain WSFs; (3) communities are able to raise adequate user fees for purchasing spare parts; and (4) that there is a strong backup support at the district level to carry out major repairs. Major threats to the sustainability of WSFs include high poverty levels in communities, weak institutional framework and inability of communities to handle major breakdowns.

Key terms in the study are: Sustainability of rural water supply, community management, partnership approach, centralized management approach, appropriate technology, policy and institutional framework and community participation.

ACRONYMS

ADB	Asian Development Bank
APM	Area Pump Minder
CMMU	Community Management and Monitoring Unit
DAPP	Development Aid from People to People
DDCC	District Development Co-ordinating Committee
DISS	Department of Infrastructure Support Services
DWA	Department of Water Affairs
D-WASHE	District Water, Sanitation and Hygiene Education
GRZ	Government of the Republic of Zambia
IDWSSD	International Drinking Water Supply and Sanitation Decade
IWSC	International Water and Sanitation Center
GTZ	German Technical Cooperation
JICA	Japanese International Co-operation Agency
MCDSS	Ministry of Community Development and Social Services
MCM	Million Cubic Meters
MEWD	Ministry of Energy and Water Development
MNR	Ministry of Natural Resources
MLGH	Ministry of Local Government and Housing
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOFND	Ministry of Finance and National Development
MMD	Movement for Multiparty Democracy
NGO	Non-Governmental Organisation

NWASCO	National Water Supply and Sanitation Council
O&M	Operation and Maintenance
PCU	Programme Co-ordination Unit
PDCC	Provincial Development Co-ordinating Committee
P-WASHE	Provincial Water, Sanitation and Hygiene Education
RSU	Reform Support Unit
RWS	Rural Water Supply
RWSS	Rural Water Supply and Sanitation
SAP	Structural Adjustment Programme
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
V-WASHE	Village Water, Sanitation and Hygiene Education
WASHE	Water, Sanitation and Hygiene Education
WHO	World Health Organisation
WRI	World Resource Institute
WSF	Water Supply Facility
WVI	World Vision International

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CHAPTER ONE

SCOPE OF THE STUDY

1.0 BACKGROUND

It is estimated in Zambia that as many as two thirds of the rural population do not have access to safe water (World Bank 1976:44; Briscoe & de Farrenti 1988: 1&3; Pickford, Baker, Elson, Ferguson, Parr, Sayvell, Shaw & Skinner (eds). 1996: 23; McPherson 1994: 11; MEWD 1994: 19; Kifle 1998: 5). To make matters worse, the one third of the population that has access to safe water is also struggling to maintain their water supply facilities. The rate at which water supply facilities are falling into disuse is alarming (Taylor & Mudege 1996:3; Glennie 1983:97). Almost half of all water supply facilities constructed in Zambia are not operational (RSU 1999: 3; WHO 1993: 43; Kimena 1998: 11-12). In addition, most of these water supply facilities break down in the first three years of construction (GTZ 1997: 2; Taylor & Mudege 1996: 3; Glennie 1983: 97).

In its pursuit to provide access to safe water for all its citizens, the Zambian government is faced with two problems: constructing new water supply facilities; and maintaining already constructed water supply facilities (Duncan 1996: 76; Brikke 1994: 43; Kifle 1998: 5). Maintaining already constructed water supply facilities is therefore critical in increasing access to safe water. Without sustainable rural water supply, the number of people having access to safe water will continue to decline, while the number of people depending on unsafe sources of water, and those exposed to water related and water borne diseases, will continue to rise (WRI 1998: 79).

This dissertation has attempted to provide insight regarding sustainability of rural water supply in Zambia, by presenting perceptions and experiences of rural communities and water supply agencies regarding sustainability and non-sustainability of water supply facilities. The dissertation looks into three sets of factors of sustainability in rural water supply sector. These are: (1) factors that contribute to the promotion of water supply facilities as perceived by selected communities and water supply agencies, (2) understanding of the adequacy of the policy, legal and institutional framework for the water supply sector, as perceived by water supply agencies, and (3) identification of the most effective management approach for rural water supply in Zambia, as perceived by water supply agencies.

1.1 PROBLEM FORMULATION

Recent studies indicate that over 40% of all water supply facilities constructed in Zambia are in a state of disrepair (Duncan 1996: 76; Brikke 1994: 43; RSU 1999: 18; WHO 1993: 43; Kimena 1998: 11). These figures could even be understated because several water supply facilities continue to fall into disuse each year (Roark, Hodgin, & Wyatt 1993: 1). Churchill (1987: 1) and Roark et al. (1993: 1) assume that in many places there might be as many water supply facilities falling into disuse as those that are being constructed.

This problem is not unique to Zambia. Statistics across the world, especially in the third world countries, indicate that rural water supply facilities are falling out of use at an alarming rate (Clark 1988: 133; McPherson 1994: 11; Taylor & Mudege 1996: 3). In West Sudan for example, 50% of the systems were assessed as being inoperable at any one time (McPherson 1994: 11).

Lack of participation by rural communities who are the end users in the planning, implementation and management of water supply facilities and weakness in the operation and maintenance system are some of the reasons responsible for this problem (Churchill 1987: 1; Kimena 1998: 13; Sutton & Mwansa; 1998: 28). Other reasons given for this problem are: lack of comprehensive government policy on responsibilities for co-ordination of the rural water supply sector, lack of a clear policy on O&M, lack of spare parts for many hand pumps, logistical problems for district maintenance teams and complexity of pumping technologies (RSU 1999: 18).

The high number of water points falling out of use threatens sustainability of the rural water supply sector in Zambia, and if unchecked, the national goal of universal access to safe, adequate and reliable water supply will never be achieved (MEWD 1994: 19; RSU 1999: 3; Yachiyo 1994: 2; Kifle 1998: 5; Churchill 1987: 1).

It should however be noted that although there are many water supply facilities that are not sustainable, there are many that are sustainable. Lessons drawn from both unsustainable and sustainable water supply facilities can significantly contribute to the understanding of the situation,

and development of practices and policies that would promote sustainability of the rural water supply sector in Zambia.

1.2 REASONS FOR CHOOSING THIS AREA FOR INVESTIGATION

Three main factors led to the researcher choosing this area (sustainability of rural water supply) for investigation: first, having worked in the field of rural water supply sector in Zambia for five years, the researcher observed that many water supply facilities were falling into disuse at a high rate and wanted to find out factors that have led to this problem. Second, huge resources invested in rural water supply go to waste due to a high number of water supply facilities falling into disuse. Making water supply facilities sustainable would make the rural water supply sector more cost effective and would result in a positive return on investment. And third, when water supply facilities are not sustainable, the number of people having access to safe water is reduced.

1.2.1 RELEVANCE OF THE RESEARCH STUDY TO SOCIAL WORK THEORY AND PRACTICE

The relevance of this research study to social work theory and practice is three-fold. First, provision of water is critical to the improvement of the quality of life of people because having access to sufficient quantities of clean and safe water enhances the health and productive lives of people in rural areas. This is important both in social and community development promoted by social workers (GRZ 1994: 3; Bernstein & Gray 1997: 7). Second, social workers have a valuable contribution to make to the water supply sector, which is at the centre of the fabric of rural communities, because of their understanding and skill in dealing with social issues. Findings from this research study would contribute to the body of knowledge in social work. And lastly, research findings could also be used by social workers in the field of rural water supply to promote sustainability of rural water supply facilities in Zambia and other third world countries.

1.3. AIM AND OBJECTIVES OF THE RESEARCH STUDY

Below is the aim and objectives of the research study:

1.3.1 AIM OF THE RESEARCH STUDY

The aim of this research study was to identify factors that contribute to the promotion of sustainability of rural water supply facilities in Zambia. The researcher chose this as the aim of research because he would like to contribute to the sustainability of rural water supply, which is considered not to be sustainable. As mentioned above, almost half of all water supply facilities constructed in Zambia are not operational (RSU 1999: 3; WHO 1993: 43; Kimena 1998: 11-12).

1.3.2 OBJECTIVES OF THE RESEARCH STUDY

In order to achieve the above aim, the following four objectives were identified for the research study:

1. To conduct a literature review on sustainability of rural water supply facilities.
2. To establish perceptions of water supply agencies on the adequacy of the current policy, legal and institutional framework in promoting sustainability of rural water supply in Zambia.
3. To identify what water supply agencies perceive as the most effective approach in the management of rural water supply in Zambia that would ensure sustainability of water supply facilities.
4. To establish what communities and water supply agencies perceive as the most critical factors that contribute to the promotion of sustainability of rural water supply in Zambia.

1.4. RESEARCH QUESTION

The following research question was set for the research study.

1.4.1 RESEARCH QUESTION

This research study sought to answer the following research question: what factors contribute to the sustainability of rural water supply facilities in Zambia? Answers to this

research question has helped in identifying critical factors that needs to be put in place, if rural water supply in Zambia is to be sustainable.

1.5 RESEARCH DESIGN – METHODS OF INVESTIGATIONS

The research design shows how the research was conducted and includes the following: research method, exploratory research design, the research procedure, respondents, and methods of sampling, data collection, and processing and analysis.

1.5.1 RESEARCH METHOD

The philosophical approach to research chosen by the researcher is the phenomenological research. It implies an emphasis on people's subjective experiences and interpretations of the world, in order to understand a subject matter from their perspective. Rubin and Babbie (1993: 377) state that phenomenological research implies understanding people's feelings, views of reality and meaning when conducting research.

Phenomenological research uses inductive reasoning, which entails developing generalization based on a set of specific observations. This type of research paradigm is appropriate to the research study because it allows the researcher to develop a more accurate, in depth understanding and has richness of detail in relation to the subject under study (Neuman 1997: 106; Rubin & Babbie 1993: 26; Mancosa 2000: 10).

1.5.2 EXPLORATORY RESEARCH DESIGN

The researcher selected exploratory research design for the purpose of this research study because it was found to be the most suitable research design for two reasons. First, exploratory research is "usually small-scale research undertaken to define the exact nature of the problem and to gain a better understanding of the environment within which the problem has occurred" (McDaniel & Gates 1995: 27). And second, exploratory research design is appropriate to this research because it is primarily concerned with finding out what is happening and discovering new insights about a social phenomenon. The researcher

conducts an in-depth search of the literature, interviews experts in the field, and interviews respondents mainly using group interviews or focus group discussions. Out of these diverse sources of information, the researcher begins to piece together details about the real nature of the field of interest (Mancosa 2000: 21).

1.5.3 THE RESEARCH PROCEDURE

The research conducted comprised the following steps:

- A comprehensive theoretical and literature study was conducted on aspects relating to sustainability of rural water supply in Zambia;
- A sample of 16 communities in Mazabuka district: 8 with functional and another 8 with semi/non-functional water supply facilities, were selected;
- Two structured interviews were designed by the researcher to investigate the phenomenon under study with communities and water supply representatives respectively;
- A pilot study involving a representative from each of the two sample groups was undertaken to test the interview schedules;
- Questions were then modified on the basis of the pilot study. The order of some questions was reorganised to facilitate the respondents' responses, and some questions found repetitive or irrelevant, were removed from the interview schedules;
- The researcher then conducted structured interviews with respondents. The researcher introduced himself to respondents, the purpose of the interview was explained; and in all cases, respondents were willing to co-operate with the researcher;
- The data obtained was recorded, and a report-comprising respondent's responses, were drawn up for each interview conducted. On the basis of the results reflected in the reports, data was evaluated, analysed and inferences made in terms of the existing literature and theories; and
- On the basis of the results, recommendations were made on the factors that should be put in place in order to promote sustainability of the rural water supply sector in Zambia.

1.5.4 RESPONDENTS

Respondents comprised community members with improved water supply facilities and representatives of water supply agencies. A total of 16 rural communities were visited. In most cases, interviews were conducted with members of a water committee. Interviews were only conducted with other community members when no member of a water committee was available. Both individual and group interviews were conducted. However, the latter was preferred. Individual interviews were only conducted where only one person was available. Eight respondents from water supply agencies were also interviewed: four from Lusaka and the other four from Mazabuka. In all cases individual interviews were conducted.

1.5.5 METHODS OF SAMPLING

Purposive sampling technique – a non-probability sampling design - was chosen by the researcher to select respondents. This sampling technique is appropriate in the absence of a sampling frame as the case was for this research study (Neuman 1997: 206; Feuerstein 1986: 72.). Purposive sampling technique was applied as follows: first, the researcher inquired from water supply agencies at district level on areas that were suitable for collecting data that would meet the research objectives. Three geographical areas were identified: east, north and south of Mazabuka district. And second, the researcher conducted interviews with communities with water supply facilities in each geographical area.

For water supply agencies, the researcher conducted interviews with all (four) water supply agencies in Mazabuka that are involved in rural water supply. In Lusaka, the researcher conducted interviews with representatives of four water supply agencies that are prominent in the rural water supply sector across the country.

In this study, a community (a group of households in a particular area that share one or more water supply facilities) was considered as a unity of analysis, while key community informants, mostly water committee members, were considered as units of

observation (Bless and Achola 1988: 68; Rubin & Babie 1993: 247; Wimmer & Dominick 1987: 77; Neuwman 1997: 214; Feuerstein 1986: 73). Both individual and group interviews were conducted. However the later was preferred.

1.5.6 METHOD OF DATA COLLECTION

The researcher decided to use structured interviews as the most appropriate data collection method for this research study. The researcher designed two types of structured interviews. (Copies of interview schedules are found in the appendix). The first type of structured interviews was conducted with respondents from 16 communities with water supply facilities. The second type of structured interviews was conducted with eight respondents from water supply agencies involved in rural water supply.

The researcher found structured interviews to be the most appropriate data collection method for the research study because of the following reasons. First, structured interviews are more suitable for collecting information that gives an overall indication of progress and achievement of interventions in relation to community needs and preferences. Second, structured interviews allow for probing in order to find out underlying meaning and reasons to answers given by respondents, which would otherwise not be possible with other data collection methods. They also give room for unanticipated potentially important data, while at the same time ensuring that materials considered necessary to basic data collection are included. And lastly, the researcher was able to easily adapt or change the questions during the investigation. This allowed for deeper understanding of the problem under study (Rubin and Babbie 1993: 374; Collins 1994: 52; IWSC 1987: 77 & 78).

1.5.7 DATA PROCESSING AND ANALYSIS

Analytical comparison was used as a method of data analysis. A method of agreement and difference forms a basis for analytical comparison. The researcher first compared responses of each respondent against other respondents, and second, he compared the

primary data against theory and literature review. Similarities and differences between the collected data and theory were at the core of the analysis (Neuman, 1997: 428).

1.6 LIMITATIONS AND VALUE OF THE RESEARCH STUDY

Outlined below are limitations and value of this research study:

1.6.1 LIMITATION OF THE RESEARCH STUDY

Two major limitations of this study were identified. First, generalisation of the results of the study to the total population of communities with rural water supply facilities should be done with caution due to the following reasons:

- The sample size was small.
- Different organisations are working in different districts employing different strategies. As a result, what is happening in one district may not necessarily be happening in other districts.
- Ignorance of a sampling frame made it impossible to obtain a probability sample, making it difficult to generalise findings. In addition, the use of non-probability sampling design increases sampling errors.

And second, the researcher focused on the sustainability of boreholes fixed with hand pumps to the exclusion of other types of rural water supply technologies mainly because hand pumps are the most common type of technology in Mazabuka. This is a limitation because sustainability of rural water supply may lie in other types of technology that were not investigated.

1.6.2 VALUE OF THE RESEARCH STUDY

Although the research study has limitations, it has value too, as outlined below:

- Despite the fact that generalisation of research findings should be done with caution, this research helps to show that each district in Zambia is unique and may be affected by factors not common to other districts. This research study will therefore

assist in dealing with problems of unsustainable water supply facilities in Mazabuka district if recommendations made are implemented;

- Some problems identified in this research study are systemic and common to all districts in Zambia. Therefore, recommendations made in this research study are applicable to many other districts in Zambia;
- Research findings from this research study could also significantly contribute to the promotion of sustainability of rural water supply in other third world countries in general and Zambia in particular. This would subsequently contribute to the promotion of social development in rural communities; and
- Although focusing only on the sustainability of one type of technology was identified above as a limitation, there is also value because hand pumps have been adopted nationwide as the most suitable technology in rural water supply. Therefore, sustainability of this type of technology would go a long way in sustaining rural water supply in Zambia.

1.7 PREVIOUS RESEARCH

Outlined below are major findings of previous relevant research conducted in Zambia:

- A survey conducted by CMMU in 1996, revealed that about 40% of all water supply facilities constructed in Zambia were not operational mainly due to poor maintenance (Kimena 1998: 13).
- Duncan (1996: 76) indicates that breakdowns and lack of maintenance are the main reasons why water points are non-operational in Zambia.
- A review of Irish Aid support to the water sector in Zambia revealed that many water points have fallen into disuse because operation and maintenance has not been adequately addressed (Sutton & Mwansa 1998: 28).

These studies clearly demonstrate that rural water supply facilities in Zambia are not sustainable. However, these studies do not provide an in depth analysis on reasons why rural water supply in Zambia is not sustainable, and what should be done for it to be sustainable, hence the need for this research.

1.8 DEFINITION OF CONCEPTS

Reference should be made to the description of terms below in order to avoid confusion in the meaning of terms used in this dissertation.

- **Community** refers to a group of households in a particular area that share one or more water supply facilities.
- **Centralised Management System** refers to rural water supply that is dependent and directed by the central government for management, technical and financial support (Briscoe & de Farrenti 1988: 5). For detailed discussion, readers are referred to section 4.5.1 of the dissertation.
- **Community Management** refers to the capacity of a community to control or at least strongly influence the basic decisions over construction and management of its water supply system (McCommon & Yohalem 1990: 10). For detailed discussion, readers are referred to section 4.5.2 of the dissertation.
- **Operation and Maintenance (O&M)** refers to mechanisms put in place for efficient management and repair of water supply facilities. For detailed discussion, readers are referred to section 4.4.3 of the dissertation.
- **Partnership Approach** refers to sharing of roles, responsibilities and costs between a community and a water supply agency in the construction, management and maintenance of a water supply facility. For detailed discussion, readers are referred to section 4.5.3 of the dissertation.
- **Rural Water Supply (RWS)** refers to provision of clean and safe water to rural communities through construction of boreholes, protected wells and springs.
- **Sustainability** refers to water supply facilities being maintained in a condition that ensures a reliable and adequate potable water supply over a prolonged period of time (Davis and Brikke 1995: 6). For a detailed discussion readers are referred to section 3.3 of the dissertation.
- **Water Supply Agencies (WSA)** in this dissertation refer to all institutions, public, private and non-governmental, which are involved in the provision of water to rural areas, through funding, implementing and monitoring of rural water supply programmes.

- **Water Point** means any water source where a rural community draws water. This might be a well, borehole, spring, river or a dam.
- **Water Supply Facility** refers to (1) boreholes fixed with a hand pump or with bucket and chain, and (2) protected wells (where rural communities draw clean and safe drinking water). In this dissertation, water supply facility is interchangeably used with water supply system.

1.9 CONTENT OF THE DISSERTATION

The dissertation is divided into seven chapters. Chapter one deals with the problem formulation, objectives, research question and assumptions of the study and the research design of the empirical study. Chapter two provides an overview of water supply in Zambia. Chapter three looks at social development, rural water supply and sustainability. Chapter four is a literature review, which also includes relevant previous research and theories. Empirical investigations and results of the study are presented in chapter four. Research findings are presented and discussed in chapter five and six respectively. Conclusions and recommendations on how to achieve sustainability of rural water supply in Zambia are presented in chapter seven.

CHAPTER TWO

OVERVIEW OF WATER SUPPLY IN ZAMBIA

2.0 INTRODUCTION

This chapter provides an overview of water supply sector in Zambia, in order to provide an understanding of the context in which the rural water supply sub-sector operates. The chapter is divided in two major sections: water resource base and water sector reforms. The latter is divided in three sub-sections: policy, legal and institutional framework.

2.1 WATER RESOURCE BASE

Zambia has a good water resource base both in terms of surface and groundwater water resources. The mean annual rainfall in Zambia varies from 1,400 mm in the North to 700 mm in the South, along the shores of Lake Kariba. The country has a well-distributed system of perennial rivers, streams, lakes and swamps throughout its territory. There are five river basins of the Zambezi, Kafue, Luangwa, Chambeshi/Luapula and Tanganyika. In all, the surface water resources are estimated to cover 45,000 square kilometers (6%) of the total land area (MEWD 1994: 5).

Zambia also enjoys favourable ground water conditions compared to most countries in the Southern African region with regards to depth, storage capacity, available yields and exploitation potential. The total ground water storage is estimated at 1,740,380 MCM and ground water recharge of 160,000 MCM per annum. The exploitation of ground water resources in the country goes on without any monitoring or regulation. This is compounded by the fact that groundwater has always been regarded as privately owned. This has resulted into failure to delineate potential areas that would support agricultural and industrial aspects in the above-mentioned basins (MEWD 1994: 12).

Although in normal years the country has sufficient water resources to meet both short and long-term requirements, water is still considered to be a scarce resource. This is due to unfavourable climatic conditions in some regions of the country, uneven geographic distribution of water in relation to demand, declining quality of water in some basins such as the Kafue, and the obligation

to share the available water resources with other countries in a common basin. The other consideration that makes water a scarce resource is the seasonal/annual variability both quantitatively and qualitatively in some basins, particularly in the southern part of the country where there are few perennial rivers (MEWD 1994: 5).

2.2 HISTORY OF WATER SUPPLY REFORMS

Zambia's water supply sector is categorized under two headings, namely urban water supply and rural water supply. Urban water supply involves the provision of safe water to both rural and urban towns through mechanical and electrical plant and reticulation systems, while rural water supply involves the provision of safe water to rural communities mainly through protected wells and hand pumps (Zambia-water 2002: 4).

The water supply sector did not for a long time deliver acceptable levels of service in the country (Zambia-water 2002: 4). This failure resulted in the government launching the water sector reform in 1993. The water supply sector reforms were spearheaded by the Programme Co-ordination Unit (PCU), which was established by the government (Harvey & Skinner 2002: 5). The main objective of PCU, an inter-ministerial committee with membership from 10 government institutions, was to make recommendations on the reorganization of the water supply and sanitation sector in Zambia and to oversee its implementation. Seven policy principles were adopted as a basis for the restructuring the sector (MOFND 2002: 92; N-WASHE 2000:3; Zambia-water 2002: 4, Harvey & Skinner 2002:5):

- Separation of water resource management from water supply and sanitation provision;
- Separation of the functions of regulation and service provision;
- Devolution of authority to local authorities and private enterprises;
- Full cost recovery in the long run (with lifeline tariff and cross-subsidy);
- Human resource development resulting in more effective institutions;
- Technology appropriate to local conditions; and
- Increased government priority and budget to the sector.

The water sector reforms have resulted in the development of the policy and legal framework and change of the institutional arrangement in the water supply sector. After meeting its objectives,

PCU was transformed into a statutory body known as the National Water and Sanitation Council (NWASCO). Details of its functions are outlined under the legal framework below (Harvey & Skinner 2002:5).

2.2.1 POLICY FRAMEWORK

Zambia was until 1994 without a coherent water policy for planning, management and development of water resources. Water supply sector operated on ministerial statements that were based on various ad-hoc water user objectives that merely provided principles for the often crisis prone management and uncoordinated development purposes. These principles were contained in a ministerial policy statement called “construction, maintenance and operation of public water supplies”. The lack of a comprehensive policy had to a great extent contributed to the deterioration of the water supply infrastructure (GRZ 1994: 1; Kimena 1987: 7; RSU 1999: 7; Tranor 1994: 7).

It was towards the end of 1994 that the national water policy was developed. The national water policy covers water resources management, water use, and water quality aspects. It aims at promoting sustainable water resources development with a view to facilitate adequate, equitable, and good quality water for all users at acceptable costs, and ensuring security of supply under varying conditions. The development of the water policy has been a major positive development in providing a policy framework and direction in water resource management, urban and rural water supply sub-sectors (Kimena 1998: 7; MOFND 2002: 92).

The policy framework includes the following key policy strategies:

- Recognising the important role of the water sector in the overall socio-economic development of the country;
- Vesting control of water resources in the country under state control;
- Promoting water resource development through an integrated management approach;
- Providing adequate, safe, and cost-effective water supply and sanitation services with due regard to environmental protection;
- Defining clear institutional responsibilities of all stakeholders in the water sector for effective management and coordination;
- Recognising water as an economic good.

Within this policy framework, government successfully implemented a broad-based, collaborative, and consultative approach to elaborate strategies that are specific to different sub-sectors (MOFND 2002: 92). In addition to the National Water Policy, the Government in 1996 adopted the WASHE (Water, Sanitation and Hygiene Education) concept as a cornerstone of its service delivery strategy for rural areas. The WASHE concept emphasises the importance of an inter-sectoral approach to planning and a participatory approach to implementation (Harvey & Skinner 2002: 5). Another critical element of the WASHE concept is that the government has set a limit on the number of people who are supposed to use one water supply facility to 200 (Nkoloma 2001).

This strategy facilitates the involvement of the rural population in assessing priorities; determining affordable and sustainable technology; management, operation and maintenance; and improving the health and hygiene practices in rural communities. The strategy is being implemented through district level committees (D-WASHE), which are part of the formal district level planning process. Communities are encouraged to establish lower level WASHE committees to ensure effective community planning and management of water supply and sanitation facilities (MOFND 2002: 92).

Although the adoption of the national water policy has also become a first step towards a systematic approach to the development and management of water supply sector, emphasis has however been placed on urban water supply to the detriment of rural water supply. In addition, more work still remains to be done to translate the strategies and measures proposed in the policy into reality. There is also a need to elaborate policy, legislature and institutional framework for rural water supply to enhance collaboration among the service providers and coordination of activities to improve coverage and efficiency in the service delivery (RSU 1999: 687).

2.2.2 LEGAL FRAMEWORK

The primary legislation prescribing the development and management of water resources in Zambia is the Water Act, Cap. 198. This Act was originally enacted in 1948. The Water Act establishes the Water Board as the organisational unit responsible for administering water rights in the country. The Department of Water Affairs (DWA) in the Ministry of Energy and Water Development provides technical support to the Water Board. DWA is responsible for water resources planning

and management (MOFND 2002: 93). However, the Water Act is outdated and does not adequately address the development and control of ground water and international rivers. In addition, the Water Act does not make sufficient provision for water quality control, institutional framework for regulating development of water resources, provision for facilitating decentralised water resources management and stakeholder participation (MOFND 2002: 93). As a result of these deficiencies, the Act is being revised within the overall water sector reforms (Phiri 2000:1).

The Water Supply and Sanitation Act number 28 of 1997 presently anchors the legal framework in water supply and sanitation sector. According to the Act, local authorities (under the Ministry of Local Government and Housing (MLGH), acting by themselves, through commercial utilities or the private sector, are now responsible for provision of water and sanitation services to all areas in the jurisdiction of the local authority. This role was in the past played by DWA in the Ministry of Energy and Water Development. The Department of Infrastructure Support Services (DISS) in the Ministry of Local Government and Housing now provides technical support to local authorities and assists in the mobilisation and coordination of financial resources for all infrastructure development in local authorities (MOFND 2002: 93).

The Act also establishes the National Water Supply and Sanitation Council (NWASCO) as the regulator for provision of water supply and sanitation services throughout the country. NWASCO, which became operational in 2001, is responsible for developing policies, setting standards and guidelines, licensing water and sanitation utilities and monitoring their performance, and taking any necessary actions to ensure efficient and sustainable provision of water supply and sanitation services (MOFND 2002: 93; RSU 1999: 4).

There was anticipation by many stakeholders in Zambia before the Water and Sanitation Act was passed by parliament, that the inadequacy of the legal framework in rural water sector would be resolved. However, stakeholders were disappointed to discover that the Water and Sanitation Act was virtually silent about rural water supply. Whilst the Act is clear about the roles and responsibilities of NWASCO with regard to the regulation of urban-based commercial utilities, it does not provide rural water supply and sanitation sector with a similar body to coordinate activities. In addition, the provincial and district WASHE committees that have been given the responsibility to co-ordinate rural water supply and mobilise resources, have been left without a

legal status. This has affected their ability to effectively perform functions especially resource mobilisation (RSU 1999: 7).

Other related statutes in water supply sector are the Environmental Protection and Pollution Control Act, Cap. 204, of 1990, which is primarily concerned with control of water pollution. And the Zambezi River Authority Act of 1986, which is concerned with the management of the water resources in the Zambezi River for shared power generation at Kariba between Zambia and Zimbabwe.

The current legal framework is unfavourable in as far as attempting to address the urgent tasks facing Zambia – providing universal access to safe water. The process of translating declarations of intent and policy into law is ongoing but with the passing of the national Water and Sanitation Act and the creation of NWASCO, it would appear that an opportunity to address the challenge has almost slipped stakeholders' hands. The 'slip' may have partly been facilitated by the fact that the supreme law (the Constitution) is silent on social, economic and cultural rights (Phiri 2000: 3). This is unlike the South African government which has enshrined in its constitution, that access to basic water and to an environment not harmful to health or well-being, is a basic right (Muller 2002: 3). The Water and Sanitation Act does not squarely address the issue of universal coverage of water with any deliberate urgency. There is also confusion over what is meant by "obligation to provide water supply and sanitation services". "It is still very business –as- usual" Act (Phiri 2000: 30).

2.2.3 INSTITUTIONAL FRAMEWORK

In Zambia, organisations and institutions involved in rural water supply provision operate independent of each other mainly because there are no clear operational guidelines. This has resulted in a high degree of confusion, costly duplication, and competition rather than cooperation. There are also a lot of overlaps in responsibilities. As a result, various NGOs and government institutions have often installed hand pumps with minimal consultation with beneficiary communities or with other donor and institutions. Consequently, implementation approaches have varied greatly; and a wide variety of different hand pumps have been installed nationwide. Although the WASHE model is being promoted, which is at the heart of the current national rural water supply, and is based on devolving responsibility and authority to district level government,

many district councils lack technical staff and still rely heavily on DWA to fulfill its role (Harvey & Skinner 2002: 12).

The problem was compounded before 2001, when there were no policy guidelines on the lead institution in rural water supply. Both the MLGH and MEWD/DWA were claiming responsibility over rural water supply (RSU 1999: 23). The government has now separated the functions of regulation and service provision. The MEWD has retained the responsibility for water resource management and regulation while the MLGH has now been given the responsibility for water supply provision (MOFND 2002: 92; N-WASHE 2000: 3; Zambia-water 2002).

Although the responsibility for routine maintenance of water supply facilities are being squarely placed on Village WASHE (V-WASHE) committees, communities do not always have the capacity to manage their own water supply facilities without any outside help (Parry-Jones, Reed & Skinner 2001: 13). The effectiveness of V-WASHE committees is also likely to be influenced by local traditional leaders. Hence, all new projects in the area should be implemented through consultation with the local chief to enhance long-term sustainability of water supply facilities (Harvey & Skinner 2002: 24).

The institutional arrangements for water supply and sanitation service provision to urban areas, in particular, are elaborated in the Strategy and Institutional Framework for the Water and Sanitation Sector, which was adopted in 1994. It establishes the framework for devolution of authority for service provision from central government to local authorities and private enterprises, and it has so far been the basis of the ongoing institutional reform of the Water Supply and Sanitation (WSS) sector (Zambia-water 2002: 4; MOFND 2002: 92). It states that executive (operational) functions of water supply and sanitation, which were previously carried out by the Department of Water Affairs (DWA) of the Ministry of Energy and Water Development should now be transferred to the Local Authorities under the supervision of the Department of Infrastructure Support Services (DISS) under the Ministry of Local Government and Housing (Harvey & Skinner 2002: 5).

The institutional framework in water supply sector involves several institutions, at national, provincial, district and village levels.

2.2.3.1 GOVERNMENT INSTITUTIONS

At national level a number of Ministries share responsibilities that are related to water supply and sanitation.

- **The Ministry of Local Government and Housing** is responsible for the direction and control of Local Authorities as of 2002. In turn, local authorities have a responsibility to provide and maintain water supply and sanitation in local authority's areas. At national level therefore, planning, development and construction and management of water supply and sanitation are the responsibilities of the Ministry of Local Government and Housing.
- **The Ministry of Energy and Water Development** is responsible for planning and water resource management.
- **The Ministry of Finance and National Development** is responsible for determination of inter-sectoral investment priorities. The Ministry is also responsible for mobilising finances from local and external sources. In its capacity, the Ministry is responsible for co-ordinating donor aid.
- **The Ministry of Environment and Natural Resources** is responsible through the Environmental Council of Zambia, for control of environmental pollution.
- **The Ministry of Community Development and Social Services** is responsible for community mobilisation and awareness through its literacy program.
- **The Ministry of Works and Supply** is responsible for management/provision of water supply and sanitation facilities.
- **The Ministry of Education** is involved in digging and management of water supply and sanitation facilities in schools (RSU 1999:5).

At district level, District Councils are the focal points of decentralised government responsibility for the provision of services within rural districts. Each council has a District Development Co-ordination Committee (DDCC), which reports to the Provincial Development Co-ordinating Committee (PDCC) and has overall responsibility for development projects within the district (Harvey & Skinner 2002: 9).

There is also a District WASHE (D-WASHE) Committee, which is responsible for overseeing the implementation and monitoring of WASHE projects and activities. It is an inter-ministerial and

normally consists of representatives of the District Council, DWA, MOH, MOA, MCDSS and NGOs involved in water, sanitation and hygiene education. Some districts have also established sub-district WASHE committees (Harvey & Skinner 2002:9; RSU 1999:6). D-WASHE committees have also been given a responsibility to co-ordinate rural water supply and sanitation in each district and to solicit for funds. They also provide external support services to communities such as capacity building of V-WASHE committees, which are established at the community level. In addition, D-WASHE Committees conduct training for water committees, caretakers and area pump minders. V-WASHE committees have the responsibility to operate, manage and maintain water supply facilities. They also deal with environmental hygiene and sanitation issues at the community level (MOFND 2002: 92).

2.2.3.2. EXTERNAL ORGANISATIONS

(a) THE WORLD BANK

The World Bank has provided funding for the Zambian water sector restructuring process; and many government policies mirror World Bank policies and conditions that have been promoted as part of the water sector reforms (Harvey & Skinner 2002: 9).

(b) OTHER EXTERNAL SUPPORT AGENCIES

There are several multilateral and bilateral External Support Agencies involved in the water sector in Zambia. These include UNICEF, GTZ, Irish Aid and JICA. UNICEF has been instrumental in increasing hand pump provision and in developing and supporting the WASHE programme nationwide. It is also actively involved in the supply of spare parts. JICA and GTZ have supported and are currently supporting large-scale drilling and hand pump installation programmes in several provinces of Zambia (Harvey & Skinner 2002: 9).

(c) NON-GOVERNMENTAL ORGANISATIONS

There are several International NGOs involved in rural water supply activities in Zambia, which include Water Aid, Care International, Africare, World Vision International and Development Aid from People to People (DAPP). These NGOs work in close collaboration with D-WASHE

Committees and have representation on relevant D-WASHE committees so that implementation and operation and maintenance procedures should be as uniform as possible for all partners involved in a district (RSU 1999: 5; Harvey & Skinner 2002: 9).

2.2.3.3. LOCAL INSTITUTIONS

(a) COMMUNITY BASED ORGANISATION

Many communities form V-WASHE committees, which are responsible for managing operation and maintenance of community-owned hand pumps. Such committees, which can have up to 10 members, are normally elected by community members and are responsible for collection and keeping of maintenance funds, monitoring of pump performance, routine preventive maintenance and organisation of repairs and replacements. These community-based organisations (CBOs) are often given training in management and maintenance procedures by the implementing agency, and sometimes by the District WASHE committees. Communities are encouraged to ensure that women are sufficiently well represented on V-WASHE committees (Harvey & Skinner 2002:9; MOFND 2002: 91).

(b) THE PRIVATE SECTOR

The private sector has also been involved in rural water supply through borehole drilling and hand pump installation and as a result, there is significant competition to win contracts (Harvey & Skinner 2002: 10). This function was in the past performed by the Department of Water Affairs but is increasingly being performed by the private sector. However, DWA still provides the private sector companies with technical direction and supervision (RSU 1999: 6).

In addition, there are also several companies involved in importing hand pumps and spare parts into the country. These include AFE Limited, Aquagro Limited, and SARO Limited. The latter also imports hand pumps and spare parts from India. These companies are also involved in drilling and installation of hand pumps. Aquagro manufactures some spares parts such as rods and pipes in country and offers free training to pump minders (Harvey & Skinner 2002: 10).

Private individuals also work as Area Pump Minders (APMs) in some areas. Each APM is selected by the community and trained by the D-WASHE Committee in pump maintenance and repair. He or she is provided with a standard and 'special' India Mark II toolkit, and is responsible for zone or area. Special 'fishing tools' for removing pipes that drop in the borehole, are kept at District Council stores and are available to APMs. In many districts, APMs are also used for installation of hand pumps, including supervision of apron production and construction (Harvey & Skinner 2002: 10).

2.3 CONCLUSION

The purpose of chapter two was to give an overview of the water supply sector in Zambia so that the context in which the rural water supply sub-sector operates is understood. The chapter was divided in two major sections: water resource base and water sector reforms. The conclusion is that although the water sector in general has undergone reforms since 1997, problems of the water sector have not abated, in some respects they have worsened, because a number of problems still exist. However, the government continues to address them (Zambia-water 2002: 2).

Having provided an overview of rural water supply in Zambia, the researcher will in chapter three endeavour to link rural water supply and social development. He will establish the meaning of sustainability in rural water supply, which is a central theme in this dissertation.

CHAPTER THREE

SOCIAL DEVELOPMENT, RURAL WATER SUPPLY AND SUSTAINABILITY

3.0 INTRODUCTION

The aim of this chapter is to show a link between social development, rural water supply and sustainability of rural water supply. The chapter is divided in three sections. The first section looks at water and social development. The second section looks at approaches in the rural water supply sector. And the last section looks at sustainability of rural water supply facilities.

3.1. WATER AND SOCIAL DEVELOPMENT

This section explores the interrelationship among various concepts, which include water and poverty, development, social development, and water and social development. It is a core section of this chapter.

3.1.1. WATER AND POVERTY

Lack of water hits the poor the hardest due to numerous water-related problems they face. More than 80% of the 1.1 billion poor people who lack water live in rural areas, however, the number of urban residents without adequate water services is on the increase. The majority of those without adequate water services live in Asia, while Sub-Saharan Africa has the highest proportion of people without water (ADB 2003: 1).

A discussion on what poverty is and how it is measured is imperative at this point before proceeding with the discussion on the link between poverty and water. Poverty is the negative analogue of human development. If human development signifies the process of enlarging people's choices and opportunities that are most basic to human development, poverty signifies their denial. Such deprivations include material deprivations in terms of food and nutrition, health, education

and literacy, safe water and sanitation, clothing and shelter. Added to this is deprivation of security on account of vulnerability to external events such as bad weather, natural disasters, illness, and economic shocks that reinforce material deprivation. To all these must be added the deprivation of human rights through discrimination, disempowerment, and exclusion that leads to loss of human dignity (MOFND 2002: 20).

In the past, poverty was measured from three perspectives. First, it was measured in terms of an income perspective where a person was considered to be poor if his/her income falls below a defined money-metric line, for example \$1 a day. Second, it was measured in terms of a basic needs perspective where a person was considered to be poor if he/she falls short of the material requirements for minimum acceptable fulfilment of human needs (Burkey 1993: 3). This concept goes beyond the lack of income. And lastly, poverty was measured in terms of capability perspective where a person was said to be poor if he/she lacks certain basic capabilities to function. Such 'functioning' include physical ones such as adequate food, water and shelter; and also includes more complex issues such as social achievements like participation in the life of the community. The merit of the capability approach lies in its ability to reconcile the notions of relative and absolute poverty (MOFDN 2002: 20).

It should be noted that no one set of measurements will give a complete picture because poverty is a multi-dimensional problem and can only be captured through a multi-dimensional measure. A truly holistic measure of poverty needs to encompass elements from all the three perspectives mentioned above (Burkey 1993: 5; MOFDN 2002: 20).

Although inadequate water services cannot alone cause poverty, inadequate water services have devastating impacts on poor people. Many poor people face numerous problems with water security: they are vulnerable to disasters, are the victims of conflicts over water resources or face declining stocks of fish or other products essential to their livelihoods (ADB 2002: 3). Poor access to water contributes to hunger and poor food security. Women and girls bear a heavy burden in providing water for their families; conflicts over water are increasing at local, regional and international levels. The poor are particularly vulnerable to water scarcity, pollutions, flooding and millions who lack water fall ill or die each year from water-related health risks (ADB 2003: 1).

In Zambia, poverty is still a fundamental and worrisome problem despite more than a decade of implementation of the Structural Adjustment Program (SAP). Deepening poverty has reduced critical dimensions of life, worsened by SAP implementation (UNDP 1994: 4; 1995: 5; 1996: 4). More than 80% of Zambians are living below the poverty line. Although poverty is widespread in urban areas, the incidence and severity of poverty is worst in most remote rural areas. This is mainly due to the cut in the social sector expenditure on which most rural areas depend for social services such as health, education and rural water supply (UNDP 1995: 5).

3.1.2 DEVELOPMENT

Despite more than three decades of intensive development research, numerous problems still exist in the concept of development, such that in certain circles some people hold the view that answers to this problem are more inaccessible to human sciences than ever before. Although there are problems with the concept of development, this researcher does not hold such a pessimistic view. He believes that development should be culturally determined and that each society should determine the type of development it wants to pursue (Coetzee 1989: 6).

Coetzee (1989: 25) defines development as “a process of directed/determined controlled change leading to economic growth, political autonomy and a broad basis of social/structural reconstruction”. The author further argues that improvement of human conditions should be the underlying motive, and advancement of human well-being as the ultimate goal. Development should lead to the creation of a condition for the realisation of every ones’ personality. For development to be achieved according to this definition, deliberate efforts must be made in an environment to change that which is not desirable.

Development is also defined as “a process in which people increase their abilities and desires to satisfy their own needs and legitimate desires and those of others (Coetzee 1989: 6).” It implies a process of growth by the individuals to enable them to meet their needs. Development cannot be said to be taking place if people’s ability to meet their needs remains on the same level. It is further argued that development should be development of man, which depends on the theories of basic needs and human relations, resulting from the way wealth, which is instrumental in satisfying these needs, is distributed. Meeting human basic needs is very important for development to take place.

However, these needs should not be satisfied in a manner that denies individual dignity and self-determination.

Development should be seen to or measured by its impact on the individual members of society. For development brings freedom, provided it is development for the people. It should also be kept in mind that people couldn't be developed; they can only develop themselves. For while one can build a house for another, an outsider cannot give the man pride and self-confidence in himself as a human being (Bavu 1974: 26).

Two types of ingredients stand out from the discussion of development above. First, development at an individual level is a self-generated phenomenon, related to free involvement in the person himself or herself, meaning that development of the individual cannot be externally induced. And second, development is determined by improvement of life conditions. Development is therefore both an economic and socio-political process. Anything short of involvement of the self or short of the basic requirement for the sustenance of the lives results in "no-development" (Bavu 1974: 29).

3.1.3 SOCIAL DEVELOPMENT

The concept of development is a generic term with a wide range of meaning. It among other things includes economic, social, political, community development and others. On the other hand, social development is concerned with the eradication of poverty and pursuit of equity in the identification of more holistic solutions to development problems. It addresses problems of access to resources, basic needs, distribution of resources and effectiveness of the use of resources. It examines the different premises on which policy decisions are made and the context in which they are elaborated. It takes as its starting point, the willingness of governments to intervene in directing efforts and contributing resources to the satisfaction of basic needs and the redistribution of assets on a more egalitarian basis (Marsden 1990: 2).

Social development can be traced to three factors. First, specific interest in social development date back to the 1950s when the 'social' was separated from the 'economic' by the United Nations in their reports on the world social situation. The 'human factor' was seen to have been neglected in

thinking about economic development; and sectoral analysis based on concerns with expanding social welfare provision were elaborated (Marsden 1990: 3).

Second, social development has existed as a formal paradigm in interrelated social welfare for more than 30 years. The impetus for its development came from the failure of the traditional individual intervention approach of social workers as well as top down development economists in dealing with problems of the third world countries. There was a realisation of the need to co-join the macro level growth oriented approach of development economists with micro level people oriented approach. Thus, social development brings a human factor to the mainstream of development (Murtaza 1995: 57). And third, decades of the 1950s, 60s and 70s were characterised by capital-intensive development projects such as dams and electricity projects in the developing world. These development projects did not pay attention to environmental degradation and social costs of such projects. Individualism was also perceived as a potential springboard to national social and economic development. The results were negative. Development strategies did not add quality to the life styles of the majority. Hence change of emphasis on social development (Nooyo 2000: 76).

Social development will therefore encapsulate sustainable development as it looks at the remedial, preventive, supportive and developmental services of the citizenry with the view of improving their quality of life. Social development in effect propels positive changes in the lives of individuals, groups and communities. It places the environment at the disposal of human beings and also involves structural transformation of societies rather than measures that stimulate economic development only. Social development must not be solely symptomatic but must be pragmatic and advocate for positive changes that are far reaching and take all facets of social well being into account. Social development endeavours to analyse the totality of human conditions by interrogating issues like status quo, class conflict and social inequalities because social problems have to be considered as primarily emanating from imperfect societal systems (Nooyo 2000: 78).

3.1.4 WATER AND SOCIAL DEVELOPMENT

Water and development are intrinsically linked so that communities cannot achieve development and improve their living conditions without water. Convenient access to safe water leads to improvement in the health status of people and allows more time to be available to them for

education, social and economic development, which are the ultimate achievement (UNICEF 2002:1).

The link between water and development was explicitly stated in 1997 by the United Nations Water Conference, which declared that all people regardless of their stage in development or social and economic conditions have a right of access to drinking water in quantities and quality to meet their basic needs (WRI 1998: 78). Water is a basic need and is an essential ingredient for sustainable development (Mogane-Ramahotswa 1995: 1). Water is not just considered as a basic human right but also plays an important role in the lives of people and in the economic development of a country (UNDP 1998: 43).

Water is critical to the improvement of living standards of societies. Improvement in water supply for those who lack water in the world do much to reduce the global burden of water related diseases and to improve the quality of life. Improvement in water supply coverage can reduce the incidences of diarrhea, ascuiasis, quinea worm, and other water related diseases. Roughly one billion people lack access to clean water worldwide. Diarrhoea diseases caused by contaminated water represent one sixth of the world's disease burden. Lack of adequate water, sanitation and hygiene is responsible for an estimated 70% of all deaths globally and according to the recent estimate, diarrhea alone claims the lives of some 2.5 million children (WRI 1998: 79). In Zambia, more than 8,000 people die per year due to diarrhea and malnutrition and around 1,600 people died in two cholera breakouts that happened before 1997. Therefore, lack of water and sanitation services is a major constraint to both personal and community development (PCU 1997: 111).

Rural communities with access to sustainable safe water supplies have great potential for engaging in economic activities to reduce poverty and improve their quality of life. Sustainable access and use of safe water supply in addition to good health, lead to the release of scarce economic resources from curative health to more productive activities. Time and energy savings from the drudgery of water fetching release women and children to participate in educational and socio-cultural activities (MOFND 2002: 91).

Water provision also has other economic benefits. Water plays a significant role in improving food security and household incomes. Communities with access to adequate water are able to grow

vegetables for household consumption, which improves the nutritional status of families. The surplus can be sold to raise money for other household needs. Water is also critical in keeping livestock such as cattle (Rahmato 1999: 3).

Water is an important factor in improving agricultural production through irrigation as it reduces complete reliance on rain fed agricultural productivity, which is seasonal. Zambia has a favourable climate, which could support at least two crop harvests a year, if water was made available throughout the year, by both small- and large-scale irrigation schemes. This would not only improve food security and reduce the cost of food, but also help reduce poverty, particularly in rural communities (MOFND 2002: 91).

Small-scale hydropower generation targeting rural growth centres would not only provide power for rural agricultural industries, enhancing employment for rural communities, but would also support educational and cultural activities to improve the quality of life in the presently deprived rural areas. Water is also important for sustaining natural eco-systems (such as wetlands), which are the basis of the tourism industry. It is also important for fishing (providing nutrition and livelihood for rural communities) and for rural transport on lakes and rivers (Rahmato 1999: 3; MEWD 1994: 1, MOFND 1992: 91; MNR 1996: 2).

It is well established that investment in water resources management and the delivery of water services are central to poverty reduction. More investment is needed to improve water security for the poor, particularly in rural areas, and such investment should be made more effective. There are well-known local solutions that will improve water supply for consumption and household use, raise food production, reduce water-related hazards, and protect the ecosystems on which the poor often rely for their livelihoods. But rural areas often lack three factors, without which projects and new investment in rural poverty reduction, become less effective. These factors are: local capacity of community, government, and non-government organisation in rural areas to implement sustainable development activities at the local level; streamlined design and implementation of participatory rural investments to speed up implementation and produce benefits more quickly; and partnerships and cooperation among organisations to catalyse pro-poor investments and help to scale-up successful local solutions to widen development impact across the country (ADB 2003: 5).

The discussion above shows that without adequate safe water, no individual, group and community can achieve development; whether economic or social development. The government of the republic of Zambia having realised the link between water and development, adopted a national water policy whose overall objective is “improving the quality of life and productivity for its citizenry by ensuring an equitable provision of adequate quantity and quality of water to all competing groups ...at an acceptable cost on a sustainable basis” (MEWD 1994: 1).

3.2 APPROACHES IN RURAL WATER SUPPLY

The rural water supply sector gradually emerged in the two decades prior to the 1980s International Drinking Water and Sanitation Supply Decade (IDWSSD). It (the rural water supply sector) developed in reaction to the post-colonial governments that wanted to extend the benefits of ‘modern’ infrastructure to their rapidly expanding populations (IWSC 2003: 1). Several approaches, some which are discussed below, have been undertaken since IDWSSD in an effort to improve the living conditions of rural communities through access to adequate water services.

3.2.1 CENTRALISED SYSTEM APPROACH

The first approaches used in providing water to rural communities were those that favoured highly centralised systems. In rural water supply, a centralised system is an approach that is dependent and directed by the central government for management, technical and financial support. It involves a public sector organisation managing mobile teams, which report to the regional headquarters (Sami & Murray 1998: 14; Evans & Appleton 1993: 7). Communities were selected for assistance on the basis of an external determination of ‘need’, rather than the communities’ ‘demand’ for services. Communities were not involved in the decision-making process about the management of the water supply facilities. The nature of service provided was also based on an external perception of ‘affordability’, rather than on the communities’ desire or willingness to pay (Boydell 1999: 2). The centralised systems approach has proved to be ineffective in most of developing countries (RSU 1999: 20).

3.2.2 COMMUNITY MANAGEMENT APPROACH

The second approach that has been tried in rural water supply is community management of rural water supply facilities. Community management approaches did not come spontaneously from, nor do they exist in a vacuum. They have a long history of trial and error in the rural water supply sector, especially with the failure of centralised management approaches. Community management is now entering its second decade in the rural water supply sector (IWSC 2003: 1). It is aimed at strengthening the capacities and willingness of the community to take ownership and responsibility of managing their water supply systems, after the implementing agency has left the community (Moriarty & Schouten 2003: 2).

3.2.3 PARTNERSHIP APPROACH

The third approach being advocated in the management of the rural water supply sector is the partnership approach. It is being advocated for because it has been realised that although communities can take up a substantial share of responsibility, external support services are still required; and also because there is a limit to the responsibilities communities are able to take up (IWSC 1993: 33). Responsibilities that communities are able to take up depend on the organisational, financial and technical capacities of that community, which differ from community to community (IWSC 1993: 4). A partnership approach between government, communities, the private sector, NGOs and donors can provide a sustainable management structure whereby responsibilities are allocated to those institutions and individuals who are best suited to manage the risks of taking on those tasks (Harvey, Skinner & Reed 2002: 17).

3.2.4 PRIVATE SECTOR PARTICIPATION APPROACH

The fourth approach is the private sector participation approach that has become prominent in Bangladesh. Twenty-five years ago, the private sector was almost completely uninvolved in the provision of goods and services in rural water supply and sanitation. The development of affordable hand pumps, and rapid expansion of demand for these goods, has resulted in a radically different situation today (Robinson & Paul 2000: 2). There are several lessons learned from this approach. First, removal of subsidies increased private sector participation. Second, the private sector was

able to provide more flexible and innovative services than the public sector or NGOs. And third, the private sector produced more affordable and demand-responsive products (Robinson & Paul 2000: 11).

There are two other innovative approaches worth mentioning under this section. The first one is the water for business approach and the local private sector approach. Both of these are initiatives that are originated from within the community.

3.2.5 WATER FOR BUSINESS APPROACH

The women of Diass in Senegal introduced the water for business approach. Before 1991, the women of Diass suffered from water shortages. In this Senegalese area of 2,000 inhabitants, all the wells had dried up. In addition, when water from Lake Guiers, supplied through water point, stopped getting through, women were forced to travel long distances. In 1993, a Chinese financed borehole was built. Witnessed by the local authorities, the local community elected a six-person management committee. An audit committee helps to make sure that the borehole and its two water points are managed properly. Committee members – all volunteers- including four women, are responsible for each family's water supply.

The local authorities return supervisory rights. A mechanic and two sales people are paid each month from the proceeds of the sale of water. More than 18,000 metric liters of water are sold each year. The revenue collected allows the committee to maintain the pump (Toure 1998: 26).

3.2.6 LOCAL PRIVATE SECTOR INVOLVEMENT

A second small and localised approach worth mentioning here is the small-scale private involvement in water supply provision in Tanzania. After failure of successive attempts to provide a 'free water' system by the Tanzanian government, privatisation has restored water supplies to a community by the Berege village's private rural water supply system. The water has been successfully restored after the failure of other externally imposed schemes. An individual manages and operates the water supply on a private shareholder basis, with the consent of the community and government (Boydell 1999: 9).

Each home contributes about one pound per year for operation and maintenance costs. This approach has had a marked effect on community life like in a case mentioned above. Daily household use has increased to 25 litres per head per day, and improvements in sanitation and hygiene have been made. Other improvements include school children spending less time in fetching water and women are able to go on with other household chores and to participate in income generating activities (Boydell 1999:10).

Berege village is a positive example of the service approach, which is becoming increasingly influential in the planning of future community-based projects at district, regional and national levels. The successful, private initiative was not imposed by external agencies, but planned, implemented and continues to be managed from within the community (Boydell 1999:11).

This section has highlighted the importance of exploring various approaches in the provision and management of rural water supply systems in order to promote social development in rural communities. Only the first three approaches are discussed in detail again in the following chapter, in terms of their effectiveness to promote sustainability of rural water supply facilities.

3.3 SUSTAINABILITY IN RURAL WATER SUPPLY

Water can only contribute to social development for individuals, groups and communities if water supply facilities are sustainable, without which water would only be available for a short period of time. In order to understand sustainability of rural water supply therefore, the researcher looks at the concept of sustainability in general and sustainability in rural water supply in particular.

The term sustainability is central to many current debates in development circles. While the concept has substantial appeal, consensus on the meaning is lacking, especially concerning what combinations of resources or practices that should be sustained. Although the concept of sustainability has only emerged in the past few years, the proposition that particular human practices in the world have proved unsustainable has cropped up in literature going all the way back to ancient Greece. Sustainability has been somewhat more frequent and sweeping in the two hundred years since the work of Malthus, more so in the period since the World War II. However,

only in the past 14 years has sustainability become a catchword capable of capturing the attention not only of the environmentalists but also of the economists, policy makers and other social scientists (Holdren, Daily & Ehrlich 1995: 1-17).

Concerns about environmental degradation and the earth's carrying capacity have led to what might be called critical limits view of sustainability. It implies that we must preserve the ecosystem and respect the limits that they impose on the number of people in the world and their mode of living. On the other hand, sustainability focuses on balancing social, economic and ecological goals. It aims at meeting a broad range of human needs and aspirations, including health, literacy, and political freedom, as well as purely material needs (Farrell 1998: 2).

Environmentalism, which has contributed to sustainability awareness, has been growing ever stronger over the past few decades. Sustainability, however, has rapidly emerged in several countries in the recent past as a commonly held objective for those concerned with the population, resources, environmental issues and the future in general. It is obvious to any one who has thought about these issues that humankind's present destructive relationship with the environment cannot continue. There is thus a growing crescendo of calls to move away from the simplistic industrial-era thinking and move towards the ecosystem thinking, sustainable development, sustainable agriculture, sustainable society, and in general a sustainable future (Marien 1994: 115-116).

According to Shearman (1990: 3) the meaning of sustainability is far from being ambiguous. It has been consistently used explicitly or implicitly, to mean continuity through time and that any ambiguities are not with respect to the concept of sustainability itself, but rather with respect to the implications of sustainability when applied to any given context. He adds that if there is any ambiguity in the meaning of sustainability, then it is a matter of degree and not of kind. Shearman concludes that the meaning of sustainability should not be an item for discussion but what should be discussed are the implications of sustainability that result when it is applied as a modifier in a particular context. The questions to be asked however are: "what are the consequences that result from seeking a sustainable society, a sustainable economic arrangement, or sustainable ecosystem and how are they constituted? What contradictions if any become apparent within each of these contexts when sustainability is sought as a goal?" He states that these questions point to a need to

define the conceptual framework of sustainability (not sustainability itself) so that we might achieve a greater understanding of the issues involved.

A sustainable process or condition is defined as “one that can be maintained indefinitely without progressive diminution of valued qualities inside or outside the system in which the process operates or conditions prevail” (Holdren et al. 1995: 1). Perhaps the most applicable definition to this dissertation is the definition by Cannon (1999: 12) who defines sustainability as “a continuation of the benefits that result from the activity, with or without the programs or organisation that stimulated the benefits in the first place. The source of those benefits may change but the benefits are still available because the demand for it is strong.”

The Oxford Advanced Learners Dictionary (1995 Sv “sustainability”) defines sustainability as something that can be kept going or something that can be maintained. Parker (1989: 10) defines sustainability in rural water supply as “the ability to maintain efforts and derived benefits both at community and agency levels without detrimental effects on the environment, even after technical, financial and management assistance is phased out.”

Sustainability in rural water supply also refers to water supply facilities being maintained in a condition which ensures a reliable and adequate potable water supply and that the benefits of water supply are continued to be realised over a prolonged period of time (Davis & Brikke 1995:6). The researcher has adopted this definition because it gives an accurate meaning of what is implied by sustainability in this research study.

3.4 CONCLUSION

In this chapter, a link between rural water supply and social development was made. It has been demonstrated that without sustainable rural water supply facilities, social development cannot be achieved. However, sustainability of rural water supply facilities is dependent on many factors. These factors include, policy, legal and institutional framework, social factors such as demand for water, community participation and community organisations; economic factors such as ability to meet the cost of maintenance and ability to pay for services; technological factors such as

technology choice, availability of spare parts and operations and maintenance; and lastly management factors (Parry-Jones; Reed & Skinner 2001: 8; Harvey & Skinner 2002: 24).

How all these factors promote sustainability of rural water supply is discussed in detail in the following chapter.

CHAPTER FOUR

FACTORS WHICH INFLUENCE SUSTAINABILITY OF RURAL WATER SUPPLY FACILITIES

4.0 INTRODUCTION

This chapter focuses on five categories of critical factors that influence sustainability of rural water supply facilities. These are policy, social, financial/economic, technological and management factors (Parry-Jones Reed & Skinner 2001: 8; Harvey & Skinner 2002: 24). These factors are discussed in relation to the role they play in promoting sustainability of rural water supply in third world countries in general and in Zambia in particular.

4.1 POLICY FACTORS

Policy factors have significant impact in the promotion of sustainability of rural water supply because they provide a framework in which rural water supply is implemented and also give an indication of government commitment to the sector (IWSC 2003: 1). Detailed discussion of this section is divided in three subsections. These are policy context, legal framework and institutional capacity.

4.1.1 POLICY CONTEXT

The policy context within which rural water supply projects are developed and implemented is central to providing a supportive environment that ensures long-term sustainability. In the absence of a coherent policy, different actors often employ different implementation approaches and technologies, which can lead to a fragmented and unsustainable rural water supply sector (Parry-Jones, Reed & Skinner 2001: 11). The problem however is that rural water supply sector policies have been poorly defined in many developing countries. The situation has been exacerbated by the fact that donors and implementing agencies bypass governments to set up their own policies and rules for their projects (Katz & Sara 1998: 2). Therefore, the development of a comprehensive policy framework in the rural water supply sector helps government agencies, international

development agencies, bilateral support organisations and others to identify their roles vis-à-vis the development of the water supply sector in the national context (Shah 1998: 321).

In countries like India, policies have often addressed problems in the rural water supply sector from the supply side to the neglect of the aspects of the demand side. Such policies have not only rendered a large number of projects financially unviable but have also resulted in inadequate coverage of aspects such as the population and ecological sustainability (Ratna 1999: 79). Policies have legitimacy to the extent that all stakeholders (including political leaders, government officials, donor representatives, the private sector and men and women in the general public) collaborate in their development and see them as valid expression of current government actions and future intentions. Therefore, in order for policies to be effective in guiding changes, they must be developed and formulated with the involvement and participation of all stakeholders (IWSC 2003: 1).

Success in managing policy contexts depends on more than simply defining new policies or identifying which policies are important, or negotiating with key stakeholders on those policies. Technical issues and processes are also important to the success of such policies. Policies impact on water programmes. They provide the foundation on which implementation strategy and action plan are developed. The strategy helps define details and outline of activities based on the policy principles and guidelines, thereby enabling appropriate funding to be sourced, capacity developed and progress monitored (IWSC 2003: 1). For example, the development of clear policies and targets for the water sector in Tanzania in the 1970s, led to substantial donor investment in the rural sector (Parry-Jones, Reed & Skinner 2001: 11). Policies also set the stage for monitoring programme implementation and help to define accountability mechanisms (IWSC 2003: 1).

4.1.2 LEGAL FRAMEWORK

A sound legal framework in the water and sanitation sector that contains clear and mutually compatible policy statements regarding water and sanitation, gives guidance and confidence to all agencies working in the sector. This helps them to determine their own policies and plans and to advance their activities as quickly as possible (Muller 2002: 3). A legal basis is important and may take the form of laws, legislative acts, decrees, regulations and official guidelines. To be

comprehensive, the legal basis should encompass the full range of legal instruments, including essential legal statutes used to implement the policies. Without a legal framework to guide overall policy implementation, water programs run the risk of violating societal norms and failing to address the objective for which the policies were established (IWSC 2003: 2).

Sound water laws and policies are necessary for an integrated water resource management. However, there are many areas where these are deficient. In many countries, ground water legislation is non-existent, inappropriate or outdated. In addition, water laws can be very sector specific and fail to integrate very well the concerns of other sectors. In many countries, protecting the rights or allocating new rights to poor water users is not very well developed. Clearly in these cases, there is a need for changes in the legal framework. In other cases though, there are relevant laws, but the implementation is very poor because the organisational capacity to do so is non-existent or the laws are not just well thought out or they are inappropriate. It is important when thinking about water rights and water laws to make sure that relevant laws exist. It is also important to ensure that institutions are developed to support the enforcement of the laws (MOFND 2002: 93).

4.1.3 INSTITUTIONAL CAPACITY

The institutional set-up or organisational arrangements are considered to be a central factor in sustaining water supply facilities. These arrangements relate mainly to the maintenance system that is established to provide ongoing financing and repair mechanisms of water supply facilities. No water supply facility should be installed unless a proven maintenance system is also established to support it because the maintenance system is critical to its sustainability (Morgan 1993 in Parry-Jones, Reed & Skinner 2001: 12).

Institutional weakness is usually singled out as the reason for difficulties in providing the necessary services to communities in the rural water supply sector (Roark et al 1993: 19). Therefore, institutions require radical reform if they are to meet the challenges facing the rural water supply sector, and if they are to provide effective services. Organisational framework and the quality of staff also influence institutional effectiveness. In addition, clear lines of responsibilities and authority are critical. Co-ordinating mechanisms are also essential, especially when several government agencies and ministries are involved in the rural water supply sector, in addition to

NGOs and donor agencies. It is for this reason that central government has a special role to play in order to ensure institutional effectiveness that support rural water supply (Roark et al 1993: 19).

It is also argued that better management of water supply facilities could only be achieved if responsibilities are devolved from central government to autonomous agencies. This would greatly limit the extent of political interference and allow water supply facilities to be managed according to efficient business practice (McPherson 1994: 17). As a result, local government is recommended to be more suited in providing supervision of the rural water supply sector due to its proximity to local communities. However in most African countries, local government bodies are under-funded and lack capacity to fulfill this role (Brikke et al 1995: 7). In Zambia for example, the lack of co-ordination between provincial and local government institutions and NGOs has led to overlaps, conflicts and omissions in service delivery (Parry-Jones, Reed & Skinner 2001: 13). This approach was not successful due to the fact the local governments were overburdened, under-funded and had inadequate technical capacity to offer adequate support to rural communities (Glennie 1983: 100).

In order to achieve sustainability of rural water supply therefore, it is essential to build adequate capacity at all levels, but in particular at local government level. This would ensure that support systems are in place for service delivery and maintenance (Parry-Jones, Reed & Skinner 2001: 13)

4.2 SOCIAL FACTORS

In addition to policy factors, sustainability of rural water supply is also influenced by social factors. In this dissertation social factors refer to social interaction in a given social context (Carillo 2002: 190; Parry-Jones, Reed & Skinner 2001: 8). The following are included under this category: demand-responsiveness, community participation and community organisation.

4.2.1 DEMAND-RESPONSIVENESS

Rural water supply can only be sustainable if it is demand driven. Communities must therefore request for the improvement of the water supply facilities before the water supply facility is constructed (Davis, Garvey & Wood 1993: 146; Ball & Ball 1991: 6; McPherson 1994: 3&17; Brikke et al 1995: 2). As a result, water supply agencies should determine what the community

wants, and is able to support and sustain, instead of providing water supply facilities that have not been requested. Water supply agencies should ensure that projects that are based on effective demand are given the first priority (McPherson 1994: 3). Unfortunately some water supply agencies provide water facilities without the communities asking for them. What is overlooked is that in as much as there might be a need for an improved water supply system, in order to improve the health status of the community, communities' do not always demand for improved water supply facilities for health reasons. They are more concerned about reducing the burden on women who carry water for long distances, so that they can save time for other activities. If water supply facilities are constructed based on supply and not on demand, they are usually abandoned not long after they have been handed over to the community. Thereafter, community members help themselves with some components of a water supply facility, such as nuts and bolts (Briscoe & de Ferranti 1998: 1).

Demand responsiveness takes place when users decide on the type and level of improvement to their water supply system (Briscoe & de Ferranti 1998: 1; Brikke et al 1995: 11). Users should also be consulted about the type of designs or level of service they want. This gives users a voice in defining what is acceptable and affordable to them (McPherson 1994: 4). This is one of the features, which has led to the success of the Murugi-mugumago water society in Mweru District in Kenya. There are cases however where it is in the best interest of the community to have access to protected sources of water and the community has not yet realised it. In such a case, awareness campaigns to sensitise the community of the dangers of drawing water from unprotected sources must be carried out. This will help in enlisting commitment on the part of community members, so that they can take up the responsibility for the management and maintenance of the water supply facility (Davis et al 1993: 145).

4.2.2 COMMUNITY PARTICIPATION

Community participation refers to “an active process whereby beneficiaries influence the direction and the execution of the development projects rather than merely receiving a share of projects benefits” (McCommon & Yahalem 1990: 6). Brikke (1993: 6) states that in order to increase the chances of the water supply system to meet the needs of users, community participation should begin as early as possible in the project development. In fact, community participation should begin as soon as a community has requested a water supply facility. Thereafter, community members

should be directly involved in planning the new scheme and deciding how it can be run, and by so doing, the prospects of its success are improved. According to Mogane-Ramahotswa (1995: 175), development is for the people and that it is people themselves who must have the ultimate say and direct all development efforts.

The water supply agency that has come to the aid of the community should ensure that the community is involved from the start of the project through to the evaluation stage (RSU 1999: 17). In addition, Ball & Ball (1991: 6) argue that “active participation of the community is the process which leads to design, installation, and subsequent maintenance of the water supply system, should begin at the earliest possible stage”. According to Narayan (1995: 1) the importance of community participation is that when people influence or control the decisions that affect them, they have a greater stake in the outcome and will work harder to ensure that they succeed.

User participation does not just allow willingness to pay but also involvement in the operation and maintenance of the water supply system, which is a key to long term sustainability of the water supply system (McPherson 1994: 8 & 15; Glennie 1983: 98). The UNDP/World Bank concluded early in their projects that strong participation of the user community in maintenance of their water supply systems is essential to their sustainability (Kerr 1989: 169).

Community participation cannot take place without information. Community members should therefore have access to information, so that they can make enlightened decisions (Swanepoel 1997: 5; Brikke 1993: 6.1). The importance of information is that it makes community members feel confident to take charge of the project and to feel that the project is theirs and that they can manage it. Therefore, water supply agencies should not wait until the project has taken root before they could involve community members in the management of the project (Mumba in DWA 1994: 2).

Unfortunately, some water supply agencies reduce community participation to the provision of cheap labour and locally available materials when communities should participate in making major decisions concerning the project. The community should also participate in carrying out baseline surveys conducted at the beginning of the project, in order to ensure that they continue to participate throughout the project life (Osei-Hwedie, Mwansa, Mfune 1990: 114; Pickford, et. al 1996: 23; Brikke et al 1995: 11; Umgeni Water 1993; 3; Briscoe & de Ferranti 1988: 44). A

participatory baseline survey, which is conducted at the beginning of the project, should include assessment of the needs and the problems of the community. It should also cover the availability of reliable water sources, locally available materials, spare parts, needed skills and the most appropriate structure to support the system. In addition, the desired service level that should correspond to the management capacity of the community's financial resources and willingness to pay should be considered (Brikke et al 1995: 11).

Community participation at the inception of the project helps the water supply agency to assess community preference of the water supply system. Pickford et al (1996: 23) indicate that in order to ensure that community members are involved in the whole process; participatory methodologies must be employed throughout the project development. Participatory methodologies help in the utilisation of rich community knowledge about their environment (Swanepoel 1997: 97). Briscoe and de Ferranti (1988: xiii) argue that assessing of consumer preference is one of the most neglected aspects of rural water supply, and features more prominently in reasons for project failure. Only when consumers actively participate in the selection of the service levels, and decisions associated with the how and why of the cost recovery, can they accept ownership.

The danger of not involving the community in the implementation of the water supply system is that community ownership of the water supply system is compromised, and consequently community members expect the providers of the water supply system to operate and maintain it for them. Brikke (1993: 6) argues that with community participation, much more is likely to be accomplished and services provided cheaply. In addition, community participation gives community members intrinsic value in what they able to achieve. However, Briscoe and de Ferranti (1988: 13) warn that although community participation has enormous potential, there is a danger of trivialising it and to only reduce it to low cost labour.

Community participation should also be looked at from the gender perspective, because women have the responsibility of drawing water and yet they are usually not involved in the decision making process (Roark, 1993: 14; Parker 1989: 13; Pickford et al 1996: 24; Pfohl 1997: 20; RSU 1999: 17). According to Kerr (1989: 217) women have been consistently excluded from any dialogue about the priority of improved water supply, which has contributed to the disastrous failure of improved water supply systems. It should be borne in mind that women are the greatest

providers of water supply and are also the primary beneficiaries of any improvement and should therefore be involved in any attempt to improve their water supply facilities (Churchill 1987: xiv).

Churchill (1987: xiv) argues that although the role of women in rural water supply was totally ignored in the past, recent attempts to involve them have proved promising and should be extended. In addition, there is increasing evidence showing that the best-managed projects are those where women play leading roles (UNICEF 1995: 13). In addition, Briscoe and de Ferranti (1988: 13) argue that sustainability of rural water supply systems is dramatically enhanced when women have key responsibilities. In the Umgeni water project, the role of women has been recognised as being a critical success factor (Umgeni Water 1993: 47).

4.2.3 COMMUNITY ORGANISATION

Community participation can only be sustained when there is a system for organising the community. Community organisation therefore entails that a community has the institutional capacity to manage the development and operation of the water supply facility, if it is to be sustainable (McCommon et al 1990: 10). Mogane-Ramahotswa (1995: 177) indicates that without proper community organisation structures, effective community participation has no hope for sustainability. As a result, Sami & Murray (1998: 14), argue that the responsibility to manage water supply system should not be transferred on the community structure that does not have the capacity to operate and maintain it.

It is for this reason that most governments, donor and water supply agencies typically require that communities establish water committees to co-ordinate local management of new water supply systems (Brikke 1993: 6). However, before forming a water committee, it is important to ensure that their roles and responsibilities are made clear. Because when the roles and responsibilities are not clear, it creates role confusion among the water committee members, which subsequently affects their motivation to work on behalf of the community (Davis et al 1993: 148; Roark et al 1993: 14; Ball & Ball 1991: 6). It is also important to determine whether or not a water committee is necessary. And if not, existing community management structures should be considered as an alternative (Davis et al 1993: 149). This happens in Zambia whereby water committees are formed in the community where there are existing structures that could perform functions of the water

committee. The researcher has had an experience whereby the Ministry of Health through its extension network formed a Neighborhood Watch committee to look at health and sanitation issues. UNICEF went to the same area and used the same people to form Village WASHE committees to perform almost the same functions.

Although communities have been managing traditional sources of water for ages, new water supply systems can make new demands that require new approaches. Social and economic development taking place within the country and elsewhere can undermine the pre-existent community management systems and reduce their effectiveness in the new setting. As a result, there is a need for a new management structure with the introduction of new water supply systems (Brikke 1993: 6).

The importance of water committees is that they act as a medium for a community to manage the rural water supply facility (Umgeni 1993: 46). Water committees also represent the community in making contacts with the water supply agency, help in the collection and management of community contributions such as money and labour. They also help in organising and supervising operation and maintenance (Brikke 1993: 5). Water committees also recruit and supervise the work of the water point caretakers and area mechanics. As a result of this, it is the Zambian government's policy that each water supply facility should have a water committee, called Village WASHE committee (MOFND 2002: 92).

The future of water committees in Zambia is however not certain because the mechanisms to continue to motivate them are not adequate. Water committees are usually active when the water supply agency is operating in the area but become inactive as soon as the water supply agency pulls out of the area (RSU 1999: 16). To ensure that water committees continue to function, a strong government department should be given the responsibility to monitor their performance, through a strong extension network or through NGOs operating in a particular area. This government department or NGO should be responsible for providing adequate external support services. This will help to solve the problem identified by the National Action Committee for IDWSSD (1991: 9) that inadequate external support services are a contributing factor to the communities' inability to manage their water supply systems in Zambia.

4.3 FINANCIAL/ECONOMIC FACTORS

In this section, financial/economic factors that influence sustainability of rural water supply facilities are discussed. These are: the ability to meet the cost of maintenance and willingness to pay for the service.

4.3.1 ECONOMIC ABILITY TO MEET THE COST MAINTENANCE

Davis et al (1993: 157) argue that operation and maintenance costs money, whether it is done by the community or by the water supply agency. The question that is raised with community based operation and maintenance system is whether or not the poor rural communities can meet the full cost of operation and maintenance. Some actors in the water supply sector argue that beneficiaries can fully meet maintenance costs (WHO 1993: 9), while others argue that meeting full costs of operation and maintenance by rural communities is difficult because of high poverty levels. Even in cases where the community members are willing to contribute financially to O&M, they are hampered by lack of resources for O&M (RSU 1999: 10; Briscoe & de Ferranti 1988: 13).

Those who promote the idea that maintenance costs should be met by local communities argue that there is amounting evidence that even the poorest and most underprivileged segments of society are willing to pay for water supply, as long as it is reliable (McPherson 1994: 14; Briscoe & de Ferranti 1988: 13). Furthermore, they argue that recent studies on water demand have generally found that poor people are willing to pay a higher proportion of their income for improved service than their rich neighbours (Briscoe & de Ferranti 1988: 13; UNCHS 1997: 4). Churchill (1988: ix) also supports this view. He argues that although there are undoubtedly some areas in some countries where poverty is extreme, the review of the global situation reveals that most rural communities can afford to pay for improved services, provided that appropriate technology is used. The reason for his argument is that people in rural areas are already spending large amount of time and energy in water collection.

Glennie (1983: 104) warns that although financial contribution is attractive to a lot of water supply agencies, it should be done with great care because it often creates more problems than it solves. It can become a major task, which can completely dominate actual maintenance. It can also strain the

relationship with the water supply agency. Therefore, it is better for community members to make a contribution for the purchase of spare parts, when the water supply facility has broken down.

To the contrary, Davis et al (1993: 158) argue that if a community waits until the water supply facility has broken down, it might not collect enough funds from community members. Their major concern however has to do with the keeping of funds within the community. They suggest that in order to avoid corruption and misappropriation of funds, the money should be kept in the bank. The problem is that few rural communities, particularly in Zambia, have access to banking facilities.

Glennie (1983: 10) advocates for shared responsibilities because community members in rural areas cannot fully meet all operation maintenance costs because they are too high. It is for this reason that water supply agencies will always have to play a role in carrying out operation and maintenance that are beyond the capacities of communities. It is important to realize that local communities only have the capacity to carry out minor repairs due to high poverty levels.

4.3.2 WILLINGNESS TO PAY FOR SERVICES

In order for the community to meet the cost of maintenance, community members must be willing to pay for the services. However, not every community member is willing to pay for the services. Willingness to pay for the services is influenced by a number of factors. One such factor is availability of alternative sources of water in the community. For example, a Bangladesh community, with a river near-by, is prepared to pay much less for a hand pump than a Malian with similar income who has to walk kilometers to fetch water. This is why a survey should be done before the project is started to determine willingness to pay (Roark et al 1993: 18, Briscoe & de Ferranti 1988: 13). Under the Umgeni water project, payment for the services is regarded as essential to the long-term sustainability of the project and all discussions with communities are carried out within this framework (Umgeni Water 1993: 47).

The other factor that influences willingness to pay is providing an opportunity for private connections or having a private hand pump at one's house, as opposed to paying for communally owned water supply facilities. Piped water can be used for water borne toilets and bath-showers, which are not possible for communally owned hand pumps. Community members are willing to

pay for services they perceive to be valuable and every effort therefore, should be made to involve them in the determination of the type of service they are willing to pay for (Briscoe & de Ferranti 1988: 12).

For example, in Zimbabwe willingness to pay for standpipes is greater than for hand pumps. In Malawi, communities are prepared to make significant payments for piped water, even when the distance is not reduced. This is because there is an inherent attraction in many settings for 'modern' service similar to those available in towns and cities (Briscoe & de Ferranti 1988: 12).

4.4 TECHNOLOGICAL FACTORS

Three factors that influence the sustainability of rural water supply from the technological point of view are discussed. These are: technology choice, availability of spare parts and operation and maintenance.

4.4.1 TECHNOLOGY CHOICE

Technology choice is crucial to sustainability of the rural water supply sector because the type of technology chosen affects operation and maintenance (Taylor and Mudege 1996: 10). If a community is to manage a water supply system, the technology used needs to be the type that community caretakers can maintain with little outside assistance (Davis et al 1993: 155). It must suit the existing locally available skills or skills that can be acquired by community members (IWSC 1993: 4).

Technology is considered suitable if it is socially acceptable, economically sustainable, technically effective, and environmentally sound. Communities should have a say in the technology choice and not to consider technology choice to be too technical and beyond the comprehension of community members. If technology is not suitable, communities end up relying on central government or the water supply agency to maintain the water supply facility, which, as indicated above, has not proved to be successful (Pasha & Macgarry 1989: 52; McPherson 1994: 4). Roark et al (1993: 14) indicate that since there is a wide range of technology choices, the fundamental maxim is that it should be compatible with the beneficiaries' ability to handle it. There are many examples of overly

intensive and complicated technologies being used in the situation where their operation and maintenance is beyond the capacity of the state, let alone the local people (Briscoe & de Ferranti 1988: x). This problem arises from the compulsion to transfer technology that has been developed in the developed countries but which is not appropriate. It also becomes difficult to apply this technology to poor countries because of lack of resources (McPherson 1994: 15 & 19).

Inappropriate technology is also imported due to political interference whereby some government officials would favour a particular technology even when it may not be the best or appropriate (McPherson 1994: 17). In other cases, donor aid requires that the hardware be purchased from the donor countries, which provided the aid (Brikke et al 1995: 16). Many systems' failure is partly attributed to inappropriate technology from developed countries. And also, many water system models that are appropriate for the affluent developed countries are often not appropriate to developing countries.

It is important to realise that the level of service must be one that can be operated and maintained by the users (McPherson 1994: 19). Appropriate, affordable and acceptable technology is very important to users because if the water supply system does not perform as intended, the willingness and motivation to pay suddenly wanes (Mogane-Ramahotswa 1995: 179). Planning for operation and maintenance from day one of the project development together with optimum decision-making on selection of the technology are important elements of sustainable water supply systems (Brikke et al 1995: 2&3).

Two major factors have contributed to inappropriateness of technology in Zambia. The first one is that all technology is developed outside the country. Unlike in Zambia, the Zimbabwean Programme has significant strength because of the availability of locally produced technology, which has been designed in the country, and is locally acceptable, politically, socially, technically and economically (Taylor & Mudege 1996: 10). Technology in Zambia has been supply rather than demand driven. Some hand pumps were brought into the country as gifts from other countries on good will missions, they are in minority, and do not have the sustainability backup (RSU 1999: 17). When the technology used has been developed abroad, it is important to ensure that it is tested for appropriateness and sustainability in the local conditions before it is applied or adopted (Chanda in DWA 1994: 1).

The second factor is lack of guidelines in rural water supply or lack of government policy on technology, which leads to each organisation or institution operating independently. This has led to the proliferation of technologies, because each organisation or institution decides on the technology to use (WHO 1993: 43; Tranor 1994: 2). In addition, standardisation and effective co-ordination of donor funded programmes is necessary to reduce the proliferation of technologies in rural water supply as donors will have to follow government laid down guidelines (RSU 1999: 23).

As a result of this gloomy scenario, standardisation became necessary in Zambia. The process for standardisation began in 1986, by the establishment of a standards committee. As a result, India Mark II was identified as being an appropriate hand pump to adopt for the Zambian environment (RSU 1999: 19). However due to lack of co-ordination, standardisation of India Mark II has not succeeded (WHO 1993: 7).

Although it is appealing to water supply agencies to involve communities in deciding the type of technology, it is important to ensure that communities make informed decisions by providing them with information on different types of technologies, their advantages and disadvantages. If this is not done, communities are bound to make mistakes because certain types of technology might not be suitable for certain areas (Umgeni Water 1993: 46; RSU 1999: 17).

4.4.2 AVAILABILITY OF SPARE PARTS

Lack of spare parts has been a major constraint in the sustainability of water supplies and has been a recurring problem. In some cases it has led to the complete abandonment of the water supply system (Brikke et al 1995: 16; Roark et al 1993: 14). If sustainability is to be achieved, it should be ensured that after appropriate technology is chosen, spare parts for that type of technology are made readily available.

Lack of standardisation policy in Zambia, which led to proliferation of technologies, meant that some projects are operating under semi autonomous or autonomous conditions, with little or no back up spare parts. This makes stocking of a comprehensive range of spare parts virtually impossible for a poor country (Brikke et al 1995: 16). Even where spare parts are provided, repair work becomes very difficult when those spare parts are exhausted, because the other spare parts

available in the country are for the other types of hand pumps, and which may not be interchangeable. Once hand pumps break down, they remain in a state of disrepair for a long time until spare parts are obtained or a pump unit is replaced by another model or make (RSU 1999: 19). This situation is made worse by the fact that some donor countries only participate in the construction phase of the projects and do not make provision for continued supply of spare parts following the transfer of ownership to communities (Brikke et al 1995: 11).

Most of the spare parts for the rural water supply are imported into Zambia by individual water supply agencies, which are mostly donors and/or NGOs. They also employ a wide range of technologies because there is no standardisation policy on technology. This poses a great danger when the concerned water supply agency pulls out of country or operational area. Communities end up not having access to spare parts and consequently the water facility which community members worked hard for, falls into disuse (Davis & Brikke 1995: 10).

There are some areas in Zambia where communities are willing to maintain their own water supply systems but there is no back up system of spare parts. Community members travel long distances to the Copperbelt or Lusaka provinces to purchase spare parts, which in the end increases the cost of spare parts. There is no mechanism by which community-managed water supply schemes can have a reliable supply of spare parts (RSU 1999: 14).

In order to solve the above-mentioned problems, harmonise training and ensure that spare parts are readily available, countries like Zimbabwe and Uganda have standardised the technologies (Morgan 1990: 62; Pickford et al 1996: 24; RSU 1999:19; WHO 1993: 7&43; Tranor 1994: 2). According to Brikke (1993: 6), consideration of spare parts should not be an after thought to the technical and operation design but should be a principal item of a checklist of viability. Therefore, spare parts should be a function of planning, design and project intervention in their own right. Further, Morgan (1990: 100) argues that spare parts should be stocked within the community store and some by the water committee in order to ensure that spares are available when needed.

Good operation and maintenance is frequently constrained by lack of spare parts and by the absence of local manufacturing sector. Where spare parts have to be imported, it becomes difficult or even impossible to have them in the country if foreign exchange is in short supply (McPherson 1994:

104). The problem of spare parts could be solved by a strong government policy and strong external support agencies, which should ensure that there is continued supply of spare parts. The government should also ensure that funds for spare parts are put in the national budget. Locally manufactured equipment and policies that standardise equipment are the best answers to this problem. Local manufacturing also eliminates the need for hard currency, which is always in short supply (Roark et al 1993: 16).

4.4.3 OPERATION AND MANTAINANCE

Operation and maintenance (O&M) covers the efficient day-to-day running of the water supply facilities, regular preventive maintenance and the assurance of proper use. The long-term success, according to Mogane (1990: 106), of any water programme, depends almost entirely on effective maintenance, and yet it is as an aspect that is very often neglected. It does not just entail having technical aspects but also encompasses social, gender, economics and many other aspects (Brikke et al 1995: 1).

Although O&M is critical to the sustainability of the water supply facilities, analysis of water supply systems has revealed that inadequate arrangement for O&M is the major cause of failure. This is because few water supply agencies consider operation and maintenance a major priority. They instead consider construction of new facilities and systems expansion more important, due to the unmet backlog of communities that require new water supply facilities (Sami & Murray 1998: 14).

Properly planned projects should incorporate O&M at the design stage, and as the water supply facility is completed, O&M activities begin and benefits start to be realised (Roark et al 1993: 7). Because failure to maintain functionality of water supply facilities leads to community members again relying on unprotected sources of water, which has serious health implications (Sami & Murray 1998: 41; Brikke 1995: 1). In fact, it is impossible to achieve sustainability of water supply facilities without considering how crucial operation and maintenance is (Taylor & Mudege 1996: 6).

The realisation of the importance of O&M has come about due to scarcity of resources and maximization of their use. There is also insufficient appreciation of the magnitude of O&M problems and skills required within the water sector to properly operate and maintain the water supply facilities, mainly due to the lack of financial data. In addition, decision-makers are not given adequate information to enable them appreciate the importance of operation and maintenance (McPherson 1994: 12).

Another reason for high rate systems failure has been attributed to lack of participation of local community in O&M. This realisation has led to projects in developing countries to stress the importance of involving the local communities in operation and maintenance (Kerr 1989: 217 & 259). As a result of the failure of the centralised system, it has also been realised that rural water supply cannot be sustainable without the involvement and participation of users in operation and maintenance (IWSC 1993: v).

In Zambia, O&M has not been recognised as a major component of rural water supply (RSU 1999: 23; Roak et al 1993: 7). It has instead been given a low and inferior profile compared to construction of new water supply facilities (McPherson 1994: 1&11; RSU 1999: 23; GTZ 1997: 17). This is because it is easier to construct a water facility than to ensure its continued operation. O&M should be a major consideration when selecting technology because sustainability depends on planning and implementation of a complete and comprehensive O&M package (Glennie 1983: 97; Chanda in DWA 1994: 1).

Brikke et al (1995: 1) said that because operation and maintenance is critical to sustainability, governments, external agencies, as well as local communities are concerned about the importance of integrating operation and maintenance in planning, implementation, and management and monitoring activities. Evidence has shown that the most successful water project have a high degree of community participation in operation and maintenance.

Carrying out an effective operation and maintenance system depends on management tiers. The first tier is one that is managed by a central body, the second tier has the regional responsibilities, and the third one consists of the local community (Sami & Murray 1998: 1). The first two tiers are not suitable for community managed water supply facilities because they are centralised systems, which

have lamentably failed. In order to ensure that sustainability is promoted, the third tier would be more effective. This means that the community takes up the day-to-day running and management of their water supply. The actual operation and maintenance can be given to the water point caretakers, who would be responsible for preventive maintenance on a daily basis while an area mechanic could be contracted to carry out the major repairs (Davis et al. 1993: 153).

Although caretakers are important, Davis and others (1993: 153) discourage the idea of voluntary caretakers in the community that is struggling to survive economically. They state that the community should give incentives to the water point caretakers, either in cash or in kind. Area pump minders could be responsible for several water points and should be paid by communities for repairing their hand pumps (Sami & Murray 1998: 14). Training of communities, caretakers and pump minders is crucial, and should be done by the water supply agency (Dahlegren 1993: 29; Davis et al. 1993:19-21). Spare parts and tools should also be made available.

In order to ensure continuity, the water supply agencies should employ the area mechanic, who could only receive a small allowance but would live within the catchment area. This is because it is risky for communities to be dependant on a voluntary person for repairs. When the area mechanic is employed by the water supply agency, his supervisor should monitor his work. However, an agreement should be made with communities that they meet part of the costs. This would considerably reduce operational costs, as he/she would only need a bicycle and tools because communities would meet most, if not all the maintenance costs (Glennie 1983: 101). The area mechanic could refer repair work that will require more sophisticated tools and machines to the second tier at the district level, which would consist of a mobile unit. The Indian three-tier system, which has a mobile unit of four people, covering an area in a district, could be used as an example (Kerr 1989: 170).

Sustainability cannot fully be realised if communities are not able to operate and maintain their own water supply facilities, because operating and maintaining of the water supply system on the day-to-day basis ensures that it continues to work for a long time (Davis et al 1993: 144).

4.5 MANAGEMENT FACTORS

Three main management approaches in rural water supply have been identified. These are: centralised management approach, community management approach and the partnership approach (McCommon & Yahalem 1990: 1; Brikke et al 1995: 18). Pros and cons of each management approach are discussed in the following subsections.

4.5.1 CENTRALISED MANAGEMENT APPROACH

Centralised management system refers to a rural water supply system that is dependent and directed by the central government for management, technical and financial support. It involves a public sector organisation managing mobile teams, which report to the regional headquarters. The regional headquarter handles overall budgets, spares, procurement and distribution. Each team includes skilled workers equipped with special tools capable of carrying out all repairs. Sites are visited when a community reports a breakdown or in some circumstances according to the maintenance schedule (Sami & Murray 1998: 14).

Disadvantages of this approach are that it has been associated with high costs. The cost of operating and maintaining the vehicles is typically 50% or more of the total cost of the mobile teams. Long delays in responding to the reported breakdowns due to communication chain and working list of the communities to be serviced create problems. Sometimes it takes months before the repairs are made. There is also very little sense of ownership by the communities since control is in the hands of the external agencies. This results in more misuse and vandalism of water supply facilities. This in turn results in an increased rate of failure, further increasing communities frustrations and discontent (Sami & Murray 1998: 14).

The mobile teams are externally funded and are not accountable to the community. There is also little chance of full cost recovery due to high overhead costs. The fact that centralized management system is dependent on government for funding makes it even more vulnerable to budget constraints or restrictions associated with central governments. This leads to reduction of extension of maintenance services. Centralized organizations frequently have too few vehicles and staff, insufficient stocks of spares for pumps, vehicles and insufficient funds. It takes time to respond to

requests and their staff is poorly motivated. In addition, funds would rather be allocated to construction of new facilities than to operation and maintenance, resulting in an unequal distribution of resources. Rising costs also pose a serious problem while funding has been declining and many completed systems are in disrepair or have been abandoned (Sami & Murray 1998: 14; Evans & Appleton 1993: 7; RSU 1999: 20; Tranor 1994: 2).

This state of affairs has led many experts to question the effectiveness of centralized management approach (McCommon & Yahalem 1990: 1). The shortcoming of the centralized systems resulted in the shift of maintenance responsibilities to communities (Sami & Murray 1998: 14), referred to as community management of rural water supply. A discussion on the same follows in the next subsection.

4.5.2 COMMUNITY MANAGEMENT APPROACH

Rising unit costs for improving water supply, declining funding in the sector and a high number of completed systems which are in disrepair, previously managed under a centralised system, and has led experts in the rural water supply sector to propose community management as an alternative approach most likely to achieve sustainability (McCommon & Yahalem 1990: 1). “Community management means that communities exercise responsibility for decision making and control over the subsequent execution of these decisions during the project development” (McCommon & Yahalem 1990: 10). It implies that communities are involved in all aspects of the project, from project identification to evaluation. It is also linked to the idea that the community owns their water supply systems, and as owners, they should have responsibilities and decision-making powers (Brikke 1993: 6).

“Community management as distinguished from community participation means that community members have the authority and control over the organisation, implementation and supervision of the project. It means that the local community as opposed to the water supply agency manages the water supply system (WHO 1993: 19-24; Mumba in DWA 1994: 1; Tamm 1991: 1). Community participation however is a component of community management, and it refers to the involvement of the local population in decision-making, concerning projects that have been designed for their benefit (White 1981: 3; Mumba in DWA 1994: 1; Swanepoel 1997: 4).

Community management can only be effective if adequate capacity building to operate and maintain the water supply facilities is given to local communities. To develop this capacity, high priority should be given to training of the local people (McCommon & Yahalem 1990: 7; Sami & Murray 1998: 14; Brikke 1993: 6; Umgeni Water 1993: 47).

Although community management is now widely accepted, there are some professionals within and outside the rural water supply sector who are still skeptical about its success. For instance, Tamm (1991: 1) argues that community management is more ideological than operational and as much guided by beliefs than by practical consideration, due to lack of specificity, which in part is also due to lack of corresponding successful examples.

The problem with community management is compounded by the fact that the definition of the term community, which means different things to different people, also affects the definition of community management. Briscoe and de Ferranti (1988: 13) argue that expecting local communities to play a leading role in all aspects of rural water supply has a danger of romanticizing the term community, expecting communities in developing countries to demonstrate cohesion, capacity and will that do not exist elsewhere, either in the developing or developed countries. They go on to say that while it is useful to talk about “the community”, it is important to realise that not all community members are interested in improving their water supply system.

Furthermore, communities do not always accept the idea of them managing their own water supplies. A study carried out in Pakistani found that contrary to widely accepted opinion that communities would automatically take over the responsibility to manage the water supply facilities, community households in Punjab displayed reluctance to take over any managerial or operational responsibility. They preferred to leave the water supply systems in the hands of the neutral government agency even at the cost of efficiency (Altaf, Jamal & Whittington 1992: xv).

In order to determine the community’s ability to manage its own water facilities, each community should be studied and understood; and its capacities and culture examined (McCommon & Yalem 1990: 5; Osei-Hwedie, et al 1990: 114). It is unrealistic to expect communities to manage water supply facilities, without assessing their capacity to do so. It should also be realised that it takes

time, effort and resources for community management to be effective. Those who are in a hurry to see results should use other approaches other than community management.

Brikke (1993: 6) argues that choosing community management is more than a simple choice between a top down and bottom up approach. The idea that community management should be based on partnership suggests that limits are recognised, and although communities may be able to take up substantial share of management responsibilities, agency involvement may always be required. A discussion on the partnership approach follows in the next section.

Community management seems to hold great potential for development in rural areas, and is an appealing solution to the current sustainability problems in rural water supply. However, no further steps should be taken until more studies are done to test the hypothesis that strong community management does lead to sustainability of water supply systems. In addition, water supply agencies should exercise great caution not to consider community management as panacea or quick fix to the sustainability 'nightmare'. Community management is a process that takes time to evolve and could run into considerable costs in terms of technical staff, transport, information materials and equipment (McCommon & Yahalem 1990: 39; Kerr 1989: 2; Mumba in DWA 1994: 2). It requires patience and perseverance and is time consuming but fundamental to sustainability of rural water supply (McCommon & Yahalem 1990: 40).

4.5.3 THE PARTNERSHIP APPROACH

According to Roark et al (1993: 1) there are different management models of rural water supply, ranging from highly centrally systems managed by the government agencies, to grass root community managed systems, owned and operated by local communities. Between the two extremes is the shared responsibility in which both government agencies and communities share responsibilities in the management of rural water supply. Brikke (1993: 5) calls this approach as the partnership approach. It refers to a more equal and supportive relationship between the community and the external organisation. It starts from the beginning of the project and continues throughout the project cycle. It is believed that only by so doing can the long-term sustainability of the water supply system be ensured (Brikke et al. 1995: 18).

The partnership approach is being advocated because it has been realised that although communities could take up a substantial share of responsibility, external support services will always be required due to the realization that there is a limit to what communities can do (IWSC 1993: 33). Responsibilities that communities are able to take up depend on the organisational, financial and technical capacities of that community, which differ from community to community (IWSC 1993: 4).

Brikke (1993:5.1) states that the water supply agency should give required support to the community. It should ensure that supplies and back up services are available when the community needs them, so that communities are not overwhelmed with the responsibilities they do not have the capacity to handle. This could inevitably lead to the collapse of the water supply systems. For example, inadequate support services led to the collapse of the community water system that was installed in Peru. The communities found themselves inexperienced and untrained for their management role (Briscoe & de Ferranti 1988: 13).

Glennie (1983: 98) indicates that although participation of the community in the installation of water systems is of major significance for subsequent maintenance, this sense of responsibility must be supported by a reliable organisation. The sense of responsibility alone is not enough for continued maintenance and long-term sustainability of the facilities. Both technical and material support is required from outside the community. For example, in Malawi, communities carry out most maintenance work, but the water programme has still retained the overall responsibility for the water supplies. The water programme still provides a support framework in the form of staff and materials. This has significantly contributed to the success of the water programme in Malawi.

Glennie (1984: 98-100) also indicates that it is unrealistic to expect communities to take up all the responsibilities of maintenance. Furthermore, Sami & Murray (1998: 14.20) show that for water systems to continue being operational, a strong regional support network should back up the communities for skills not available in the community. In addition, a study by Mogane-Ramahotswa (1995: 180) revealed that community's self-initiated projects with a strong backup support from development agencies are more likely to succeed.

Furthermore, Brikke (1993: 4) argues that although communities may be able to take up a very substantial share of management responsibility, water supply agency involvement may always be required to some degree. After a water supply system has been handed over to the community, the role of the water supply agency is to ensure that suitable support is given to the community, such as training and availability of spare parts. The water supply agency should ensure that the capacity of the community to manage a water supply system is strengthened to enable the community to perform management tasks (Brikke 1993: 6).

Communities require continued support from water supply agencies, be it government or non-government. A recent evaluation of water programmes in Peru revealed that while community participation is necessary, little attention is paid to the importance of community support (Briscoe & de Ferranti 1988: 13). Briscoe and de Ferranti (1988: 13) also indicate that communities should not take up responsibilities for which they do not have the capacity to manage. Water supply agencies should therefore continue to support communities with repairs, training and monitoring for the continued functioning and use of their water supply system (IWSC 1993: 4).

Under the Umgeni water project, continued support by water supply agencies, maintenance and extension staff has been considered to be crucial to the success of the water supply system. This has been achieved through the partnership approach (Umgeni Water 1993: 46). Furthermore, the Kwale water project in Kenya succeeded because strong external support services were made available. Mutually supportive relationships were developed between community groups, government ministries, an NGO and external donors. Achieving a sustainable functioning of a community owned water supply system was the overriding vision, which they shared (Parker 1988: v). Kwale water project succeeded because there was partnership between agencies, which also allowed the programme to evolve and grow (Parker 1988: 31).

4.6 CONCLUSION

In this chapter, five categories of critical factors that influence sustainability of rural water supply have been discussed. These are: policy, social, technological, economic/financial and management factors. These factors are critical to sustainability of rural water supply, without which sustainability cannot be achieved.

Gaps in knowledge have been identified particularly in relation to how these factors are being addressed in Zambia. There is enough evidence to suggest that while these issues have been extensively researched in other countries, they have not been adequately researched in Zambia. This necessitated this research, whose findings are presented in the following chapter.

CHAPTER FIVE

PRESENTATION OF RESEARCH FINDINGS

5.0 INTRODUCTION

This chapter presents research findings of the empirical study, which were intended to answer the following research question: what factors contribute to sustainability of rural water supply in Zambia? Data from all water supply facilities and four water supply agencies was collected from Mazabuka district in Southern Province of Zambia (see map below for estimated locations of the water supply facilities) while data from the remaining four water supply agencies was collected from Lusaka. The Lusaka-based water supply agencies have national responsibilities of rural water supply, including Mazabuka district.

The chapter is divided in three main sections. The first section looks at an overview of Mazabuka district, the second section looks at how data was collected and the third section presents detailed research findings based on (1) eight functional water supply facilities, (2) eight semi/non-functional water supply facilities; and (3) eight water supply agencies. Research findings are summarized and presented in three tables with summary findings at the end of each table.

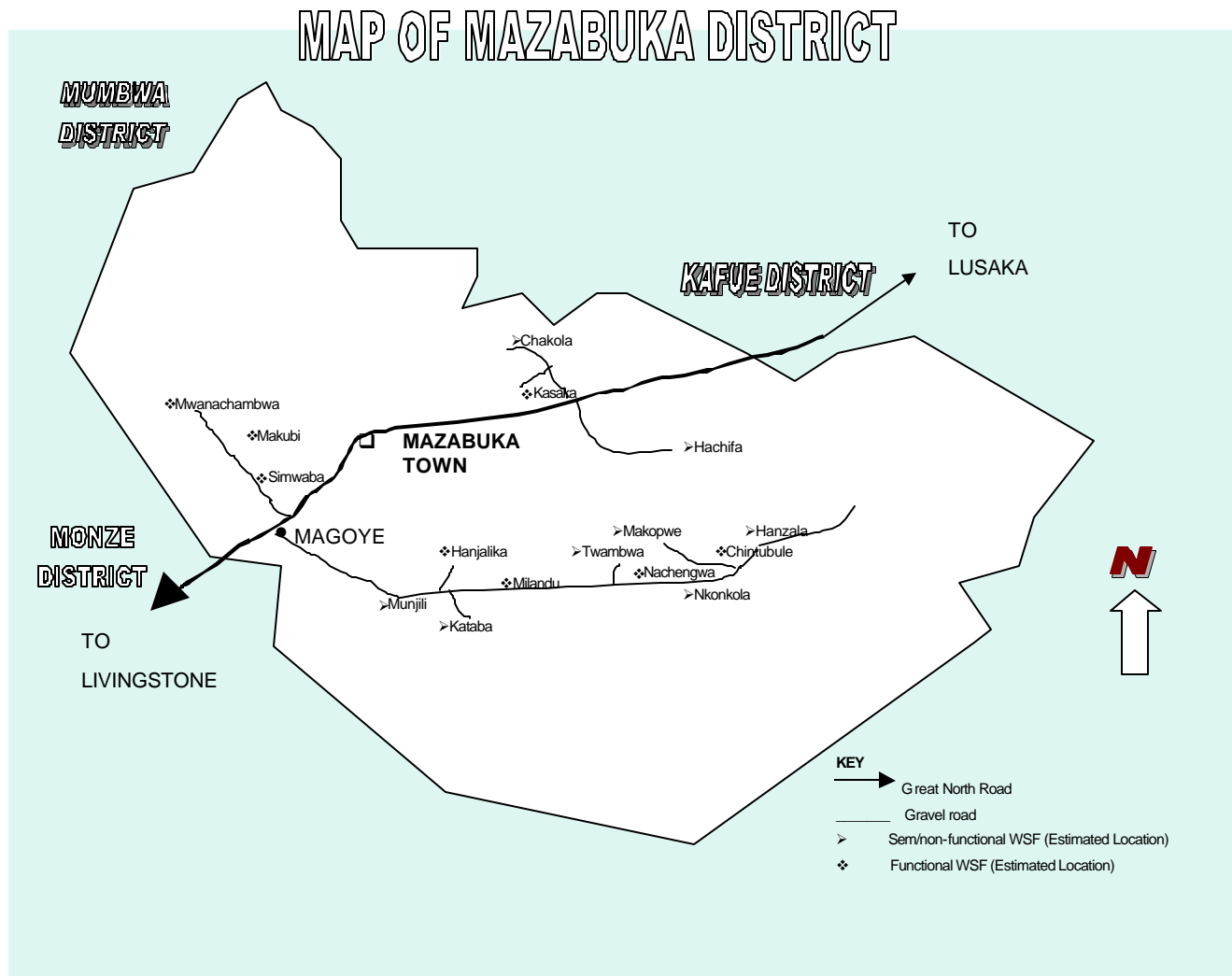
5.1 OVERVIEW OF MAZABUKA DISTRICT

This section presents an overview Mazabuka district in order to put rural water supply in Mazabuka district within context. Overall context of the rural water supply sector in Zambia is presented in chapter two of this dissertation.

According to the Mazabuka district situation analysis (MDC 2003: 1-18); Mazabuka district is located in the Southern Province of Zambia along the Great North Road. It is 125 kilometers from Lusaka, the capital city of Zambia, and about 360 kilometers from Livingstone City. Like the rest of the country, Mazabuka district has three seasons: dry, wet and cold. The rain season stretches from the end of September until the end of April. The cold and dry season starts in May and ends in July. The dry and hot season starts from August to the end of September. The district receives an average

of 708.3 mm of rainfall per year.

Mazabuka district is located directly south of and adjacent to the Kafue flats which is the flood plain of this portion of the Kafue River. As a result, the region is characterized by rich agricultural land and an economy dominated by large-scale agriculture especially sugar cane cultivation and processing. Good climate, fertile soil, water availability, and access to transport by road and rail, has made the district an optimal location for the cultivation of sugar cane as well as wheat, coffee and maize.



The economic base of Mazabuka district is therefore dominated by commercial and subsistence agriculture. Livestock rearing, which is in three groups: traditional, settlement and commercial sectors, also forms an important part of the agricultural sector in the district. The majority of livestock (65%) is kept by the commercial farmers, followed by the 25%, which is kept by the

traditional/subsistence farmers and the remaining 10% of cattle is kept by farmers who live in settlements. The livestock kept by the traditional/subsistence farmers, mainly for self-sustenance, suffer from livestock diseases due to lack of knowledge and high cost of veterinary medicine. Consequently, a lot of households have lost their livestock.

The population of Mazabuka is estimated to be 236,978 people. Seventy five percent (75%) of the population lives in the rural area, where there is no formal employment. The Tonga tribe, who are also predominant in the rest of Southern Province, dominates Mazabuka district. In rural areas, the Tonga people live in extended families. The extended family system is critical to the rural economy especially farming. The extended family system provides security to families, as they are able to draw on the support of relatives in time of need such as funerals, famine and other important social functions such as weddings and initiation ceremonies.

The principal source of water supply in rural Mazabuka is hand dug wells and boreholes. Though hand dug wells are found in many parts of the district, the water table has dropped considerably to lower depths due to droughts that have occurred in the past decade, causing many wells to dry up. Re-deepening of new wells is often frustrated by the presence of hard rocks, especially in the eastern part of the district, which is one of the areas the researcher visited. To arrest this problem, drilling of boreholes has been identified as the key solution. As a result, efforts are being made to drill as many boreholes as possible, which are then installed with hand pumps. However, the ratio of water points to the population is still large.

Mazabuka D-WASHE committee coordinates rural water in the district. It comprises the Mazabuka district council, DWA and other organizations that play a role in rural water supply and sanitation. Functions performed by the D-WASHE committee include but are not limited to (1) soliciting funds from donors and international NGOs for drilling boreholes in the district, (2) providing external support services to communities such as capacity building to water committees called V-WASHE committees, which are established at the community level, and (3) coordinating and conducting training for water committees, caretakers and area pump minders/ area mechanics.

5.2 DATA COLLECTION

Data was collected from 16 functional water supplies facilities through structured interviews conducted between 30th April and 2nd May 2001. The following communities had functional water supply facilities: Hanjalika, Simwaba, Makubi, Mwanachambwa, Nachengwa, Chintubule, Milandu and Kasaka, while the following communities had semi/non-functional water supply facilities: Munjili, Hanzala, Makopwe, Twambwa, Kataba, Nkonkola, Hachifa and Chakola. (See location of each water supply above).

The researcher began interviews by introducing himself and asking whether or not respondents were willing to be interviewed about their water supply facility. After getting consent from respondents, the researcher explained the purpose of the interview. Interviews were conducted as follows: first the researcher asked respondents questions relating to the background of the water supply facility, followed by questions on the ability of the community to maintain the water supply facility; this was followed by questions on the maintenance system for each water supply facility. The researcher concluded interviews by asking respondents general questions on water supply facilities. At the end of each interview, the researcher observed the condition of the water supply facilities together with respondents. The researcher wound up interviews by thanking respondents for giving him an opportunity to interview them.

Data was also collected from eight water supply agencies through structured interviews in order to provide a big picture of rural water supply in Zambia and to triangulate the information collected from communities. The researcher collected data between 3rd and 8th May 2001. Interviews with World Vision International, Plan International, the District WASHE committee and the District Water Affairs were conducted in Mazabuka district. While interviews with DWA Lusaka, MLGH, U.S Peace Corps and UNICEF were conducted in Lusaka. Water supply agencies interviewed in Mazabuka provided a district focus to rural water supply while those interviewed in Lusaka provided a national focus to rural water supply.

The researcher followed almost the same process for conducting interviews with water supply agencies as the one followed with rural communities. However, the order of questions was different: the researcher first asked questions on sustainability of rural water supply facilities,

followed by questions relating to operations and maintenance; legal, policy and institutional framework; approaches in the management in the management of the water supply sector and concluded interviews by asking general questions.

5.3 WATER SUPPLY FACILITIES AND AGENCIES

This section provides background of water supply facilities and water supply agencies. It is divided in three subsections: background of functional water supply facilities, background of semi/non-functional water supply facilities and background of water supply agencies.

5.3.1 BACKGROUND INFORMATION ON FUNCTIONAL WATER SUPPLY FACILITIES

5.3.1.1 HANJALIKA COMMUNITY

Hanjalika community is situated about 70 kilometres off Mazabuka Chivuna road, east of Mazabuka town. Hanjalika community is easily accessible by a fairly good gravel road. The number of people that use the water supply facility at Hanjalika community is said to be more than 100 people and 350 school children that attend Hanjalika Basic School. The researcher interviewed the vice chairperson of the water committee outside her home which is just few meters from the water supply facility.

Africare, upon community request, rehabilitated this water supply facility in 1995 by replacing the old hand pump with a new one, and building a new apron and a drainage system. The respondent did not however know when the water supply facility was originally constructed. The community did not make any contributions towards the rehabilitation of the water supply facility because Africare did not request them to do so.

The water supply facility was functional and well kept at the time of the interview. It had a well-built slab (apron), with a good drainage system. The community also has made a fence out of poles around the water supply facility.

5.3.1.2 SIMWABA COMMUNITY

Simwaba community is situated about 28 kilometres west of Mazabuka town, off Mazabuka Monze road. The community is easily accessible by a fairly well maintained gravel road, which branches off the Mazabuka Monze road. There are two water supply facilities in Simwaba community. The water supply facility on which this interview was based is situated at Simwaba Basic School. The population that uses the water supply facility in Simwaba community is said to be more than 250 people, plus 350 school children that attend Simwaba Basic School. The population that uses this water supply facility is too high compared to the government recommended number of 200 people per water supply facility.

The researcher interviewed the chairperson of the water committee, at the respondents' house, which is about 500 meters from the Simwaba Basic School. The water supply facility was originally constructed in 1972 by Department of Water Affairs; and was rehabilitated in 1995 by the D-WASHE committee. The rehabilitation involved the replacement of the old hand pump with a new one. During the rehabilitation, the community contributed sand, stones and also made bricks for making the apron on which the hand pump is installed. The community also put a fence made out of poles around the water supply facility. After rehabilitating the water supply facility, community participation involves cleaning the surroundings and donating K500 (R1.5) per family per month.

The water supply facility was at the time of the interview functional. Although the water supply had a well-built apron, it had a poorly maintained drainage system. The surrounding was also dirty, contrary to the claim by the respondent that the community cleans the surrounding of the water supply facility every day.

5.3.1.3 MAKUBI COMMUNITY

Makubi community is situated about 40 kilometres west of Mazabuka town off Mazabuka Monze road. Access to the community is through a gravel road, which is fairly well maintained. The population that uses the water supply is said to be more than 300 people, which is higher than the government recommended number of 200 people per water supply facility. There is only one water supply facility in the community. Information on this water supply facility was collected from a water committee member at his house. The house is about 100 meters from the water supply facility. This community is far from any government institution such as a rural health centre or school.

The D-WASHE committee upon the headman's request constructed this water supply facility in 1995. The community contributed sand and stones during the water supply facility construction. These materials were used to construct an apron - a slab on which the hand pump is installed. The community also put a fence made out of poles around the water supply facility. After the water supply facility was constructed, the community put in place a user fee collections system. Community members contribute K500 (R1.5) per month per family meant for purchasing of spare parts when there is a break down. The water committee is responsible for collecting user fees.

The water supply facility was functional at the time of the interview and has never broken down before. The researcher observed that the water supply was well kept and had a well-built slab with a good drainage system.

5.3.1.4 MWANACHAMBWA COMMUNITY

Mwanachambwa community is situated about 42 kilometres off Mazabuka Monze road, west of Mazabuka town. The community is easily accessible through a gravel road, which branches off the Mazabuka Monze road. The number of people that uses the water supply facility at Mwanachambwa community is said to be more than 300 people. This is higher than the government recommended number of 200 people per water supply facility. Information on this water supply facility was collected from three members of the water committee, which also included the chairperson for the water committee.

The D-WASHE committee rehabilitated this water supply facility in 1996 upon community request. The community had a windlass before it was replaced with a hand pump. The community did not contribute anything during the rehabilitation of the water supply facility. After the water supply facility was constructed, the community contributes user fees whenever there is a breakdown.

The water supply facility was functional and well kept at the time of the interview. It had a well-built slab (apron), with a good drainage system. There was also a fence around it, which was made of out poles.

5.3.1.5 NACHENGWA COMMUNITY

Nachengwa community is situated about 70 kilometres east of Mazabuka town. It is easily accessible by a fairly well maintained road, which cuts across the community. There is only one water supply facility in the community. The number of people that uses the water supply facility in Nachengwa community is said to be more than 700 people. This is almost three times higher than the government recommended number of 200 people per water supply facility. Information on this water supply facility was collected from the chairperson of the water committee at the respondent's house, just a few meters from the water supply facility.

This water supply facility was constructed in 1995 with funding from World Vision International upon the headman's request. The community contributed 6x50 kilograms of pockets of cement, sand and stones, for the construction of the apron on which the water supply facility is installed. The community also put a fence made out of poles around the water supply facility.

The water supply facility was functional at the time of the interview, although it had broken down eight months earlier because rubbers were worn out. The community bought rubbers and repaired it. The researcher observed that the water supply facility was well kept. It had a well-built slab, with a good drainage system.

5.3.1.6 CHINTUBULE COMMUNITY

Chintubule community is situated about 75 kilometres east of Mazabuka town. It is easily accessible by a fairly well maintained gravel road that cuts across the community. There is only one water supply facility in the community. The number of people that uses the water supply facility at Chintubule community is said to be more than 800 people. This is four times more than the government recommended number of 200 people per water supply facility. Information on this water supply facility was collected from five community members - four women and one man, because all members of the water committee were not available.

The water supply facility was constructed in 1997 with funding from World Vision International upon the request of the community. During the construction of the water supply facility the community contributed sand, stones, 6x50 kilograms of pockets of cement for the construction of the apron. After the water supply facility was constructed, the community ensures that the surrounding of the water supply facility is clean, including the drainage system. In addition, the

community had put stones around the apron and constructed a fence around the water supply facility.

The water supply facility was functional at the time of the interview. The researcher observed that the water supply facility was well kept. It had a well-built slab (apron), with a good drainage system. It also appeared that respondents were very proud of the water supply facility, judging by the enthusiasm they showed during the interview.

5.3.1.7 MILANDU COMMUNITY

Milandu community is situated about 68 kilometres east of Mazabuka town, off Mazabuka Monze road. The community is easily accessible by a well-maintained gravel road, which cuts across Milandu community. There is only one water supply facility in Milandu community, which is just by the roadside. The population that uses this water supply facility is estimated to be 400 people. This is twice the government recommended number of 200 people per water supply facility. Information on this water supply facility was collected from the chairperson of the water committee, who is also the headman of Milandu community. The interview was conducted at his house about a kilometre away from the water supply facility.

This water supply facility was constructed by DWA more than 15 years ago. In 1993 Africare rehabilitated the water supply facility by replacing the hand pump with a new one. The community did not make any contributions towards the rehabilitation of the water supply facility because Africare did not request them to do so. After the water supply facility was rehabilitated, the community ensures that the surrounding of the water supply facility is kept clean, including the drainage system. The community has also put stones and a fence around the water supply facility.

The water supply facility was functional at the time of the interview. It had broken down three times in the past, since it was rehabilitated. The major problem the community faced with the water supply facility was that the cylinder head had developed a fault. The area councillor who was a resident of Milandu community used his political influence to obtain a new cylinder head from the D-WASHE committee in Mazabuka town.

5.3.1.8 KASAKA COMMUNITY

Kasaka community is situated about 60 kilometres northeast of Mazabuka town, off Lusaka Mazabuka road. The community is only about a kilometre off the Lusaka Mazabuka road. There are five water supply facilities in the nearby communities. The population that uses the water supply facility at Kasaka community is said to be more than 100 people. Information on this water supply facility was collected from three community members who included the water committee chairperson.

The D-WASHE committee upon community request constructed this water supply facility in 2000. The community contributed 6x50 kilograms of pockets of cement, sand and stones for the construction of the apron. The community also contributed K30, 000 (R75) commitment fee before the D-WASHE committee could construct the water supply facility in the community. The D-WASHE committee directed the community to contribute K50,000 (R125), for purchasing spare parts, after the water supply facility was constructed.

The water supply facility was functional at the time of the interview. It had only broken down once because rubbers were worn out. The water supply facility was only six months old at the time of the interview. The water committee borrowed rubbers from the neighbouring community to repair it. The researcher observed that the surroundings of the water supply facility was not well kept and the community has not put a fence around it as the case is with almost all other water supply facilities visited by the researcher

TABLE 1

FUNCTIONAL WATER SUPPLY FACILITIES

BROAD CATEGORY OF INFORMATION	Community Specific Information	HANJALIKA COMMUNITY	SIMWABA COMMUNITY	MAKUBI COMMUNITY	MWANA-CHAMBWA COMMUNITY	NACHENGWA COMMUNITY	CHINTUBULE COMMUNITY	MILANDU COMMUNITY	KASAKA COMMUNITY	
BACKGROUND INFORMATION	Source of information	Vice chair person of the water committee	Chair person of the water committee	Water committee member	3 water committee members	Chair person of the water committee	APM and 3 water users	Chair person of the water committee	Chair person and two water users	
	Year constructed/rehabilitated	1995 Rehabilitation	1995 Rehabilitation	1995 Construction	1996 Rehabilitation	1997 Construction	1997 Construction	1993 Rehabilitation	2000 Construction	
	Estimated Population	100	250	300	300	700	800	400	100	
	Distance to Mazabuka	70km	28km	40km	42km	70km	75km	68km	60km	
	Decision Making in constructing the WSFs	Community	Community	Community	Community	Community	Community	Community	Community	
	Status of the WSF	Functional with good a drainage system	Functional with poorly maintained drainage	Functional with a well maintained drainage	Functional with a well maintained drainage	Functional with a well maintained drainage	Functional with a well maintained drainage	Functional with a well maintained surrounding	Functional with a poorly maintained surrounding	Functional with a poorly maintained surrounding
	Source of Funding	AFRICARE	DWA	D-WASHE	D-WASHE	WVI	WVI	AFRICARE	D-WASHE	
SOCIAL FACTORS	Community participation after construction/rehabilitation	Fencing of the WSF	Cleaning surrounding and user fees contribution R1.5/month/family	Contribution of user fees R1.25/Family/month	Contribution of user fees and fencing	Fencing of the WSF	Cleaning the surrounding, putting of small stones around the WSF	User fees contribution	User fees contribution	

TECHNOLOGICAL FACTORS	Technology Choice	The community had no say and has problems handling India Mark II hand pump	No say but community has ability to handle India Mark II hand pump	No say and no ability to handle India Mark II hand pump	No say but community has ability to handle India Mark II hand pump	No say but community has ability to handle India Mark II hand pump	No say but community has ability to handle India Mark II hand pump	No say and no ability to handle technology	No say but community had ability to handle India Mark II hand pump
	Easiest WSF to maintain	A well is the easiest but wells dry up in dry season	A well is the easiest but water is easily contaminated	A well is the easiest but water gets contaminated easily	A hand pump is better than the windlass the community had in the past	Hand pump is easy to maintain than windlass	A well is the easiest but wells dry up in dry season	A well is the easiest but dries up easily and area is rocky	Not sure
	Accessibility of Spare Parts	Easy access	Not easily accessible	Not easily accessible	Accessible in Mazabuka only	Readily available in the community and Mazabuka	Readily available in the community and Mazabuka	Easy access to spare parts in Mazabuka	Spare parts readily available in Mazabuka
	Problems faced to maintain the WSF	Inability to raise funds, high cost of spare parts, only one APM is Available.	WSF breaks frequently and refusal to pay user fees in the rain season	High cost of spare parts, Non - availability of spare parts	Lack of tools for conducting repairs	Community members stop contributing user fees in the rain season	Water committee and APM	Inability to raise adequate user fees due to poverty	Inability to raise user fees
SUSTAINABILITY FACTORS	Preparation to sustain and maintain WSF	Not adequately prepared	Not adequately prepared	Not adequately prepared	Not adequately prepared	Adequately prepared	Adequately prepared	Not adequately prepared	Adequately prepared

External support to manage WSF	No external help	No external support	No external support	No external support	Receives external support: (training) from WVI	Receives external support from WVI	Only from WVI not Africare	No external support
Factors considered critical to sustainability of WSFs	Spare parts, user fees and APM	Repair tools, Spare parts (pipes, rods, valves & rubbers)	Spare parts, local skills to repair	Spare parts, lubricants and repair tools	Ability of the community to contribute user fees	Proper use of WSF and ability to raise user fees for spare parts	Spare parts availability, skills in O&M, effective water committee and user fees	User fees, lubricant
Critical factors put in place	Only user fee collection system put in place	None of the above put in place	None of the above have been put in place	Only lubricants have been procured	User fee collection system put in place but ineffective in rain season	Proper use of WSF only	Only water committee put in place	Only lubricant have been procured

5.3.1.9 SUMMARY OF FINDINGS FROM FUNCTIONAL WATER SUPPLY FACILITIES

Below is the summary of major findings for functional water supply facilities:

a. BACKGROUND INFORMATION

- Seven water supply facilities were constructed or rehabilitated between 1995 and 2000. Only one water supply was constructed in 1996. Five years is the average age for all functional water supply facility.
- The population that uses a water supply facility ranges from 100 to 800 people per water supply facility. Seven water supply facilities are used by a population that is higher than the government recommended number of 200 people per water supply facility.
- Five communities with functional water supply facilities made contributions towards the construction of their water supply facilities in form of sand, stones and cement. These materials were used for making stands on which hand pumps are installed. Only three communities did not make contributions mainly because they were not requested to do so.

b. SOCIAL FACTORS

- All eight water supply facilities had a management system put in place for their water supply facilities. However, only half of water supply facilities were considered to have an effective management system put in place.
- Alternative sources of water have a negative impact on community participation as most community members stop contributing user fees in the rain season.

c. ECONOMIC FACTORS

- Five communities indicated that they are unable to meet the cost of spare parts because they are expensive. They said they are only able to meet the cost of less expensive spare parts such as rubbers, valves and lubricants while spare parts such as pipes, rods and cylinder heads are beyond the financial capacity of communities.
- The inability to meet the cost of spare parts was attributed to high poverty level in communities resulting from poor agricultural production. Respondents said community

members are experiencing poor agricultural production because agricultural inputs such as fertiliser and seed have become too expensive. The problem has been compounded by the fact that most of their cattle used as animal draught power have died from animal diseases.

d. TECHNOLOGICAL FACTORS

- All communities were not consulted on the type of technology that they are using because India Mark II hand pump was predetermined by the water supply agencies which assisted communities in the construction of the water supply facilities.
- Although none of the communities were consulted on the technology they are using, five respondents felt that they have the ability to handle the technology because they have been trained to operate and maintain their water supply facilities.
- Six communities with functional water supply facilities said that they do not receive external support services from water supply agencies that facilitated the construction or rehabilitation of their water supply facilities.
- Respondents from five communities said the arrangement put in place for the repair of their water supply facilities was not effective. This was mainly attributed to the communities' inability to meet the cost of spare parts and due to the fact that the APMs do not live within the communities they serve. Other reasons given included lack of tools for carrying out repairs, lack of spare parts, lack of technical skills and in one case, dependence on the area councillor to provide spare parts.

e. SUSTAINABILITY FACTORS

- The following were considered to be critical factors that would promote sustainability of water supply facilities: availability of affordable spare parts, communities' ability to contribute user fees and the ability of communities to carry out repairs.
- Inability to raise adequate user fees to purchase spare parts is one of the major problems communities face in sustaining their water supply facilities. This is because they perceive themselves to be too poor to afford the required amount. Poverty has been attributed to poor agricultural production due expensive agricultural inputs such as fertilizer and seed. In addition, most community members lost their cattle to animal diseases, which are used as animal draught power. As a result, community members contribute user fees that are nominal compared to the cost of spare parts. The second major problem faced by

communities is the lack of tools to carry out repairs, because people who were trained were not equipped with tools.

- There are two main reasons why water supply facilities under this category are sustainable. First, most of these water supply facilities were relatively new having either been constructed or rehabilitated between 1995 and 2000. Second, most of these water supply facilities either had not experienced a major breakdown or were quickly repaired after a breakdown.

5.3.2. BACKGROUND INFORMATION ON SEMI/NON-FUNCTIONAL WATER SUPPLY FACILITIES

5.3.2.1 MUNJILI COMMUNITY

Munjili community is situated about 60 kilometers east of Mazabuka town. The community is easily accessible through a gravel road that cuts across the community. The condition of the road is fairly good. The population that uses the water supply facility at Munjili community is said to be more than 500 people plus 350 pupils that attend Munjili basic school. The community also has a rural health centre which caters for Munjili community and surrounding communities. Information on this water supply facility was collected from the treasurer of the water committee and the vice chair person of the Parents Teachers Association.

This water supply facility was constructed more than 10 years ago by DWA mainly to serve the school population. At the time of construction, the community did not make any contributions. All the costs were borne by DWA. The water supply facility was not functional at the time of the interview because it had a faulty cylinder head. The researcher observed that the water supply facility had a fence made out of poles around it. The surrounding of the water supply facility was also relatively well kept.

The water supply facility had been in a state of disrepair for two months according to the respondents. The water committee had requested for help from DWA to repair the water supply facility since the community was facing a problem that was beyond its financial and technical capacity. However, the community was told to meet fuel costs and lunch allowance for staff from

DWA before they could visit the community. After making an assessment, DWA informed the water committee that the cylinder head was faulty and was irreparable. The community was therefore requested to replace it at cost of K800,000 (R2,000). The community would either have to come up with the money or seek for external assistance, without which the water supply water facility would remain in the same state of disrepair.

5.3.2.2. HANZALA COMMUNITY

Hanzala community is situated about 80 kilometers east of Mazabuka town. The community is easily accessible by a gravel road, which cuts across the community. The road is only poor 20 kilometers before Hanzala community. The population that uses the water supply facility at is said to be between 500 and 600 people. The community has a basic school and a rural health Centre. The water supply facility is situated at the rural health center. Information on this water supply facility was collected from a member of the water committee and an area pump minder.

DWA originally constructed this water supply facility more than 15 years ago. It was primarily constructed to provide water to the rural health center. The community did not make contributions towards the construction of the water supply facility. All costs were borne by DWA. After the water supply facility was constructed, the community has constructed a slab on which the hand pump is installed and has also put a fence around the water supply facility. In addition, community members contribute K1,000 (R2.5) per family per month as user fees. User fees are used to purchase spare parts and pay the APM each time he carries out repairs.

The water supply facility was barely functioning at the time of the interview and it was very difficult to operate. Community members had to apply a lot of effort to draw water. Although the water supply facility was in that state for two months, it has been giving the community problems for three years. Respondents felt that there was very little they could do to resolve the problem since it was beyond their capacity. The problem has been caused by the collapse of the borehole at the bottom. In an effort to resolve the problem, the community reduced the number of pipes and rods for the hand pump. Respondents felt that drilling a new borehole is the only solution to their problem.

5.3.2.3 MAKOPWE COMMUNITY

Makopwe community is situated about 70 kilometers east of Mazabuka town. The community is easily accessible by a gravel road that cuts across the community. The condition of the road is good except for a stretch of about 10 kilometers before Makopwe community. The population that uses the water supply facility at Makopwe Community is said to be around 800 people. Information on this water supply facility was collected from two men and three women who are users of the water supply facility, because none of the water committee members were available at the time of the visit.

This water supply facility was constructed with funding from WVI in 1997 upon community request. During the construction of the water supply facility, the community contributed stones, sand and 6x50 kilograms of pockets of cement for the construction of the apron. After the water supply was constructed, the community ensures that the surrounding of the water supply facility is kept clean. In addition, the community has put a fence around the water supply facility.

The water supply facility was not functional at the time of the interview because pipes had dropped in the borehole. The water supply facility had been in that state for two months. The community has not been able to repair the water supply facility because they do not have equipment to fish out pipes from the borehole. The water committee was planning to contact DWA for assistance in fishing out pipes from the borehole.

The community has removed the hand pump from the site in order to prevent it from being vandalized. The borehole has also been sealed to avoid water being contaminated. The researcher observed that the site for the water supply facility was overgrown with grass. It appeared as if the water supply facility was in a state of disrepair for longer than six months.

5.3.2.4 TWAMBWA COMMUNITY

Twambwa community is situated about 65 kilometers east of Mazabuka town. The community is easily accessible by a gravel road, which cuts across the community. The condition of the road is relatively good. The population that uses the water supply facility at Twamba Community is said to

be 600 people. Information on this water supply facility was collected from the APM because the water committee had been disbanded. This water supply facility was constructed in 1996 with funding from WVI upon community request.

The water supply facility was not functional at the time of the interview because pipes had dropped in the borehole. The water supply facility had been in the state of disrepair for four years. The community has not been able to do anything about the situation because the problem was beyond its financial and technical capacity. To resolve the problem, the community requested for help from DWA, which has the technical knowledge and equipment to fish out the pipes from the borehole.

The community did not make any contributions towards the construction of the water supply facility because all the costs were borne by WVI. After installation of the water supply facility, the community participation included clearing the site and making a fence around the water supply facility.

5.3.2.5 KATABA COMMUNITY

Kataba community is situated about 40 kilometers east of Mazabuka town. The community is easily accessible by a gravel road, which cuts across the community. The condition of the road is quite good. The population that uses the water supply facility at Kataba community is said to be more than 350 people plus 270 pupils that attend Kataba Basic School. Information on this water supply facility was collected from a member of the water committee and a schoolteacher.

This water supply facility was constructed in 1991 by DWA mainly to serve the school population. The community did not make any contributions towards the construction of the water supply facility. According to respondents, community participation after installation of the water supply facility included the management of the water supply facility and contribution of user fees. Community members contribute K1,000 (R2.5) per month per family, while pupils contribute K100 (R0.25) per year.

Although the water supply facility was functional at the time of the interview, it had a problem with a cylinder head. Respondents felt that the cylinder head had outlived its usefulness and needs to be

replaced. The water supply facility had been in a state for more than a year. Respondents felt that the long-term solution to the problem is replacing the India Mark III hand pump with India Mark II hand pump because the latter is easy to operate and maintain; and also because spare parts and tools are easily available compared to the former.

5.3.2.6 NKONKOLA COMMUNITY

Nkonkola community is situated about 70 kilometers east of Mazabuka town. Nkonkola community is easily accessible by a gravel road that cuts across the community. The condition of the road is quite good. The population that uses the water supply facility at Nkonkola community is said to be more than 800 people. The Nkonkola community plays a critical role in the area as it has a rural health center and an upper basic school. Information on this water supply facility was collected from a member of a water committee who is also a teacher at Nkonkola upper basic school. The interview was conducted a few meters from the water supply facility.

This water supply facility was constructed more than 15 years ago by DWA mainly to serve the school population. The community did not make any contributions towards the construction of the water supply facility. According to the respondent, community participation after installation of the water supply facility included the management of the water supply facility and contribution of user fees. In addition, the community had put a fence around the water supply facility.

The water supply facility was not functional at the time of the interview because the cylinder head had fallen in the borehole. The community has not been able to repair the water supply facility because they do not have equipment to fish out the cylinder head from the bottom of the borehole. The water supply facility had been in the state of disrepair for two months. The respondent felt that poor workmanship by the APM led to the cylinder head falling into the borehole. Regarding what the community has done to resolve the problem, the respondent said the community was making an effort to contact DWA at the district level to come and fish out the cylinder head. The community was drawing water from WVI offices at the time of the interview.

5.3.2.6.7 HACHIFA COMMUNITY

Hachifa community is situated about 60 kilometers northeast of Mazabuka town, off the Lusaka Mazabuka road. The condition of the road is very good. The population that uses the water supply facility at Hachifa community is said to be more than 300 people. Information on this water supply facility was collected from a member of water committee who is also a community headman. The interview was conducted at the respondent's house, just a few meters from the water supply facility.

This water supply facility was constructed more than 20 years ago through an agricultural program initiated by the government. The water supply facility was constructed mainly to serve the needs of farmers because the area had an animal husbandry program. The hand pump had been changed several times over the years. The latest change was done by the D-WASHE committee, which replaced the old hand pump with a new one. The community did not make any contributions towards the construction of the water supply facility. They were however required to contribute sand, stones and 6x50 kilograms of pockets of cement for the construction of the apron. In addition, the community also contributes user fees and has put a fence around the water supply facility.

Although the water supply facility was functional at the time of the interview, it was not in a good condition mainly because most of the pipes in the borehole leak due to corrosion. The community on several occasions has welded the pipes to alleviate the problem. In order to solve the problem, the community needs new pipes but cannot raise adequate funds to buy the required number of pipes.

5.3.2.6.8 CHAKOLA COMMUNITY

Chakola community is situated about 62 kilometers northeast of Mazabuka town off Lusaka Mazabuka road. The condition of the road is very good. The population that uses the water supply facility at Chakola community is said to be more than 100 people. Information on this water supply facility was collected from the chairperson of the water committee. The interview was conducted at the site of the water supply facility.

This water supply facility was constructed by DWA more than 15 years. In 1996, Africare rehabilitated it by replacing the old hand pump with a new one - India Mark II hand pump. The community did not make any contributions towards the construction of the water supply facility

because they were not asked to do so.

The water supply facility was barely functional at the time of the interview because pipes in the borehole leak due to corrosion. In an effort to alleviate the problem, the community ties pipes with rubbers every time the problem worsens. The community has been experiencing this problem for more than a year. The respondent said that the only long lasting solution to the problem was to replace old pipes with new ones. Unfortunately the community was unable to raise enough money to buy new pipes.

The researcher observed that there were a lot of women at the water supply facility trying to draw water. The women told the researcher that they find it difficult to operate the water supply facility because the handle is hard. As a result, women apply a lot of effort to draw water.

TABLE 2.

SEMI/NON FUNCTIONAL WATER SUPPLY FACILITIES

BROAD CATEGORY OF INFORMATION	Community	MUNJILI COMMUNITY	HANZALA COMMUNITY	MAKOPWE COMMUNITY	TWAMBWA COMMUNITY	KATABA COMMUNITY	NKONKOLA COMMUNITY	HACHIFA COMMUNITY	CHAKOLA COMMUNITY
	Specific Information								
BACKGROUND INFORMATION	Source of information	Vice chair of water committee	Water committee member and APM	Five water users	APM	Member of the water committee and school teacher	Water committee member	Water committee member	Chair of the water committee
	Year constructed/rehabilitated	Constructed before 1990	Constructed before 1985	Constructed in 1997	Constructed in 1996	Constructed in 1991	Constructed before 1985	Constructed before 1980 rehab. 1994	Constructed before 1980 rehab. 1996
	Estimated Population	500	600	800	600	350	800	300	100
	Distance to Mazabuka	60km	80km	70km	65km	40km	70km	60km	62km
	Decision making in construction of WSFs	DWA	DWA	Community	Community	DWA	DWA	DWA	DWA
	Community Contributions	No contributions were made	No contributions were made	Stones, sand and cement	No contributions were made	No contributions were made	No contributions were made	No contributions	No contributions were made
	Source of Funding	DWA	DWA	WVI	WVI	DWA	DWA	D-WASHE (rehab only)	AFRICARE
	Status of the WSF	Not functional because of faulty cylinder head	Barely functioning because the bore hole has collapsed at the bottom	Not functioning because pipes dropped in the bore hole	Not functioning because pipes dropped in the borehole	Barely functional because cylinder head has outlived its life span	Not functional because cylinder head had dropped in the bore hole	Barely functional because pipes leak due to corrosion	Barely functional because pipes leak due to corrosion
	Period the WFS had been in current state	Two months	Two months	Two months	Four years	More than a year	Two months	Two months	More than a year

	Community effort to repair the WSF	Community requested DWA to replace the cylinder head	Reduced number of pipes. Construction of new one is the only solution	DWA contacted for help	Done nothing because the problem was beyond the community's ability	Wants to replace India Mark III with India Mark II hand pump	Community was to contact DWA for technical know how and equipment to fish out the cylinder head	Has welded pipes several times	Tying of pipes with plastic materials
SOCIAL FACTORS	Community Participation	Minimal contribution of user fees R4/family/month	Contribution of sand, stones and cement to construct the slab on which WFS installed	Community cleans the surrounding and had put a fence around the WSF	Community cleans the surrounding and had put a fence around the WSF	Management of WFS and contribution of user fees	Management of WFS; contributing of user fees and fencing of WSF	Fencing; and contribution of cement, sand and user fees contribution	Contribute user fees when requested by the water committee
	Management system	Water committee only	Water committee and APM	Water committee and APM	Water committee dissolved	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM
	Effectiveness of the management system	Considered effective	Not effective	Used to be effective before breakdown	Not applicable	Limited effectiveness due to inability to raise user fees	Used to be effective before the breakdown	Used to be effective before the breakdown	Not effective due to inability to raise user fees
	Role of Traditional Leaders	Assist water committee enforce collection of user fees	Assist water committee enforce collection of user fees	Assist water committee to collect user fees	Played no role	Assist water committee enforce collection of user fees	Assist water committee enforce collection of user fees	Assist water committee enforce collection of user fees	Assist water committee enforce collection of user fees
	Alternative sources of water	Shallow wells	Streams	Streams	Streams	Shallow wells	Running water at WVI offices	Dam	Hand Pump in the nearby community
	Impact of alternative sources of water on contribution of user fees	Negative impact	Negative impact on user fee contribution esp. in rain season	Negative impact on user fee contribution esp. in rain season	Not applicable	Negative impact	No impact	No impact	No impact

ECONOMIC FACTORS	Ability to meet the of cost repairs	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts	No ability to meet the cost of spare parts
	Factors affecting communities' ability to meet the cost of spare parts	Inability to contribute user fees and spare parts are expensive	Unable to meet the cost of spare parts due to erosion of the economic base	Inability to raise user fees due to high poverty level in the community	Poor agricultural production to enable community raise user fees	Inability to raise adequate user fees due to high poverty in the community	Inability to raise adequate user fees to buy spare parts	Pipes are expensive	Unable to raise user fees due to high levels of poverty & also pipes are expensive
TECHNOLOGICAL FACTORS	Technology Choice	No say and no ability to operate India Mark II hand pump	No say on technology but the community has skills to operate and maintain India Mark II hand pump	No say on technology but the community has ability to operate India Mark II hand pump	No say and unable to handle India Mark III hand pump	No say and the community is unable to handle India Mark III hand pump	No say on technology but the community has the ability to operate India Mark II hand pump	No say on technology but the community has the ability to operate India Mark II hand pump	No say in technology but the community has the ability to operate India Mark II hand pump
	Easiest WSF to maintain	A well is the easiest but water is easily contaminated	A well is the easiest but wells are difficult to dig due to area being rocky	A well is the easiest but wells are difficult to dig due to the area being rocky	A well is the easiest but wells are difficult to dig due to the area being rocky	A well is the easiest but wells dry up due to low water table	A well is the easiest but wells dry up in the hot season	A well is the easiest but water dries up due to low water table	India Mark II hand pump is the easiest because India Mark III is difficult to operate
	Availability of Spare Parts	Available in Mazabuka	Readily available in the area and Mazabuka	Available in the area and in Mazabuka	Spare parts for India Mark III not available	Not readily available	Available in the community and in Mazabuka	Available in Mazabuka	Available in Mazabuka

	Ability to sustain WSF without external help	No ability to sustain without external support	Has only ability to carry out minor repairs	Has only ability to carry out minor repairs	Has no ability because the community was inadequately prepared	Has no ability as the community cannot handle major repairs	Has ability to handle only minor repairs	Has ability except current problem is beyond community's capacity	Has ability because community has been repairing WSFs
SUSTAINABILITY FACTORS	Preparation to manage and maintain WSF	Not adequately prepared	DWA did not prepare the community but WVI did instead	WVI Adequately prepared the community	The community was Inadequately prepared	The community was Inadequately prepared	The community was not adequately prepared by DWA but WVI did instead	The community was not adequately prepared	Not adequately prepared by Africare but the community has received help from D-WASHE
	External support to Manage WSF	No external support	Limited support	Limited to training of water committee and APM	No external support	No external support	WVI stocks spare parts locally and training	Limited to training	Limited to training
	Factors considered critical to sustainability of WSFs	Ability to raise user fees, easy access to spare parts, effective water committee	Effective water committee, acquisition of skills to repair and ability to raise funds for spare parts	Repairing of the WSF and ensuring that the WSF is properly used thereafter	Repair of the WSF; reconstitution of the water committee and putting in place a user fee collection system	Replacement of India Mark III with India Mark II hand pump and putting a user fee collection system put in place	Technical skills, affordable spare parts and stocking of expensive spare parts in the area	The respondent did not know any critical factors	Replacement of leaking pipes

3.2.9 SUMMARY OF FINDINGS FOR SEMI/NON-FUNCTIONAL WATER SUPPLY FACILITIES

Below is the summary of major findings for semi/non functional water supply facilities:

a. BACKGROUND INFORMATION

- All semi/non-functional water supply facilities were constructed between 1980 and 1996.
- Seven communities with semi/non-functional water supply facilities did not make any contributions towards constructions of the water supply facilities. Only one community contributed stones, sand and cement.
- Seven semi/non-functional water supply facilities had problems with cylinder heads or pipes. Cylinder heads and pipes were either faulty or had dropped in the borehole. These water supply facilities have not been repaired for two reasons: first, communities do not have capacity to carry out major repairs; and second, communities receive little or no support from the district in carrying out repairs. Only one water supply facility had a unique problem. The borehole had collapsed at the bottom. The community had tried to reduce the number of pipes to alleviate the situation.

b. SOCIAL FACTORS

- All water supply facilities except one had a management system put in place for their water supply facilities. This mainly included a water committee and an APM who either lives in the community or in a nearby community. Respondents no longer considered the management system for the water supply facility effective since WSFs became dysfunctional.
- Availability of alternative sources of water has a negative impact on community participation as the number of community members who refuse to contribute user fees increases in the rain season when alternative sources of water have a lot of water.

c. ECONOMIC FACTORS

- Inability to raise adequate user fees to purchase spare parts is one of the major problems communities with semi/non-functional water supply facilities face in sustaining their facilities. User fees contributed by community members are nominal compared to the cost of spare parts. The second major problem faced by communities is lack of tools to carry out repairs because people who were trained were not equipped with tools.
- Inability of communities to meet the cost of spare parts, APMs not leaving within communities, lack of tools for carrying out repairs, lack of spare parts, lack of technical skills to handle major repairs were considered as factors that have made the arrangement put in place for repairing water supply facilities not effective.
- High poverty level in communities resulting from poor agricultural production was singled out as a reason why communities cannot meet the cost of spare parts. Communities have been experiencing poor agricultural production because agricultural inputs such as fertiliser and seed have become too expensive. The problem has been compounded by the fact that most of their cattle used as animal draught power have died from animal diseases.

d. TECHNOLOGICAL FACTORS

- All communities did not have a say in the technology that they were using as the decision to install the hand pumps was made by water supply agencies.
- Communities with semi/non-functional water supply facilities do not have the technical and financial capacity to repair water supply facilities without external help. They only have the ability to carry out minor repairs. Most of the problems they were facing at the time of the interview were beyond their financial and technical capacity.
- All respondents with semi/non-functional water supply facilities considered inadequate training in operation and maintenance as the reason for not being adequately prepared to manage their water supply facility.

e. SUSTAINABILITY FACTORS

- The following were considered as critical factors that would promote sustainability of semi/non-functional water supply facilities: ability to raise user fees, easy access to spare parts, effective water committee, skills to carry out repairs, repairing broken down water

supply facilities, replacement of India Mark III with India Mark II hand pump and replacement of leaking pipes.

- There are three main reasons why semi/non-functional water supply facilities are not sustainable. First, most water supply facility have been experiencing major breakdowns that are beyond the financial and technical capacity of communities. Second, this category consists of water supply facilities that were constructed over 10 years ago on average. Third, almost all communities did not make a decision to construct the water supply facilities and also never made any contribution towards the construction of the water supply facility.

5.3.2.10 COMPARISON OF SUMMARY OF FINDINGS BETWEEN SEMI/NON FUNCTIONAL AND FUNCTIONAL WATER SUPPLY FACILITIES

Below is the comparison of summary of findings between semi/non-functional and functional water supply facilities:

a. BACKGROUND INFORMATION

- Decision to construct all functional water supply facilities was made by the communities, who also made contributions towards the construction of facilities. Six of eight communities with semi/non-functional waster supplies neither made the decision to construct the water supply facilities nor made any contributions towards the construction of the water supply facility, except for one community.

b. SOCIAL FACTORS

- Both groups felt that they were not adequately prepared to manage and sustain their water supply facilities by water supply agencies that facilitated the construction or rehabilitation of their water supply facilities. However, WVI is the only organisation that was said to have adequately prepared communities to manage and sustain their water supply facilities because it had provided communities with skills to operate and maintain water supply facilities.
- A total of 12 respondents from both groups thought that wells are the easiest water supply facilities that communities can manage without external help. Communities however prefer

boreholes to wells because the latter dry up in the hot season. In addition, digging wells is almost impossible in some areas due to rocks and the low water table. Three respondents considered the India Mark II hand pump to be the easiest WFS in comparison with either India Mark III or the Windlass. Only one respondent did not have an opinion on the matter.

- A total of 15 respondents said they had a management system put in place for their water supply facilities. Only one water supply facility had no management system. The water committee was dissolved because the water supply facility was in a state of disrepair for a long time. The major difference between the two groups was that while respondents with functional water supply facilities felt that their management system was effective because both water committees and APMs were carrying out their functions effectively, respondents with semi/non-functional water supply facilities said their management system was only effective before the problems they were facing at the time of the interview.
- Both categories considered alternative sources of water to have a negative impact on community participation as most community members stop contributing user fees in the rain season when there is plenty of water in alternative sources of water.

c. ECONOMIC FACTORS

- The most outstanding problem faced by communities in relation to maintenance of their water supply facilities is the inability to raise adequate user fees to purchase spare parts.
- All respondents with semi/non-functional water supply facilities said they do not have the ability to meet the cost of spare parts compared to five respondents with functional water supply facilities that also expressed similar views.
- The reason given for inability to meet the cost of spare parts is that spare parts are expensive. Communities are only able to meet the cost of less expensive spare parts such as

rubbers, valves and lubricants while spare parts such as pipes, rods and cylinder heads are beyond the financial capacity of communities.

- Respondents attributed their inability to meet the cost of spare parts to high poverty level in communities resulting from poor agricultural production. They said community members are experiencing poor agricultural production because agricultural inputs such as fertiliser and seed have become unaffordable.

d. TECHNOLOGICAL FACTORS

- All communities were not consulted on the type of technology that they are using because India Mark II hand pump was predetermined by water supply agencies. However, equal number respondents (five) from both communities with functional and semi/non-functional water supply facilities said they have the ability to operate and maintain the technology.
- Five respondents with functional water supply facilities said they do not receive external support services from water supply agencies that facilitated the construction or rehabilitation of their water supply facilities. Ironically, five respondents with semi/non-functional water supply facilities said they receive some form of external support, although most it was in form of training.

e. SUSTAINABILITY FACTORS

- The following were considered by both categories to be critical factors that would promote sustainability of water supply facilities: availability of affordable spare parts, communities' ability to contribute user fees and the ability of communities to carry out repairs.
- There are two main reasons why functional water supply facilities are sustainable. First most of these water supply facilities were relatively new, having either been constructed or rehabilitated between 1995 and 2000. Second, most of these water supply facilities either had not experienced a major breakdown or the water supply facilities were quickly repaired after a breakdown.
- There are three main reasons why semi/non functional water supply facilities are not sustainable. First, most water supply facilities have been experiencing major breakdowns that are beyond the financial and technical capacity of communities. Second, this category consists of water supply facilities that were constructed over 10 years ago on average. And third, almost all communities did not make a decision to construct the water supply

facilities and also never made any contribution towards the construction of the water supply facility.

5.3.3 BACKGROUND INFORMATION ON WATER SUPPLY AGENCIES

This sub-section looks at the background information of eight water supply agencies.

5.3.3.1 WORLD VISION INTERNATIONAL

World Vision international (WVI) is Christian non-governmental organisation (NGO) operating in all provinces of Zambia. It is involved in many other development activities apart from the provision of water to rural communities. In Mazabuka district, WVI has an Area Development Program based at Nkonkola community, about 70 kilometers east of Mazabuka district, which among other things, constructs water supply facilities in the area. Information on this water supply agency was collected from the Community Development Officer at the WVI offices in Mazabuka.

5.3.3.2 PLAN INTERNATIONAL

Plan International is a non-governmental organisation (NGO) operating in many parts of Zambia including Mazabuka district. Plan International is involved in many other development activities apart from the provision of water to rural communities. Information on Plan International was collected from the Area Program Co-ordinator. The interview was conducted at the Plan International offices in Mazabuka.

5.3.3.3 D-WASHE COMMITTEE

The District Water, Sanitation and Hygiene Education (D-WASHE) committee is a multi-sectoral committee formed at the district level to co-ordinate rural water, sanitation and hygiene education in the district. The committee is composed of government agencies, NGOs and other organisations that are involved in the provision of water, sanitation services and hygiene education in rural areas. The D-WASHE committee also ensures that funds are solicited from donors to fund WASHE

activities in the district. Information on the Mazabuka district WASHE committee was collected from the chairperson of the D-WASHE committee at Mazabuka District Council offices.

5.3.3.4 DEPARTMENT OF WATER AFFAIRS MAZABUKA

Mazabuka District Water Affairs has had the responsibility to oversee rural water supply in the district until the year 2000. In the past, DWA had machines for drilling boreholes. It was also responsible for operation and maintenance of all water supply facilities in rural areas. With the advent of the WASHE concept, DWA supervises private drilling companies on behalf of the D-WASHE committee and funding agencies such as UNICEF. DWA is also responsible for carrying out repairs that are beyond the capacity of APMs in rural communities. Information on this water supply agency was collected from the District Water Engineer for DWA in Mazabuka.

5.3.3.5 DEPARTMENT OF WATER AFFAIRS LUSAKA

DWA at the provincial level provides support to the District Water Affairs Departments in the province and is a link between DWA at the district level and the Headquarters. Information on this water supply agency was collected from the Provincial Water Engineer for Lusaka Province at the provincial offices. The researcher interviewed the provincial water engineer because of his wide experience in several provinces including Southern Province under which Mazabuka district falls.

5.3.3.6 MINISTRY OF LOCAL GOVERNMENT AND HOUSING

The responsibility to oversee rural water supply sector in Zambia has for a long time been under DWA in the Ministry of Energy and Water Development. The responsibility as of 2001 has been shifted to the MLGH.

Information on MLGH was collected from the Coordinator for rural water supply sector in the MLGH. The respondent has many years of experience in rural water supply sector. Before her appointment as Coordinator for rural water supply, Mrs. Nkoloma worked for the National Water, Sanitation and Hygiene Education (N-WASHE), which was given a mandate by the government to form and train District WASHE committees countrywide.

5.3.3.7 U.S. PEACE CORPS

Peace Corps is United States of America federal agency. It has volunteers working in rural areas in different sectors including rural water supply sector. Information on Peace Corps was collected from the Associate Director, WASHE. The interview was conducted at the respondent's office. The respondent before joining Peace Corps was a rural water supply specialist in the Reform Support Unit, which was formed by the government to reform water supply sector in the country. She had national responsibilities over rural water supply sector countrywide.

5.3.3.8 UNICEF

UNICEF has significantly contributed to the promotion of rural water supply sector in Zambia. Apart from funding the construction of water supply facilities in a number of provinces, UNICEF has also contributed to the promotion of India Mark II hand pump, formation of water committees, (commonly known as V-WASHE committees), training of area pump minders, provision of tool kits to communities and APMs, and other WASHE activities. Information on UNICEF was collected from the Project Officer for WASHE. The interview was conducted at the UNICEF offices.

TABLE 3.

WATER SUPPLY AGENCIES

BROAD CATEGORY OF INFORMATION	WSA Specific Information	WVI	PLAN INTERNATIONAL	D-WASHE COMMITTEE	DWA MAZABUKA	DWA LUSAKA	MLGH	U.S PEACE CORPS	UNICEF
BACKGROUND INFORMATION	Source of information	Community Development Officer	Area Development Officer	Chair person of the D-WASHE Committee	District Water Engineer	Provincial Water Engineer	National Coordinator for rural water supply sector	Associate Director WASHE	Project Officer WASHE
	Coverage of interviewee	District focus	District focus	District focus	District focus	Provincial Focus	National focus	National focus	National focus
	District where interviews were conducted	Mazabuka	Mazabuka	Mazabuka	Mazabuka	Lusaka	Lusaka	Lusaka	Lusaka
POLICY AND FACTORS	Adequacy of policy framework	Respondent not conversant with subject matter	Not adequate	Not adequate	Not adequate because it is not based on reality on the ground since communities are not consulted	Policy framework adequate except RWS is in transition	Policy framework adequate because it has been made clear by govt on the lead agency in RWSS	Policy framework adequate because it identifies goals, objectives & strategies	Policy framework is adequate but funding from government to implement it is not made available

Adequacy of legal framework	Respondent not conversant with subject matter	Not adequate	Not adequate	Not adequate because it is not based on reality on the ground since communities are not consulted	Legal framework adequate except RWS is in transition	Legal framework not adequate because district and provincial WASHE committees have no legal status	Not adequate because the water policy has not been translated into an Act of parliament	Legal framework is adequate but funding from government to implement it is not made available
Adequacy of institutional framework	Respondent not conversant with subject matter	Not adequate due to lack of clarity on the lead agency in RWS	Not adequate due to lack of clarity on the lead agency in RWS	Not adequate because Councils have no financial and technical capacity to manage RWSS	Institutional framework not adequate because MLGH has no technical and financial capacity to manage RWSS	Not adequate because the MLGH has no technical and financial capacity to oversee RWSS	It is better than in the past but MLGH has no technical and financial capacity to manage RWSS	It is much clearer but MLGH has no technical and financial capacity to manage RWSS
Role of policy and legal framework in role clarification among players in RWS	Respondent not conversant with subject matter	Adequacy in policy and legal framework determines clarity of roles and responsibilities	Adequacy in policy and legal framework determines clarity of roles and responsibilities	Lack of clarity has resulted in confusion of roles among players in RWS and application of different approaches by WSAs	Plays a critical role in clarification of roles and responsibilities	Roles and responsibilities clear but the problem is lack of regulations and guidelines for players to follow	Roles and responsibilities are clear on paper but they lack reinforcement at provincial and district levels	Plays a critical role in clarification of roles and responsibilities

SOCIAL FACTORS	Determinants of high community Participation	Effective water committee	Positive attitudes by community members; demand for water	Absence of political influence; high demand for water and good use of user fees	Presence of retirees; strong economic base; high demand for water	Community involvement in the early stages of the WSF construction and water being a priority to a community	High community demand for water increases community participation	High demand for water; good timing and approach during construction of WSF	High demand for water; identification of water as a felt need; lower poverty levels
	Community organisation	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM	Water committee and APM
	Role of Traditional Leaders	They promote community participation	Strong traditional leaders play a critical role while the opposite is also true	They mobilize communities to participate in WSFs management	They encourage community participation, but can cause problems when they do not appreciate the importance of RWS	Play a critical role because they ensure community participation but this is compromised if the traditional leader is weak	They encourage subjects to participate in managing WSF and will always be in the community	They help water committees to organize community members	They encourage subjects to participate in managing WSF and will always be in the community
	Impact of alternative sources of water on contribution of user fees	Does not have negative impact, the problem is negative attitudes towards WSFs	Have a negative impact	Have negative impact on contribution of user fees	Have a negative impact on contribution of user fees	Have a negative impact on the contribution of user fees by community members	Have negative impact because communities do not want to contribute user fees due to alternative sources of water	Have negative impact because communities do not want to contribute user fees due to alternative sources of water	Have negative impact because communities do not want to contribute user fees due to alternative sources of water

	Future of water committees after program phase out	Not certain because D-WASHE stop visiting communities	Only Water committees with strong leadership are able to continue	Not certain because D-WASHE stop visiting communities	Future not certain because there is no capable institution to follow-up on water committees	The future is not certain unless the MCDSS which is present at community level is given the responsibility to monitor water committees	Have a future because skills have been acquired; but WSAs should not determine mgt. structures	The future of committees is dependent on responsibility going beyond oversight of WSF	Have a future because skills have been acquired to operate and maintain WSFs
ECONOMIC FACTORS	Ability of community to meet cost spare parts	Communities' only able to meet the cost of less expensive spare parts	Communities' only able to meet the cost of less expensive spare parts	Communities' only able to meet the cost of less expensive spare parts	Communities should be able to meet the cost of spare parts because they are heavily subsidised	Communities which contribute user fees regularly are able to meet the cost of spare parts	Communities which contribute user fees regularly are able to meet the cost of spare parts	The economic status of a community determines the affordability of spare parts	Some communities are able while others are not
	Factors affecting communities' ability to meet the cost of spare parts	Spare parts are expensive; high poverty levels in the community	High poverty level in the community, which makes it difficult for communities to raise adequate funds	Communities cannot afford expensive spare parts due to high poverty level	Communities are barely managing to meet the cost of spare parts	Communities who wait until the WSF has broken down normally fail to meet the cost of repairing their WFS especially if it is a major repair	Poorly organized communities fail to raise enough money to meet the maintenance costs	Communities that are resource poor find it difficult to raise resources to purchase spare parts	Inability of communities to raise user fees for some communities

TECHNOLOGY FACTORS	Type of maintenance system put in place	Three-tier system involving community, area and district	Two tier system involving community and area	Two-tier system involving community and area	Two-tier system involving community and area	Two-tier system involving community and area	Two-tier system involving community and area	Some organization promote two tier system while others promote three-tier system	Some organization promote two tier system while others promote three-tier system
	Technology choice	The community had no say because decision was made at national level	The community had no say because decision was made at national level	Communities had no say in technology choice, decision was made by UNICEF	The communities had no say in the technology they are using	Communities had no say in the technology they are using	Communities had no say in the technology they are using	Some communities had a say while others do not	Some communities had a say while others did not have a say
	Appropriateness of technology introduced	India Mark II hand pump is appropriate because it is easy to operate and maintain	India Mark II hand pump is appropriate because it is easy to operate and maintain	Technology not appropriate because community had no choice	India Mark II hand pump is appropriate because it is easy to operate and maintain	India Mark II hand pump is appropriate because it is easy to operate and maintain	Technology is appropriate because communities are able to acquire skills to maintain it	Technology is appropriate because communities are able to acquire skills to maintain it	India Mark II hand pump is appropriate because it is easy to operate and maintain
	Capacity of community to handle technology	Communities are able to acquire skills with minimal training	Communities are able to acquire skills with minimal training	Communities are able to manage technology if given spare parts	Communities have acquired skills to operate and maintain the technology	Communities have acquired skills to operate and maintain the technology	Communities have acquired skills to operate and maintain the technology	Both groups have acquired skills to manage and operate the WSFs	Communities have acquired skills to operate and maintain the technology

	Communities' preparation to anticipate the removal of subsidies	Communities not prepared	Communities not prepared	Communities not prepared	Communities not prepared because they are barely managing to meet the cost of subsidized spare parts	Communities not prepared because they are not able to meet the cost of unsubsidized spare parts	Communities not prepared because they are not able to meet the cost of unsubsidized spare parts	Communities not prepared because they are struggling to meet the cost of unsubsidized spare parts	A study was being undertaken to look at the issue; promotion of private sector involvement as distribution channels
	Role of private sector in local manufacturing of spare parts	Only possible in urban areas	The respondent was not sure	Able to play critical role if given a contract	Can play a role in manufacturing of spare parts, the problem is quality control	Private sector already involved in stocking spare parts but increase in demand can lead to local manufacturing of spare parts	Local manufacturing of spare parts would reduce cost of spare parts if local manufacturers are contracted	Local manufacturers should be contracted to manufacture spare parts	Local manufacturing of spare parts would reduce cost of spare parts if local manufacturers are contracted
MANAGEMENT FACTORS	Most effective management approach in RWS that can promote sustainability of WSFs	Partnership approach is the most effective	Community management approach is the most effective	Partnership approach most effective	Partnership approach is the most effective	Partnership approach is the most effective because roles and responsibilities are shared between communities and WSA	Partnership approach most effective because it recognizes that no single agency can manage RWS alone	Partnership approach is the most effective because roles and responsibilities are shared between communities and WSA	No one approach is suitable for all communities

	Role of partnership between communities and WSAs	Partnership between Community and WSAs is critical to sustainability of WSF	Partnership between Community and WSAs is critical to sustainability of WSF	Partnership between Community and WSAs is critical to sustainability of WSF	Partnership between Community and WSAs is critical to sustainability of WSF	Partnership between Community and WSAs is critical to sustainability of WSF because roles and responsibilities are shared	Roles and responsibilities are shared in managing WSFs resources and repairs	Partnership is critical to sustainability because it promotes joint management of the WSF	Promoting partnership with NGOs and communities since this is critical to sustainability
SUSTAINABILITY ISSUES	Influence of water supply system on community's ability to sustain it	Depends on complexity of technology: the more complex, the more difficult communities will find it	Depends on complexity of technology: communities are only able to handle less complex WSFs	Communities are able to manage any type of water supply system if given spare parts	It does influence, therefore communities need a water supply system that is easy to operate and maintain, for which also spare and tools must be available	Type of water supply facility has no influence. Communities can handle any system as long as they are trained and provided with tools and spare parts	It does because if complex water supply systems are introduced, communities would have no financial and technical capacity to handle them	Availability of resources in communities is what determines whether or not communities are able to sustain a water supply system	Depends on complexity of technology: the more complex, the more difficult communities will find it

Community preparation to sustain WSF	Forms and trains water committee; trains APMs; user fees; involvement of traditional leaders in management of WSF	Forms and trains water committee; trains APMs; puts a user fee collection system put in place	Forms and trains water committee; trains APMs; puts a user fee collection system in place	Committees are formed and trained; APMs are trained; tool kits are provided; and user fee collection system put in place	Identification and prioritization of needs; site selection; formation and training of water committees and user fee collection	Introduces a WASHE Concept	Introduces a WASHE Concept	Introduces a WASHE Concept
Impact of preparation on sustainability	Preparation not guarantee but a prerequisite	Preparation not guarantee but prerequisite because sustainability is dependant on many other factors	Preparation not guarantee but a prerequisite to sustainability	Preparation not a guarantee because WSAs do not spend adequate time to prepare communities	Community preparation has limits. Communities are only able to carry out minor repairs. Major repair requires external help	Plays a critical role because skills and knowledge are acquired to manage WSFs	To a great extent preparation plays a critical role, especially if communities also acquire problem solving skills	Preparation is critical but not a guarantee since sustainability is dependent on many other factors
Sustainability of supported WSFs	Not sustainable in the long run due to poor community participation	Communities that have put the above factors are able to sustain their WSFs	Communities that have put the above factors are able to sustain their WSFs	Most of these factors have been put in place	Can only be sustainable if the above is put in place and are assisted with carrying out major repairs	Well organized communities are able to sustain their WSFs	Communities that have put the above factors are able to sustain the facilities	Sustainability depends on several factors but high densely populated communities can easily manage

Factors considered critical to sustainability of WSFs	Communities interest in mgt. of WSF; contribution of user fees; sourcing of external funding	Provision of tool kits to communities; skills to operate and maintain WFS; putting a user fee collection system in place	Formation of water committees, training of APMs and putting a user fee collection system in place	Forming and training water committees; putting a user fee collection system in place; and drilling a borehole at place with high water table	Identification and prioritization of needs by communities; site selection involvement; formation and training of water committees and user fee collection	Government funding to RWS; legal status of P & D-WASHE committees; establishing coordination; and strong leadership in communities	Water should be a felt need; it should also be used for economic purposes; acquisition of problem solving skills and backup support at district level	User fees for O&M; technical skills; appropriate technology and local manufacturing of hand pumps
Expectation of communities to reach a point of sustaining WSF without external support	Unrealistic because communities are too dependent on external WSAs	It is realistic because some communities are already doing so	Not realistic	It is unrealistic because communities are failing to meet the cost of subsidized spare parts	The expectation is unrealistic because communities are not followed up after phase out of water programs. MCDSS should play this role	Can only do that if they are adequately prepared to manage WSFs	Can only do so if water is also used for economic rather than domestic purposes only	Communities cannot reach that point because of high poverty levels

5.3.3.9 SUMMARY OF FINDINGS FOR WATER SUPPLY AGENCIES

Below is the summary of findings for water supply agencies:

a. POLICY FACTORS

- The legal and institutional framework was considered to be inadequate because the Water and Sanitation Act only deals with the urban water supply sector with major emphasis on formation of commercial water utilities. In addition, MLGH does not have both the financial and technical capacity to manage the rural water supply sector.

b. SOCIAL FACTORS

- All water supply agencies have introduced the WASHE concept in order to ensure that communities' they are working with are prepared to manage and sustain the water supply facilities. The WASHE concept is a community-based approach to the management of water supply facilities whereby water, sanitation and hygiene education are implemented as a package to achieve maximum results.
- Alternative sources of water have a negative impact on community participation because the number of community members that do not want to contribute user fees increases in the rain season.
- Traditional leaders play a critical role in the construction and management of water supply facilities.
- According to respondents, traditional leaders play a critical role in the management of water supply facilities because they encourage community members to contribute user fees.
- Five respondents said that the future of the water committees is uncertain due to lack of a mechanism to monitor them after funding of water programs come to an end. The D-WASHE committees that facilitate the formation of water committees stop supervising them as soon as the construction of the water supply facility is completed due to financial constraints.

c. ECONOMIC FACTORS

- Five respondents attributed the inability to meet the cost of spare parts to high poverty level in communities. Communities are only able to meet the cost of less expensive spare parts

such as rubbers, valves and lubricants while spare parts such as pipes, rods and cylinder heads are beyond the financial capacity of communities.

d. TECHNOLOGICAL FACTORS

- The majority of water supply agencies have introduced a two-tier management system. This has limited success because communities lack support from the district level to carry out major repairs.
- The technology that water supply agencies are promoting was considered to be appropriate as it is easy to handle by rural communities. Communities are able to operate and maintain India Mark II hand pump because it is simple to handle; and spare parts are readily available. However, all communities did not have a say in the technology they are using because it was predetermined at national level. The proliferation of different technologies, some without a back up of spare parts, led to the government and other stakeholders to standardize India Mark II hand pump as the most appropriate technology for rural areas.
- All communities have not been prepared for the discontinuation of heavy subsidisation of spare parts because of high poverty level in rural communities. Most respondents said that communities are having problems meeting the cost of subsidised spare parts, let alone unsubsidised spare parts.

e. MANAGEMENT FACTORS

- Strong partnership between a community and a water supply agency was considered to have a high likelihood of promoting sustainability in rural water supply compared to community management or centralised management approaches.

f. SUSTAINABILITY FACTORS

- A total of six critical factors were identified as critical to the promotion of sustainability of rural water supply in Zambia. These are: (1) ability of communities to raise user fees, (2) communities' capacity to operate and maintain the water supply facilities, (3) demand for water, (4) effective community organisation, (5) back up support at the district level and (6) government's allocation of funding to rural water supply sector.
- The type of water supply system influences communities' ability to sustain it because rural communities can only handle less complex water supply systems. Some water supply systems are complex and require specialised technical capacity to handle.

5.4 CONCLUSION

In this chapter, the researcher presented research findings of the empirical study. The chapter was divided in three main sections. The first section looked at an overview of Mazabuka district, the second section looked at how data was collected and the third section presented detailed research findings based on (1) eight functional water supply facilities, (2) eight semi/non-functional water supply facilities; and (3) eight water supply agencies. Research findings were summarized and presented in three tables with summary findings at the end of each table.

CHAPTER SIX

DISCUSSION OF RESEARCH FINDINGS

6.0 INTRODUCTION

In this chapter, research findings presented in chapter five are consolidated and discussed. Information from both communities and water supply agencies has been presented in accordance with five broad categories presented in chapter four. These are (1) Policy Framework (2) Social Factors, (3) Economic Factors, (4) Technological Factors, and (5) Management Factors. A sixth broad category entitled “sustainability issues” has been added to facilitate easy information presentation and discussion. Background information on water supply facilities is presented first because this section does not fall in any of the above-mentioned categories.

6.1 BACKGROUND INFORMATION ON WATER SUPPLY FACILITIES

There are three major differences between functional and semi/non-functional water supply facilities. First, the average age of functional water supply facilities is 10 years while the average age of semi/non-functional water supply facilities is 13 years. Second, on average, the functional supply water facilities cover the population of 360 people while the semi/non-functional water supply facilities cover a population of 506 people per water point. These figures are far above the GRZ recommended number of 200 people per water point. And lastly, the decision to construct all (eight) functional water supply facilities was made by community members, while only two communities with semi/non-functional water supply facilities made a decision to construct their water supply facilities. The decision to construct the rest of the water supply facilities was made by water supply agencies, especially by DWA.

All functional water supply facilities were constructed between 1995 and 2000, while semi/non-functional water supply facilities were constructed before 1996. A recommendation could be made that a major rehabilitation should be carried out 10 years after constructing a water supply facility. D-WASHE Committee constructed or rehabilitated the highest number of water supply facilities (5) followed by WVI (4) and DWA (4) while Africare rehabilitated only three water supply facilities.

6.2 POLICY FRAMEWORK

This subsection looks at the adequacy of the policy, legal and institutional framework in rural water supply facility. Information on this section was only collected from water supply agencies.

6.2.1 ADEQUACY OF THE POLICY FRAMEWORK

The majority of respondents (4) said that the policy framework is adequate because (1) the government has now identified the MLGH and housing as a lead Agency in rural water supply; and (2) government has developed the national water policy with clear policy goals, objectives and strategies. The problem however is that the transfer of responsibility from DWA to MLGH is still on-going; making some players in the sector to think that the policy framework is not clear. Another problem identified is that the government has not been allocating adequate funding to implement the policy.

Three respondents said that the policy framework is inadequate because first the government has not translated the policy into policy guidelines for implementation and management of rural water supply in Zambia. One respondent was not conversant with the subject matter.

Based on the above findings, it can be concluded that although the water policy is not perfect, it is adequate because it provides a policy framework and direction in the development and management of rural water supply in Zambia (Kimena 1998: 7; MOFND 2002: 92).

6.2.2 ADEQUACY OF THE LEGAL FRAMEWORK

In general, there was an agreement among respondents that the legal framework is inadequate because rural water supply is not covered in the Water and Sanitation Act. The Act only covers urban water supply sector with major emphasis on formation of commercial water utilities and is virtually silent on rural water supply sector. In addition, the Provincial and District WASHE committees that have been established to coordinate and promote rural water supply sector, do not have a legal status. This finding is also supported by research conducted by the Water Sector Reform Unit (RSU 1999: 7) that the legal framework in rural water supply is inadequate because it

is not covered by a legal instrument; and also that the Provincial and District WASHE committees that have been given the responsibility to coordinate rural water supply do not have a legal status.

Based on the findings above, it can be concluded that the legal framework in rural water supply is not adequate.

6.2.3 THE ADEQUACY OF THE INSTITUTIONAL FRAMEWORK IN RURAL WATER SUPPLY

All respondents said that the institutional framework for rural water supply is inadequate even though the government has now clarified that MLGH is the lead ministry for rural water supply sector. Previously, both MLGH and DWA in the MEWD were claiming responsibility for rural water supply sector.

The problem however is that MLGH has neither the financial nor the technical capacity to manage rural water supply sector. To make matters worse, the government does not allocate adequate funding to MLGH for rural water supply. In addition, MLGH continues to depend on District Water Engineers who are still under DWA for technical capacity.

Studies conducted by Brikke et al (1995: 7) and Glennie (1983: 100) also confirm that although local governments are recommended to be suitable to handle rural water supply sector due to their proximity to rural communities, local governments are unable to successfully do so because they are overburdened, under-funded and have inadequate technical capacity.

Based on the findings above, it can be concluded that the institutional framework in rural water supply is not adequate. The inadequacy in the lead ministry will continue to impact negatively on the sustainability of rural water supply in Zambia.

6.2.4 IMPACT OF POLICY AND LEGAL FRAMEWORK IN ROLE CLARIFICATION

Respondents who identified inadequacies in the legal and policy framework said these inadequacies have negatively impacted on the rural water supply sector. Firstly, inadequacies have resulted in confusion in roles and responsibilities among players in rural water supply. Secondly, several actors

in rural water supply sector interpret and implement the water policy in their best interest rather than in the best interest of rural communities they claim to be serving. And thirdly, lack of legal status for the provincial and district WASHE committees has affected their ability to solicit for funds from donors because they are seen as ad hoc committees consisting of volunteers. These findings have also been confirmed by the RSU (1999: 687).

6.3 SOCIAL FACTORS

This section discusses two issues: community participation and community organisation.

6.3.1 COMMUNITY PARTICIPATION

Five out of eight communities with functional water supply facilities made contributions towards the construction of their water supply facilities in form of sand, stones and cement. These materials were used for making a stand on which hand pumps are installed. Only one out of eight communities with semi/non-functional water supply facilities made contributions towards the construction of their water supply facility. Limited community participation in the construction and management of water supply facilities before 1994 could be attributed to lack of coherent government policy on water supply. The national water policy, which now promotes community management of water supply facilities, was only developed in 1994. Before 1994, rural water supply facilities were centrally managed (RSU 1999: 687).

All 16 communities reported participating in the management of the water supply facilities after they were constructed or rehabilitated. Community participation mainly involved making of fences around the water supply facilities, cleaning the surrounding and contributing user fees.

The introduction of the community-based approach to the management of rural water supply after 1994 has increased community participation in the management of water supply facilities even for those water supply facilities that were constructed before 1994. This finding confirms the conclusion made by Macpherson (1994: 8) and Glennie (1983: 98) that user participation enables communities to play a key role in the operation and maintenance of water supply facilities, which are key to long-term sustainability of water supply systems. Based on this finding, it can be

concluded that community participation increases the likelihood of water supply facilities being sustainable.

6.3.1.1 DETERMINANTS OF COMMUNITY PARTICIPATION

According to four respondents from water supply agencies, demand for a water supply facility by a community determines high community participation. Communities who have identified water as a priority are more likely to participate in the construction and management of their water supply facility than those who have not. This finding is also confirmed by several other studies (Davis et al 1993: 146; Ball & Ball 1991: 6; WHO 1998: 7; McPherson 1994: 3), which state that water supply facilities can only be sustainable if they are demand driven.

Two respondents said that the economic well being of a community determines community participation. They said that poor communities, no matter how desperate they are for water, normally fail to maintain the water supply facilities because of lack of resources to buy spare parts and pay for repairs. This was also found by Glennie (1983: 10) who argued that poverty hinders rural communities from meeting operation and maintenance costs even if they are willing to do so. This finding however contradicts arguments by some researchers who argue that even the poorest and most underprivileged segments of society are willing to pay for water supply, as long as it is reliable (McPherson 1994: 14; Briscoe & de Ferranti 1988: 13).

Two other respondents said that effective utilization of user fees by water committees, influences community participation in the management of the water supply facility. Contribution of user fees is adversely affected when the water committee misuses user fees. This finding is in line with the warning given by Glennie (1983: 104), who states that financial contributions should be handled with care because they create more problems than they solve, especially when funds are misused.

6.3.1.2 IMPACT OF ALTERNATIVE SOURCES OF WATER ON COMMUNITY PARTICIPATION

Shallow wells and streams are the most common alternative sources of water found in communities, followed by rain harvesting. Rain harvesting as an alternatives source of water is only practiced in the western part of Mazabuka district mainly because a good number of houses in the area are

roofed with iron sheets. Other alternative sources of water mentioned are a dam, a hand pump and piped water. These were only mentioned once.

Five respondents with functional water supply facilities, four respondents with semi/non-functional water supply facilities and seven respondents from water supply agencies said that alternative sources of water have a negative impact on community participation. The major impact is that most community members stop contributing user fees in the rain season as alternative sources of water have plenty of water. Briscoe & de Ferranti (1988: 13) also found that willingness to pay for water by communities is influenced by availability of alternative sources of water. Second, some community members prefer the taste of water from traditional sources to water from boreholes. As a result of the negative impact of alternative sources of water have on community participation, one respondent from a water supply agency said community needs assessment and awareness should be carried out before constructing a water supply facility to determine community preferences. In addition, health education should be carried out to teach community members on the dangers of drinking water from unprotected water sources.

6.3.2 COMMUNITY ORGANISATION

Community organisation has been achieved in two ways: first communities elect a water committee and second, traditional leaders who have the authority to give support to these water committees to enable them carry out their functions.

6.3.2.1 WATER COMMITTEES

Fifteen communities had established water committees for the purpose of managing water supply facilities. Water committees are responsible for (1) ensuring that community members are using water supply facilities properly, (2) that user fees are collected from community members, and (3), that the APM is hired to repair the water supply facility when it has broken down. The APM is paid from user fees collected from community members. User fees are also used for buying spare parts. Only one water supply facility did not have a water committee. The committee was dissolved because the water supply facility was in state of disrepair for a long time – four years.

The major difference between the functional and semi/non-functional water supply facilities are that while four respondents with functional water supply facilities felt that their water committees were effective, respondents with semi/non-functional water supply facilities said that their water committees were not. Water committees were however effective before the water supply facility developed the problem.

Regarding the future of water committees after the phase out of funding, four respondents from water supply agencies said that the future of water committees is uncertain. This is because first D-WASHE committees that facilitate the formation of water committees stop supervising them as soon as the construction of the water supply facility is completed mainly due to funding constraints. Second, there is no capable institution to supervise water committees once the water programs are phased out. The MCDSS should be given the responsibility to monitor and supervise water committees when water supply programs are phased out, because it has a presence in most rural communities. And third, water committees normally become ineffective when the water supply facility has been operating without difficulties for a long time because the water committees do not see the need to meet. In order to avoid this problem, one respondent said that water committees should also be responsible for other development areas such as education or health.

This finding is also confirmed by the study conducted by the RSU (1999: 16), which states that the future of water committees in Zambia is uncertain due to inadequate mechanism to monitor and motivate them after the withdrawal of the water supply agency from the area.

Only two respondents said water committees have a future because communities are managing water supply facilities without external support. One respondent said communities with strong leadership have a future while those with weak leadership do not have a future. Another respondent attributed continuity of water committees, after phasing out of funding, to diversity in the roles of water committees. She said if water committees were only responsible for water supply facilities, they would stop being functional a long the way. Based on this finding, it can be concluded that unless there is an appropriate institution to monitor water committees, continued effectiveness of water committees will be affected.

6.3.2.2 AREA PUMP MINDERS

APMs are responsible for a number of water supply facilities in a catchment area. Communities hire them when their water supply facilities breakdown. APMs are trained and equipped by the District WASHE committee. Communities without APMs who live in the community, made use of APMs in the nearby community or in the area. This finding confirms that the government policy to ensure that all water supply facilities have a water committee and an APM, has taken root in Zambia (MOFND 2002: 92). The following are the problems communities face with APMs: inadequate skills, lack of tools to carry out repairs, and APMs not living in the same community. Some communities go looking for the APM every time they have a breakdown. According to one respondent, the water committee had to go and pick the APM on a bicycle because he could not walk on his own due to an injury he had sustained on his leg.

6.3.2.3 TRADITIONAL LEADERS

All respondents from communities and water supply agency said traditional leaders have a lot of influence on the construction and management of water supply facilities. They said that traditional leaders provide leadership and organise community members in the construction and management of water supply facilities. Traditional leaders also ensure that community members are contributing user fees and impose sanctions on defaulters. Respondents however pointed out that traditional leaders such as village headmen and chiefs should not be involved in the day-to-day management of the water supply facility because they interfere with the work of water committees.

Only one respondent felt that traditional leaders have not played a critical role in the management of the water supply facility because they have failed to mobilize communities to contribute funds so that the water supply facility could be repaired. This was in reference to the water supply that had been in a state of disrepair for four years.

These findings show that water supply agencies should not just put emphasis on water committees alone, if water programs are to be successful. Instead, the role that traditional leaders play in the construction and management of water supply facilities should be recognized. Studies referred to by the researcher in this dissertation only deal with the role of water committees in the construction and management of water supply facilities. They do not consider the role of traditional leaders (Brikke 1993: 6; Umgeni Water 1993: 46; Davis et al 1993: 148; Roark et al 1993: 14; Ball & Ball 1991: 6).

6.4 ECONOMIC FACTORS

This section discusses the following issues: ability to meet the cost of spare parts, factors affecting communities' ability to meet the cost of spare parts and preparation of communities to anticipate the removal of subsidies.

6.4.1 COMMUNITIES' ABILITY TO MEET THE COST OF SPARE PARTS

All (eight) respondents with semi/non-functional water supply facilities said that they do not have the ability to meet the cost of spare parts compared to five respondents with functional water supply facilities that also expressed similar views. Only three respondents with functional water supply facilities said their communities have the ability to meet the cost of spare parts. The rest said that their communities are unable to meet the cost of spare parts because they are expensive. Their communities are only able to meet the cost of less expensive spare parts such as rubbers, valves and lubricants while spare parts such as pipes, rods and cylinder heads are beyond their financial capacity.

Only two respondents from water supply agencies said communities they are supporting have the ability to meet the cost of spare parts because spare parts are heavily subsidised. One of the two respondents said it takes three years for the hand pump to break down after it is installed. In the respondent's view, this is a long period of time in which communities should be able to raise enough money to buy spare parts.

Three respondents from water supply agencies said communities they are supporting only have the ability to meet the cost of inexpensive spare parts such as valves, rubbers and lubricants, but cannot afford spare parts such as rods, pipes and cylinder heads. Three other respondents said that some of the communities they are supporting are able to meet the cost of spare parts while others are not because communities do not have the same access to resources. According to one respondent, most resource poor communities cannot meet the cost of spare parts while those with resources such as fish are able to raise enough money to meet the cost of spare parts. This finding is also confirmed by Glennie (1983: 10) who states that poor communities cannot meet the cost of spare parts because they are expensive.

6.4.2 FACTORS AFFECTING COMMUNITIES' ABILITY TO MEET THE COST OF SPARE PARTS

Respondents attributed their inability to meet the cost of spare parts to the high poverty level in communities resulting from poor agricultural production. They said that community members are experiencing poor agricultural production because agricultural inputs such as fertiliser and seed have become too expensive. The problem has been compounded by the fact that most of their cattle used as animal draught power have died from animal diseases. These findings are confirmed by other researchers (RSU 1999: 10; Briscoe & de Ferranti 1988: 13) who attribute the inability of communities to meet the cost of spare parts to lack of resources in the community.

6.4.3 REMOVAL OF SUBSIDIES ON SPARE PARTS

Seven respondents from water supply agencies said that they have not prepared communities they are supporting to anticipate and be prepared for the discontinuation of heavy subsidisation of spare parts because the level of poverty in the rural communities is too high. They said that most communities are struggling to meet the cost of heavily subsidised spare parts let alone unsubsidised spare parts. The implication of this finding is that subsidisation of spare parts will have to be continued for a long time.

Only one respondent said his organisation was preparing communities to anticipate and be prepared for discontinuation of spare parts by allowing commercial outlets to stock and sell spare parts at a market price. In addition, other commercial enterprises are importing hand pumps and associated accessories on their own because there is a market for them. This is a new finding, as the researcher did not come across a research study that has looked at this aspect.

6.5 TECHNOLOGICAL FACTORS

This section discusses the following issues: appropriateness of the technology, technology choice, ability to operate the technology, easiest water supply, preparation to manage water supply facilities, ability to repair water supply system without external help, problems faced in the maintenance of water supply facility, access to spare parts, role of the private sector in local manufacturing of spare parts and the type of maintenance system put in place.

6.5.1 APPROPRIATENESS OF TECHNOLOGY

Seven respondents from water supply agencies said that the technology they are promoting is appropriate as it is easy to handle by rural communities. They said that communities are able to operate and maintain India Mark II hand pump because it is simple to handle and spare parts are readily available.

This finding is also confirmed by other studies (RSU 1999: 19 & WHO 1993: 7), which indicate that India Mark II hand pump is recommended as the most appropriate hand pump. Although WHO indicates that standardization of India Mark II hand pump has not been successful in Zambia due to lack of coordination mechanism, evidence on the ground suggests that standardization has taken place. Almost all boreholes visited are installed with India Mark II hand pumps and spare parts are also readily available.

Only one respondent said that the technology that has been introduced is not appropriate because it has been imposed on communities. Communities were not given options of technologies from which to choose and had to do with whatever was made available to them.

6.5.1.1 TECHNOLOGY CHOICE

All respondents from communities and water supply agencies agreed that communities did not have a say in the technology they are using because it was predetermined at national level. The proliferation of different technologies, some without a back up of spare parts, led to the government and other stakeholders in rural water supply sector to try and standardize the technology. India Mark II hand pump was recommended as the most appropriate technology for rural areas because it was felt that it is easy to operate and maintain when users are trained in operation and maintenance. This finding contradicts findings that indicate that communities should always be consulted for technology to be appropriate (Pasha & Macgarry 1989: 52; Chanda in DWA 1994: 2; McPherson 1994: 4).

6.5.1.2 ABILITY TO OPERATE THE TECHNOLOGY

Six respondents with functional water supply facilities said that they have the ability to operate and maintain their water supply facilities because they have been trained, while only four respondents with semi/non-functional water supply facilities said the same. Seven respondents from water supply agencies said that communities they are supporting have the capacity to handle the technology because they have been trained in operation and maintenance. One respondent said that communities his organisation was supporting only have the capacity to handle minor repairs. These findings are also confirmed by other studies, (Taylor & Mudege 1996: 10; Davis et al 1993: 155; IWSC 1993: 4), which state that technology must suit existing locally available skills, or skills that can be acquired by communities.

Only two respondents with functional water supply facilities said that they do not have the ability to handle the technology due to lack of training in operation and maintenance. Four respondents with semi/non-functional water supply facilities said that they do not have the ability to handle the technology because (1) they are unable to afford the cost of spare parts, (2) spare parts are not readily available and, and (3) they lack the skills to operate and maintain their water supply facilities.

6.5.1.3 EASIEST WATER SUPPLY SYSTEM

Sixteen respondents from communities said that wells are the easiest water supply systems that communities can manage without external help. Communities however prefer boreholes to wells because wells dry up in the hot season. In addition, digging wells is almost impossible in some areas due to rocks and low water table. Only two respondents considered boreholes as the easiest water supply facilities that they can easily manage. The respondents previously had more difficult technology such as India Mark III hand pump and a windlass respectively. The other two respondents were not sure which type of water supply facility the community can easily manage with little outside support.

One respondent with a functional water supply facility felt that a hand pump was the easiest water supply system in comparison the windlass that the community had previously. Another respondent with a semi/non-functional water supply facility said a hand pump was the easiest water supply facility because the community had acquired skills to operate and maintain it.

Studies by Taylor & Mudege (1996: 10), Davis et al (1993: 155) and IWSC (1993: 4) state that technology must suit existing locally available skills or skills that can be acquired by communities if water supply facilities have to be sustainable. This shows that even though wells are the easiest water supply systems that communities can manage without external help, they are not suitable because of the problems outlined above.

Based on this finding, it can be concluded that although wells are the easiest water supply facilities that can easily be maintained without external help, they (wells) are not reliable. This makes hand pumps as the most appropriate water supply facilities for now.

6.5.1.4 PREPARATION TO MANAGE WATER SUPPLY FACILITIES

Respondents from water supply agencies said that they had introduced the WASHE concept in order to ensure that communities they are working with are prepared to manage the water supply facilities. The WASHE concept is a community-based approach to the management water supply facilities whereby water, sanitation and hygiene education are implemented as a package to achieve maximum results.

Communities are involved in needs identification, formation of water committees (also called Village WASHE committees) and overall management of water supply facilities. D-WASHE committees train water committees and APMs and provide them with tools for carrying out repairs. APMs are given the responsibility to oversee several water points; some may cover as many as 20 water points in an area.

In addition, respondents said that they ensure that a user fee collection system is put in place to enable communities raise funds for purchasing spare parts in an event that a water supply facility breaks down. User fees are also used for paying APMs when they carry out repairs. The responsibility to collect user fees is given to water committees. These findings confirm that the introduction of the WASHE concept by the government has taken root in Zambia (MOFND 2002: 92).

Respondents from communities felt that they were not adequately prepared to manage and sustain their water supply facilities by water supply agencies that facilitated the construction or

rehabilitation of their water supply facilities. However, WVI is the only organisation that was said to have adequately prepared communities to manage and sustain their water supply facilities because it has provided communities with skills to operate and maintain water supply facilities.

There are three main reasons why respondents said they were not adequately prepared to manage and sustain their water supply facilities. These are: lack of tools and technical skills for carrying out repairs, and inability to raise adequate user fees to purchase spare parts. Although there is no study that considers these factors as part of community preparation, several other studies consider these factors as critical to sustainability of water supply facilities. (Brikke et al 1995:16; Roark et al 1993: 14; Glennie 1983: 104; Dahlegren 1993: 29; Davis et al 1993: 19-21).

As to whether community preparation is a guarantee to sustainability of rural water supply, six respondents said communities' preparation to manage water supply facilities is not a guarantee that the water supply facilities would be sustainable. Community preparation however is a precondition to sustainability of rural water supply facilities. They said that sustainability to a great extent depends on the communities' ability to operate and maintain the water supply facility and also to raise funds for spare parts in an event that the water supply facility breaks down. Several other studies (Brikke et al 1995:16; Roark et al 1993:14; Glennie 1983: 104; Dahlegren 1993:29; Davis et al 1993:19-21) confirm these findings. They consider availability of affordable spare parts, ability of communities to contribute user fees and capacity at community level to operate and maintain water supply facilities, as being critical to sustainability of water supply facilities.

Two respondents said preparation of communities to manage their water supply facility is a guarantee for sustainability because communities have acquired skills to operate and maintain the water supply facilities on their own.

6.5.1.5 ABILITY TO REPAIR WSFs WITHOUT EXTERNAL HELP

Four respondents with functional water supply facilities said they have the ability to repair water supply facilities without external help because they have somebody trained within or near the community to carry out repairs. The other four respondents said they do not have the ability to repair water supply facilities without external help due to high poverty level in the community. This was attributed to communities' inability to raise adequate user fees to buy spare parts. Other reasons

given include lack of tools and APMs to carry out the repairs. These findings are also confirmed by other studies (RSU 1999: 10; Briscoe & de Ferranti 1998: 13 Glennie 1983: 10), which show that even in cases where there is willingness to contribute financially to the running of water supply facilities; communities are constrained by the lack of resources.

Five respondents with semi/non-functional water supply facilities said that they do not have the ability to repair water supply facilities without external help because they have limited technical capacity to do so. Communities only have the ability to carry out minor repairs. Two respondents said that their communities have the capacity to repair their water supply facilities, except that the problem they were facing was beyond their technical and financial ability. Although one respondent claimed that his community has the capacity to repair water supply facilities without external help, the community has failed to repair the water supply facility because they are unable to meet the cost of spare parts. These findings are also confirmed by Brikke (1993: 5); Glennie (1983: 98); Sami & Murray (1998: 14); Mogane-Ramahotswa (1995: 180). They state that without external support, water supply facilities would fall into disuse because rural communities have limited capacity to carry out repairs.

Based on this finding, it can be concluded that the majority of communities visited (12 out of 16) have no capacity to repair water supply facilities without external support.

6.5.1.6 PROBLEMS FACED IN THE MAINTENANCE OF WATER SUPPLY FACILITIES

Seven water supply facilities were either not functional or were barely functioning mainly because cylinder heads or pipes were either faulty or had dropped in the borehole. Only one water supply facility had a unique problem: the borehole had collapsed at the bottom. Six water supply facilities were in a state of disrepair for two months while two had been in the state of disrepair for one year and four years respectively. According to respondents, all these problems are beyond the financial and technical capacity of communities. The situation has been made worse because communities receive little or no support from the district to help them deal with problems that are beyond their capacity. It can be concluded from this finding that once a water supply facility has a problem with the cylinder head or pipes; it would fall into disuse because communities would have neither the financial nor technical capacity to repair it.

Mogane (1990: 106) also confirms these findings. He states that the long-term success of any water supply facility depends entirely on an effective maintenance programme, which in this case is lacking. Several other studies (Brikke 1993: 5; Glennie 1983: 98; Sami & Murray 1998: 14) allude to the importance of rural communities having access to external support services, either from the district or at regional level, where there is capacity to deal with major breakdowns.

In general, the most outstanding problem faced by all communities in relation to maintenance of their water supply facilities is the inability to raise adequate user fees to purchase spare parts. User fees that all communities contribute are nominal compared to the cost of spare parts. Several other studies (RSU 1999: 10; Briscoe & de Ferranti 1998: 13; Glennie 1983: 10) also confirm these findings. They show that even in cases where there is willingness by communities to contribute financially to the running of the water supply facilities, they are constrained by lack of resources. The second major problem faced by communities is lack of tools to carry out repairs because people who were trained were not equipped with tools.

Based on this finding, it can be concluded that the inability to raise adequate user fees by communities is a major threat to sustainability of rural water supply in Zambia.

6.5.2 ACCESS TO SPARE PARTS

Six respondents with functional water supply facilities and seven with semi/non functional water supply facilities said that they have easy access to spare parts. Only two respondents with functional water supply facilities and one with semi/non functional water supply facilities said they do not have easy access to spare parts. This is because either spare parts are not available or they are only found at the district level. However, only in two cases were spare parts not available both at community and district levels. These two communities are using India Mark III hand pump whose spare parts are not readily available in the country.

The highest number of respondents who said spare parts are easily available at community level were those whose water supply facilities were either constructed or rehabilitated by WVI, which has also a presence in the area and stocks some spare parts and lubricants such as valves, rubbers and grease.

Based on this finding, it can be concluded that availability of spare parts is not a major threat to sustainability of rural water supply sector in Zambia because they (spare parts) are readily available.

6.5.2.1 ROLE OF THE PRIVATE SECTOR IN LOCAL MANUFACTURING OF SPARE PARTS

Five respondents from water supply agencies said private entrepreneurs could play a critical role in local manufacturing of spare parts. As a result, spare parts are more likely to be cheaper and their availability assured when manufactured locally. Respondents were only concerned that local manufacturers might not maintain the same quality standards as international manufacturers. Roark et al (1993: 16) also consider local manufacturing of spare parts as a solution to the high cost and non-availability of spare parts.

Three respondents were not sure whether or not private entrepreneurs could play a role in the local manufacturing of spare parts.

6.5.3 TYPE OF MAINTENANCE SYSTEM PUT IN PLACE

Five respondents from water supply agencies said they have introduced a two-tier maintenance system. The first tier entails that at community level, a water committee responsible for managing the water supply facility, is formed. The water committee is also responsible for collecting user fees from community members who use the water supply facility; and also for hiring and paying the APM when he/she repairs a water supply facility. The second tier entails that an APM is trained to carry out repairs at the extension or area level. The APM is responsible for a number of water points in an area. Respondents said that they have not just trained APMs but have also equipped them with tools for carrying out repairs.

Three respondents said that they have introduced a three-tier maintenance system, which involves the community, extension/area and the district levels. At the district level, a maintenance team is formed in addition to the other two mentioned above. The district maintenance team has specialised equipment to handle more complex problems, which cannot be handled by APMs. Kerr (1989: 170) also recommended this approach as the most effective maintenance system.

Evidence on the ground however indicates that the link between the community and the district is either very weak or non-existent. The failure of communities to repair water supply facilities with a major maintenance problem is to a great extent attributed to a weak or non-existent link between the community and the district. This finding contradicts other studies (Brikke 1993: 5; Glennie 1983: 9; Sami & Murray 1998: 14) that promote the idea that communities should have access to external support services both in terms of material and technical support, if they are to sustain their water supply facilities.

Based on this find, it can be concluded that lack of a maintenance team at district level has contributed to communities' inability to repair water supply facilities that are experiencing major breakdowns.

6.6 MANAGEMENT FACTORS

This section discusses the most effective management approach among centralised, community and partnership management approaches.

6.6.1 PARTNERSHIP APPROACH

The majority of respondents (6) said that the partnership approach is the most effective approach in the management of rural water supply for several reasons. Firstly, the partnership approach recognises that there is a limit to what rural communities are able to do without external assistance. Communities will always need external support no matter how self-reliant they might become because major maintenance work sometimes requires expertise external to communities. Secondly, the partnership approach recognises that because of the complexity and problems associated with the management of rural water supply facilities, no single agency can effectively manage the rural water supply sector without the support and cooperation of communities and other water supply agencies. And thirdly, the partnership approach entails that roles and responsibilities are shared between rural communities and external agencies, making it much more cost effective to manage water supply facilities.

This finding is also confirmed by other studies (Brikke et al. 1995: 18; IWSC 1993: 3; Brikke 1993: 51 & Glennie 1983: 98), which state that sustainability of water supply facilities can only be

achieved if there is partnership between communities and water supply agencies as communities will always need external support due to their limited technical and financial capacity. In addition, studies by Brikke et al (1995: 18) and IWSC (1993: 33) show the importance of partnership between rural communities and water supply agencies in the promotion of sustainability of water supply facilities. They indicate that sustainability is achieved through sharing of roles, responsibilities and costs because communities cannot always take up all the responsibilities.

Respondents said that the weakness with the centralised management system is that all decisions are determined either at the regional or national level with little or no consultation with the rural communities. One respondent felt that the community management approach is the most effective approach as it teaches communities to be self-reliant and reduces communities' dependence on external help. The second respondent could not however state which management approach is more effective because he felt that no one approach would be effective in all situations.

Based on this finding, it can be concluded that the partnership approach is the most effective management approach that would increase the likelihood of water supply facilities being more sustainable compared to centralised and community management approaches.

6.7 SUSTAINABILITY ISSUES

This section looks at critical factors that would promote sustainability of rural water supply and whether communities can reach a point where they can maintain water supply facilities without external support.

6.7.1 FACTORS THAT WOULD PROMOTE SUSTAINABILITY OF WSFs

There was generally an agreement among respondents from communities on critical factors that would promote sustainability of water supply facilities. The first most important factor identified was availability of affordable spare parts, followed by the ability of communities to contribute user fees. The third factor identified was ability of communities to operate and maintain water supply facilities.

Other factors mentioned were availability of tools for carrying out repairs, having an effective water committee, good use of the water supply facilities and replacing India Mark III hand pump with India Mark II hand pump. Two communities with India Mark III hand pump mentioned this. India Mark III hand pump is considered inappropriate because community members cannot find spare parts and tools for carrying out repairs.

Several other studies (Brikke et al 1995: 16; Roark et al 1993: 14; Glennie 1983: 104; Dahlegren 1993: 29; Davis et al 1993: 19-21) consider availability of affordable spare parts, ability of communities to contribute user fees and capacity at community level to operate and maintain the water supply facility as being critical to sustainability of water supply facilities.

Respondents from water supply agencies identified a total of six critical factors that they thought would promote sustainability of rural water supply in Zambia. These are: (1) ability of the community to raise user fees, (2) communities' capacity to operate and maintain the water supply facilities, (3) demand for water, (4) effective community organisation, (5) back up support at the district level and (6) government's allocation of funding to rural water supply sector.

Most of the respondents felt that the ability of communities to contribute user fees is critical to sustainability of water supply facilities because only communities that are able to raise adequate amount of money can meet the cost of spare parts and pay for the APM. Therefore communities that are unable to raise user fees cannot sustain their water supply facilities. Davis and others (1993: 157) also confirm this finding. They state that sustainability of water supply facilities can only be successful if community members are able to meet the cost of operation and maintenance.

Regarding communities' capacity to operate and maintain water supply facilities, respondents felt that sustainability can only be achieved if communities acquire skills to operate and maintain them. The water committee should be trained to operate the water supply facility properly, while APMs should be trained and equipped with tools for carrying out repairs. Water committees should in turn teach users how to operate water supply facilities properly in order to prolong their life span. Studies by Taylor & Mudege (1996: 10); Davis et al (1993: 155); IWSC (1993: 4) also state that communities should have existing locally available skills, or skills that can be acquired by communities if water supply facilities have to be sustainable.

On demand for water as a critical factor, respondents said communities who have identified water as a felt need are more likely to sustain their water supply facilities than those who have not. Communities who have a high demand for water are more committed to the construction and management of water supply facilities. Communities that have not identified water as a priority, usually expect those who facilitated the construction of the water supply facility to be responsible for its operation and maintenance, making it difficult, if not impossible for sustainability to be achieved. Several other studies (Brikke et al 1995: 11; Davis et al 1993: 146; Ball & Ball 1991: 6; WHO 1993: 7) also allude to the importance of ensuring that water is demand driven if sustainability of water supply facilities has to be attained.

Regarding effective community organisation, respondents said that in order for sustainability of the water supply facilities to be achieved, communities should have effective water committees responsible for the day-to-day management of the water supply facilities. Respondents said water committees should also ensure that community members are using the water supply facility properly and that the surrounding of the water supply facility is kept clean. Water committees should also ensure that community members are contributing user fees, which are critical in purchasing of spare parts when water supply facilities break down. In addition, water committees should be responsible for hiring and paying the APM who carries out repairs. These findings are also confirmed by MaCommon et al (1990: 10) who state that communities should have institutional capacity to enable them to sustain their water supply facilities. Furthermore, a study by Mogane-Ramahotswa (1995: 177) found out that without proper community structures, effective community participation in the management of water supply facilities has no hope for sustainability.

Regarding back up support at the district level as a critical factor, one respondent said a district maintenance team should be established to be responsible for monitoring the performance of each water supply facility in the district. The maintenance team should also be responsible for stocking spare parts, training APMs and water committees, and above all, carrying out repairs that are beyond the capacity of APMs. Several other studies (Brikke 1993: 5; Briscoe & de Ferranti 1998: 13; Sami & Murray 1998: 14) confirm this finding. They state that it is important for communities to have access to external support services for them to be able to sustain their water supply facilities.

The final critical factor identified by another respondent is government's allocation of funding to the rural water supply sector. The respondent said that most of the funding for rural water supply comes from donors and NGOs, while the government provides little or not financial support to the sector. For example, the government did include the rural water supply sector in the 2001 national budget. Sustainability of rural water supply can only be achieved if government gives rural water supply the attention it deserves, by funding it adequately, just like other social sectors are funded.

The majority of respondents (6) from water supply agencies could not say whether or not the water supply facilities they were supporting are sustainable because they felt that achieving sustainability depends on many factors, most of which are dependent on communities. These among others, include the ability of communities to raise enough money to purchase spare parts and capacity to operate and maintain water supply facilities.

One respondent said that water supply facilities they are supporting are sustainable because communities have acquired skills to manage the water supply facilities on their own. Another respondent said that the water supply facilities they are supporting are not sustainable because communities are failing to buy spare parts, which are crucial to sustainability of rural water supply facilities.

6.7.2 POSSIBILITY OF COMMUNITIES MAINTAINING WATER SUPPLY FACILITIES WITHOUT EXTERNAL SUPPORT

Fourteen respondents from communities said that it is not realistic to expect communities to reach a point where they will be able to sustain water supply facilities without external help. This is because communities are unable to meet the cost of spare parts due to high poverty level. In addition, respondents said that they do not have the technical capacity to handle major maintenance work, hence the need for external support in case of a major breakdown.

These findings are also confirmed by several other studies (Brikke 1993: 5; IWSC 1993: 33; Brikke et al. 1995: 18, Glennie 1983: 98), which show that although communities are able to take up a substantial share of responsibilities, external support services will always be required because there is a limit to what communities can take up.

Only two respondents from both groups said it is realistic to expect communities to reach a point where they will be able to maintain water supply facilities on their own without external help. Reasons given are that (1) communities should learn to be self-reliant and (2) that communities are already maintaining water supply facilities without external help.

Five respondents from water supply agencies said that communities they are supporting are to a great extent managing the water supply facilities on their own. However, they felt that these communities would always need external support due to limited technical capacity and high poverty levels in most rural communities. This finding is also confirmed by several other studies (IWSC 1993:33; Glennie 1993: 98; Briscoe & de Ferranti 1988: 13), which show that communities will always need external support services due to limited financial and technical capacity at community level.

Three respondents from water supply agencies said that communities would reach a point where they will be able to maintain water supply facilities on their own because they have been adequately trained to operate and maintain the water supply facilities.

6.8 CONCLUSION

In this chapter, the researcher discussed research findings presented in chapter five. Information from both communities and water supply agencies was consolidated and presented in accordance with five broad categories presented in chapter four. These are (1) Policy Framework (2) Social Factors, (3) Economic Factors, Technological Factors, and (5) Management Factors. A sixth broad category entitled “sustainability issues” was added to facilitate easy information presentation and discussion.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.0 INTRODUCTION

This chapter is divided into two sections. In the first section, conclusions on the objectives of the research study are discussed. Each of the three research objectives is discussed and conclusions made on whether or not it was achieved. In the second and last section, recommendations are made to stakeholders, who include government, water supply agencies and communities, on how to promote sustainability of the rural water supply sector in Zambia.

Below are objectives set for the research study:

Objectives of the Research Study:

- To conduct a literature review on sustainability of rural water supply facilities;
- To understand the perceptions of water supply agencies on the adequacy of the current policy, legal and institutional framework in promoting sustainability of rural water supply in Zambia;
- To identify what water supply agencies perceive as the most effective approach in the management of rural water supply in Zambia, that would ensure sustainability of rural water supply facilities; and
- To establish what communities and water supply agencies perceive as the most critical factors that contribute to the promotion of sustainability of rural water supply in Zambia.

7.1 CONCLUSIONS ON THE OBJECTIVES OF THE RESEARCH STUDY

This section discusses the progress the researcher made towards meeting the objectives of the research study. Each of the objectives is discussed and conclusion made as to whether the objective was achieved or not.

7.1.1. LITERATURE STUDY ON SUSTAINABILITY OF RURAL WATER SUPPLY FACILITIES.

The researcher conducted literature review on sustainability of rural water supply facilities. Almost all factors related to the promotion of sustainability of rural water supply facilities were looked at. The literature review provided a basis for empirical investigation, data analysis and interpretation. It is the opinion of the researcher that this objective has been achieved.

7.1.2 PERCEPTIONS OF WATER SUPPLY AGENCIES ON THE ADEQUACY OF THE CURRENT POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK FOR RURAL WATER SUPPLY IN ZAMBIA.

The policy framework was considered to be fairly adequate as it identifies the policy goal, objectives and strategies for rural water supply in Zambia. However, operational guidelines have not been developed to support the interpretation and implementation of the water policy. The legal framework was not considered adequate because while the Water and Sanitation Act has backed the urban water supply aspect of the national water policy, rural water supply is not. The institutional framework is also inadequate despite the factor that the government has now clarified that MLGH is the lead ministry for rural water supply sector. Before 2002, both the MLGH and DWA in the Ministry of Energy and Water Development were claiming responsibility for rural water supply sector. Although responsibility to oversee rural water supply has been given to the MLGH, the ministry does not have the financial, technical and institutional capacity to manage rural water supply sector.

Based on the above, the conclusion is that although the policy framework is adequate; the legal and institutional framework is not adequate. Therefore, both the legal and institutional framework should be made adequate if rural water supply is to be sustainable. This research objective has therefore been achieved.

7.1.3 PERCEPTIONS OF WATER SUPPLY AGENCIES ON THE MOST EFFECTIVE APPROACH IN THE MANAGEMENT OF RURAL WATER SUPPLY IN ZAMBIA.

Partnership approach was identified as the most effective management approach in the management of rural water supply in Zambia. The basic tenet of partnership approach is that costs, roles and responsibilities are shared between a community and a water supply agency. This is because it has been realised that there is a limit to what communities can do on their own in the managing rural

water supply facilities, without external assistance. In addition, the partnership approach recognises that because of the complexity and problems associated with the management of rural water supply, no single agency can effectively manage the rural water supply sector, without the support and cooperation of communities and other agencies.

Although both communities and water supply agencies preferred this approach, the practice on the ground is different. Community management seems to have taken root. Most communities are left to fend for themselves as soon as the water supply facility is installed. Both groups (respondents from communities and water supply agencies) felt that the implementation of the partnership would have promoted the sustainability of water supply facilities in Zambia. As a result, all semi/non-functional water supply facilities would have been repaired by water supply agencies, if the partnership approach were adopted, since communities do not have the capacity to handle major repairs.

Based on the above information, this research objective has therefore been achieved.

7.1.4 PERCEPTIONS OF COMMUNITIES AND WATER SUPPLY AGENCIES ON THE MOST CRITICAL FACTORS THAT CONTRIBUTE TO PROMOTION OF SUSTAINABILITY OF RURAL WATER SUPPLY IN ZAMBIA.

A total of seven factors perceived to be critical to the promotion of sustainability of rural water supply facilities were identified by respondents both from communities and water supply agencies. Respondents said that there is need to have an effective community organization, if rural water supply is to be sustainable. Effective community organisation is achieved through the establishment of water committees. The water committee should have the responsibility for the day-to-day management of the water supply facility. To be effective and successful, water committees need the support of community members, especially the community leadership.

Respondents from both communities and water supply agencies also felt that having a trained APM, whose responsibility, is to carry out repairs, is critical to the sustainability of rural water supply. Some respondents however felt that training a group of people in repairing water supply facilities has advantages over training an individual, due to mobility, morbidity and mortality factors. If only

one person is trained, the community is at a disadvantage when that person is sick, dies or leaves the community.

Another factor identified by both groups, as being critical to sustainability of rural water supply is the ability of communities to raise user fees. They said that user fees are critical to the sustainability of water supply facilities because they are used to purchase spare parts and paying the APM after carrying out repairs. It was felt that without this factor being put in place, sustainability could not be achieved. Communities will have to be perpetually dependant on outside agencies for the sustainability of their water supply facilities, without which their water supply facilities would not be repaired once they have a major breakdown. In addition to the three factors mentioned above, communities also felt that to achieve sustainability, appropriate tools for carrying out repairs should be made available. There is also need to ensure that spare parts affordable, because at the moment most communities cannot afford the cost of spare parts such as rods, cylinder heads and pipes.

Respondents from water supply agencies also identified additional factors, which they perceived to be critical to the promotion of sustainability of rural water supply. They said that demand for water by communities was a critical factor to sustainability of water supply facilities. Therefore, provision of water supply facilities should be based on demand and not supply, because communities that have identified water as a felt need, are more willing to commit resources to the construction and management of their water supply facilities.

Water supply agencies also felt that if sustainability of water supply facilities has to be achieved, there is need to have a strong back up support at the district level, to support communities to manage their water supply facilities. This is because rural communities sometimes face problems that are beyond their capacity, which can only be handled by highly skilled manpower. Support from the district should include monitoring the performance of water supply facilities, procurement and storage of spare parts; and carrying out repairs that are beyond the capacity of APMs.

The final critical factor identified by respondents from water supply agencies is government's allocation of adequate funding to the rural water supply sector, in order to reduce dependence on donors and NGOs. It was felt that most, if not all funding to rural water supply sector comes from donors and NGOs. If sustainability of rural water supply has to be achieved, government should allocate adequate funding in same way other social sectors such as health and education are funded.

The above-mentioned are the factors that are perceived by rural communities and rural water supply agencies to be critical to the promotion of sustainability of rural water supply in Zambia. Based on the above information, this research objective has been achieved.

7.2 RECOMMENDATIONS

The findings of this research study shows clearly that although a lot of work has been done in an effort to ensure that rural water supply is sustainable, much more needs to be done to deal with inherent weaknesses that have been identified. There is a danger that if these weaknesses are not addressed, what has been achieved so far in ensuring that rural water supply is sustainable; may be lost.

Outlined below are recommendations on how to deal with weaknesses that have been identified by this research study:

7.2.1 POLICY FRAMEWORK

Two recommendations are made under this subsection: strengthening the legal framework and the institutional capacity of the Ministry of Local Government and Housing (MLGH).

7.2.1.1 STRENGTHENING THE LEGAL FRAMEWORK

The Water and Sanitation Act no. 28 of 1997 should be amended to include rural water supply and sanitation. The Act should also provide for a rural water and sanitation council that would have the responsibility to develop guidelines and procedures for implementing rural water and sanitation programmes. The rural water and sanitation council can also be given the responsibility to enforce the implementation of operational guidelines in the rural water supply sector.

In addition, the provincial and district WASHE committees should be given a legal status, with roles and responsibilities clearly stipulated in the Act. Both the national water policy and the Water and Sanitation Act should be translated into operational guidelines to avoid role conflict and varying interpretation of the water policy by various actors in the sector. MLGH should take up the

responsibility, in consultation with other stakeholders, to ensure that the legal framework is made adequate.

7.2.1.2 STRENGTHENING THE INSTITUTIONAL CAPACITY OF MLGH

Strong institutional capacity of MLGH is key to the promotion of sustainability of rural water supply in Zambia. The researcher recommends that since the MLGH has just been given the responsibility to manage rural water supply, a study be undertaken to assess the requirements for strengthening the institutional capacity of the ministry. Staffing, as well as technical and financial resource requirements at national, provincial and district levels, should be at the core of the study.

To achieve this task, all stakeholders in the rural water supply sector should be consulted on how to strengthen the institutional capacity of the lead ministry. Government should not just depend on resources from donors and NGOs for strengthening of the institutional capacity of the lead ministry but should provide resources for this task. In addition, the government should also allocate adequate funding to the lead ministry for co-ordination of the rural water supply sector, instead of expecting the lead ministry to depend on donors and NGOs.

7.2.2 SOCIAL FACTORS

Two recommendations are made under this subsection: improving community participation and supervision of water committees.

7.2.2.1 IMPROVING COMMUNITY PARTICIPATION

In order to strengthen community participation in the management of rural water supply, the researcher recommends that a lot of groundwork should be done during community entry. A situation analysis should be carried out with communities so that they are involved from the beginning. This would also help in identifying community needs, which will assist determining whether or not water is the priority for respective communities. The assessment should also include the determination of communities' willingness to contribute resources towards the management of the water supply facility.

The assessment should also be extended to the availability of alternative sources of water and how they would impact on community participation, especially the contribution of user fees by community members. During community entry, the water supply agency should ensure that they involve community leadership at an early stage. This is in accordance with the overwhelming evidence shown by this research study that traditional leaders play a critical role in the construction and management of rural water supply facilities.

Water supply agencies should ensure that communities are made aware of their roles and responsibilities before construction of the water supply facility is even started. It is also important for the community and water supply agency to agree on roles, responsibilities and expectations. In addition, health education should be carried out to sensitise communities on the dangers of drinking water from unprotected sources, so that community members see the importance of improved water supply facilities.

7.2.2.2 EFFECTIVE SUPERVISION OF WATER COMMITTEES

In order to ensure that water committees continue to be supervised and monitored after the phasing out of water programs, a capable institution such as the MCDSS should be involved from the start, in the formation and training of water committees. The MCDSS, which employs social workers, has a presence in a number of rural communities compared to other ministries.

This responsibility can also be given to NGOs operating in a particular area. An example is WVI, which seems to have helped communities by adequately preparing them to maintain their water supply facilities and stocking of spare parts locally.

7.2.3 ECONOMIC FACTORS

Two recommendations are made under this subsection: establishing an effective user fee collection system and developing a comprehensive approach to the development of communities

7.2.3.1 AN EFFECTIVE USER FEE COLLECTION SYSTEM

Poor collection of user fees is one of the major threats to sustainability of rural water supply in Zambia. Most communities are either not collecting user fees or the user fees being collected are too inadequate, such that in case of a break down, communities cannot buy even the cheapest spare part. Water supply agencies should therefore ensure that an effective user fee collection system is put in place for every water supply facility that is constructed, if sustainability is to be achieved.

Several approaches should be explored on how to establish an effective user fee collection system. One option that water supply agencies and communities could explore is the replacement of cash contributions with in kind contributions. This could be made just after harvesting crops. The crops can then be sold later to raise funds. Another option that could be considered is the establishment of a maintenance fund to which rural communities could be contributing funds. This would act as insurance against breakdowns. Modalities for managing the maintenance funds should be critically explored. Keeping of user fees in houses should at all cost be avoided because the chance of such funds being misused is high. It is therefore recommended where it is possible, bank accounts be opened in the name of the community.

It is also critical to ensure that communities are made aware of the importance of contributing user fees. This should not just be done at the beginning of construction of a water supply facility but through out the life span of the water supply facility. The D-WASHE and/or an NGO in a particular area should take up the responsibility of monitoring the effectiveness of the user fee collection system. A maintenance team, if established at the district level, can also play this role.

7.2.3.2. ADOPTION OF A COMPREHENSIVE APPROACH TO DEVELOPMENT

The researcher recommends the adoption of a comprehensive approach to development in order to ensure that water programs are not implemented in isolation from other development programs especially those that are economic in nature. Economic activities such as promotion of agriculture production, income generating activities or small-scale business enterprises should be promoted along side water programs. This will enable communities not only to have the ability to meet the cost of maintenance but also to have the ability to meet individual needs. Water also could be used for economic purposes such as gardening or beer brewing. The challenge however is whether or not viable economic activities can be found in rural areas that could enable villagers to improve their economic base.

Further investigations are required in order to find a sustainable solution to the problem of user fees. Economic dynamics of poor communities should also be investigated to determine whether or not communities should be contributing towards the management of their water supply facilities in cash or kind.

7.2.4 TECHNOLOGICAL FACTORS

An establishment of a strong maintenance team is recommended under technological factors.

7.2.4.1 DISTRICT MAINTENANCE TEAM

The researcher recommends that the government should establish a strong back up support system at the district level. A well-equipped maintenance team, consisting of a minimum of three full time staff should be established. This team could fall under the lead ministry and should also be part of the D-WASHE committee. Among other things, the responsibilities of the maintenance team should include monitoring the usage and performance of water supply facilities, procurement and storing of spare parts in the district, training of Area Pump Minders and water committees; and carrying out major repairs that are beyond the capacity of APMs. The maintenance team should also develop strong linkages with Area Pump Minders so that it becomes easy for them to collect information on the status of all water supply facilities in the district.

7.2.5 MANAGEMENT FACTORS

Adoption of a partnership approach is recommended as the most effective management approach in rural water supply.

7.2.5.1. PARTNERSHIP APPROACH

The researcher recommends the adoption of a partnership approach by the government and other stakeholders in the rural water supply sector as the most effective management approach that would increase the likelihood of water supply facilities being sustainable. It should be adopted both as an approach and strategy, for managing rural water supply in Zambia. According to this approach, costs, roles and responsibilities should be shared between a community and a water supply agency.

In order to promote sustainability of rural water supply in Zambia, the government should provide adequate funding to MLGH to support maintenance teams in all districts. Only the shortfall should be solicited from donors and NGOs as matching grants. The major role of the water supply agencies is to ensure that communities are given the capacity to manage their water supply facilities and also to deal with problems that are beyond the capacity of communities.

The district maintenance team can also play a critical role in the promotion of the partnership approach, as it would be a link between communities and the district. The maintenance team would be suited to play this role, as it would be equipped to handle problems that are beyond the capacity of communities, in addition to being at the district level.

7.2.6 FURTHER RESEARCH

The researcher recommends that additional research should be conducted to augment the findings of this research study. Additional research should have a large sample size and should cover most, if not all the provinces in Zambia, because implementation of rural water supply differs from province to province, depending on the donor supporting a particular province. Lessons that would be drawn from such a study would help in the promotion of sustainability in other provinces.

The following are recommended as specific areas for further investigation:

- Further research should be undertaken in order to find effective ways of strengthening the institutional capacity of the MLGH to enable it to effectively manage rural water supply in Zambia;
- Further assessment of the current policy and legal framework in rural water supply is required in order to find effective ways of dealing with the inadequacies that have been identified by this research study;
- An assessment of the effectiveness of the D-WASHE committees to co-ordinate rural water supply should be undertaken. This assessment could help in ensuring that D-WASHE committees are organised in a manner that makes them more effective to co-ordinate and manage rural water supply in Zambia;
- Different options for improving the effectiveness of the user fee collection systems should be explored if rural communities are to sustain their water supply facilities. This research

should focus on economic dynamics of rural poor communities in order to investigate how communities should be raising funds to sustain their water supply facilities;

- Effectiveness of different approaches used by different donors and NGOs in the management of rural water supply programs in Zambia should be investigated in order to determine the most effective approach that could be adopted at national level; and
- Further research should be undertaken to identify the most effective ways of implementing the partnership approach, which the researcher has recommended as the most effective approach in the management of rural water supply in Zambia.

7.3. CONCLUSION

The purpose of this chapter was (1) to determine whether objectives set in chapter one have been achieved and (2) to make recommendations on how to promote sustainability of rural water supply facilities. Each of the four objectives set at the beginning of the research study was discussed and a conclusion made as to whether or not the objective was met. All the objectives set for the research study have been achieved. Recommendations to stakeholders, who include the government of Zambia, water supply agencies and communities, on how to promote the sustainability of the rural water supply sector in Zambia, have also been made. A copy of this dissertation will be sent to the Ministry of Local Government and Housing and to the National Water Supply and Sanitation Council Library, where the student got most of books during the literature review stage.

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APPENDICES

APPENDIX A: SAMPLE CASES STUDIES

(1) HANJALIKA COMMUNITY (FUNCTIONAL WATER SUPPLY)

BACKGROUND INFORMATION

Hanjalika community is situated about 70 kilometres off Mazabuka Chivuna road, east of Mazabuka town. Hanjalika community is easily accessible by a fairly good gravel road. The number of people that use the water supply facility at Hanjalika community is said to be more than 100 people and 350 school children that attend Hanjalika Basic School. The researcher interviewed the vice chairperson of the water committee outside her home which is just few meters from the water supply facility.

Africare upon community request rehabilitated this water supply facility in 1995 by replacing the old hand pump with a new one and building a new apron and drainage system. The respondent did not however know when the water supply facility was originally constructed. The community did not make any contributions towards the rehabilitation of the water supply facility because Africare did not request them to do so.

CONDITION OF THE WATER SUPPLY FACILITY

The water supply facility was at the time of the interview functional and well kept. It had a well-built slab (apron), with a good drainage system. There was also a fence made out of poles around the water supply facility, which was made by community members.

MAINTENANCE OF THE WATER SUPPLY FACILITY

According to the respondent, factors that are important in ensuring that the water supply facility is sustainable are availability of spare parts; ability of the community to raise adequate funds to purchase spare parts; and having somebody in the community with skills to repair the water supply facility.

The respondent told the researcher that the community does not have the ability to maintain the water supply facility without external help due to several factors. First, the community is unable to raise adequate funds to buy spare parts due to high poverty levels in the community, which has

resulted from poor agricultural production because agricultural inputs such as fertiliser and seed have become too expensive. The problem has been compounded by the fact that most of their cattle that are used as animal draught power has died. They only contribute a nominal fee of K500 (R1.5) per family per month, which is by far inadequate. Secondly, spare parts are expensive. To make the situation worse, the community does not have easy access to spare parts because they are only found in Mazabuka town, 70 kilometres away from the community. And thirdly, the community does not have anybody living within Hanjalika community trained to repair the water supply facility. This is because only one person is trained and given a responsibility to repair several water supply facilities in a particular area. The D-WASHE committee at the district level has made this decision.

The respondent strongly felt that Africare did not adequately prepare the community to maintain and sustain the water supply facility because they were not well informed on the importance of contributing user fees to enable them buy spare parts. In addition, Africare did not train community members to repair the hand pump as mentioned above.

Shallow wells are the only alternative source of water found in Hanjalika community. Although shallow wells are easy to maintain without external help, they are only used for a short time in a year because they dry up soon after the rain season. Wells also get contaminated easily. The respondent also said that shallow wells have a negative impact on community participation because some community members refuse to pay user fees during rain season. They opt to draw water from wells when they are coerced to contribute user fees.

MANAGEMENT OF THE WATER SUPPLY FACILITY

The management system the community has put in place for water supply facility consists of a water committee and an area pump minder. The water committee is responsible for (1) ensuring that community members know how to use the water supply facility, (2) that user fees are collected from community members, and (3) that they hire an APM to repair the water supply facility in case of a breakdown. The APM is paid from user fees collected from community members. User fees are also used for buying spare parts.

According to the respondent, the arrangement put in place for the repair of the water supply facility is not effective because the APM who repairs the water supply facility does not stay within the

community. Every time the water supply has a break down, the water committee has to go looking for him. She said at one point the water committee had to go and pick him on a bicycle because he could not walk on his own due to an injury he sustained on one of his legs.

The community did not have any say on the type of the technology it is using because Africare predetermined India Mark II hand pump. The community however likes India Mark II hand pump because spare parts are readily available. The difficult the community has in handling the hand pump is that it does not have the necessary skills to repair the hand pump.

The respondent also informed the researcher that the community does not receive external support services from either D-WASHE committee or from Africare.

The respondent said that it was not realistic to expect the community to reach a point where they could manage the water supply facility without external support, due to the community's inability to raise adequate funds to buy spare parts. The water supply facility will fall into disrepair if the community is left alone.

Traditional leaders play a critical role in the management of the water supply facility as they help the water committee to reinforce the collection of user fees from community members.

(2) MUNJILI COMMUNITY (NON-FUNCTIONAL WATER SUPPLY FACILITY)

BACKGROUND INFORMATION

Munjili community is situated about 60 kilometers east of Mazabuka town. The community is easily accessible through a gravel road that cuts across the community. The condition of the road is fairly good. The population that uses the water supply facility at Munjili community is said to be more than 500 people plus 350 pupils that attend Munjili basic school. The community also has a rural health centre which caters for Munjili community and surrounding communities. Information on this water supply facility was collected from the treasurer for the water committee and the vice chair person of the Parents Teachers Association.

This water supply facility was constructed more than 10 years ago by DWA to mainly serve the school population. At the time of construction, the community did not make any contributions. All the costs were borne by DWA.

CONDITION OF THE WATER SUPPLY FACILITY

The water supply facility was not functional at the time of the interview because it had a faulty cylinder head. The researcher observed that the water supply facility had a fence made out of poles around it. The surrounding of the water supply facility was relatively well kept.

Respondents said that the water supply facility was in the state of disrepair for two months. The water committee had requested DWA for assistance repair the water supply facility because the problem the beyond the financial and technical capacity of the community. The community was told to meet fuel cost and lunch allowance before staff would visit the community to make an assessment. After making an assessment, the community was told that they needed to replace the cylinder head. The community is therefore required to replace the cylinder head at cost of K800,000 (R2,000). The community will either have to come up with the money or seek for external assistance, without which the water supply water facility will remain in the same state.

MAINTENANCE OF THE WATER SUPPLY FACILITY

According to respondents critical factors that are important in ensuring that the water supply facility is sustainable are: (1) ability of the community to raise adequate funds to meet maintenance costs (2) easy access to spare parts and (3) formation of an effective water committee to manage the

water supply facility. Respondents said that they have put all of the above-mentioned factors in place, except that the community does not contribute adequate user fees. Community members contribute only K1,500 (R4) per family per month. The money is only enough to meet the cost of less expensive spare parts such as valves, rubbers and lubricants.

The community does not have the ability to sustain the water supply facility without external help because the people who were trained to carry out repairs are unable to repair the water supply facility. As regard to problems the community faces in maintaining the water supply facility, respondents said in addition to the failure to carry out repairs by those who were trained, the community was unable to raise adequate funds to buy expensive spare parts. Respondents also felt that the community lacks external support from the district. Instead of the community receiving support, it is the community that is providing support to DWA in form of fuel and lunch allowance for the staff to enable them come to the community. The situation is made worse by the fact that several trips are made to the community before the water supply facility is repaired.

Respondents felt that DWA did not adequately prepare the community to manage and sustain the water supply facility because those who were trained cannot carry out major repairs. Respondents felt that in order to solve the problem they are facing, DWA should conduct another training to ensure that the community acquires the skills to carry out repairs without external help. They also felt that DWA should provide the community with a cylinder head because the community cannot afford to meet the cost of the same.

Respondents felt that a well the easiest water supply system that the community can maintain without external help, except that water in a well gets contaminated easily. Shallow wells are the only alternative sources of water found Munjili community. These shallow wells are mainly used when the water supply facility has broken down. However, shallow wells have a negative impact on community participation because community members opt to draw water from shallow wells when they are coerced to pay user fees.

MANAGEMENT OF THE WATER SUPPLY FACILITY

The water supply system is managed by a water committee only, which ensures that water supply facility is not vandalised. The water committee also has the responsibility to collect user fees from

community members. Respondents felt that the management system put in place was effective because the water committee carries out its duties effectively.

The community did not have any say on the type of technology they are using as the decision to install India Mark II hand pump was unilaterally made by DWA. The DWA felt that India Mark II hand pump is easy to operate and maintain. However, the community does not have the ability to handle the technology because of lack of skills within the community to deal with major maintenance problems.

Respondents said that the community does not have the ability to meet the cost of spare parts because (1) spare parts are expensive and (2) the economic base of the community has been eroded due to poor agricultural production. Respondents said the loss of cattle from animal disease, used as animal draught power, and expensive agricultural inputs such as seed and fertilizer, are the major cause of poor agricultural production in the area. According to respondents, the arrangement put in place for the repair of the water supply facility was not effective because (1) the community lacks the skills to carry out repairs and (2) it is expensive to depend on DWA to carry out major repairs.

Respondents also felt that the community does not receive adequate external support services from DWA to enable them effectively manage their water supply facility. Respondents said they do not consider repair work done by DWA as receiving external support services because the community is subsidising DWA to do its work.

According to respondents it is not realistic to expect the community to manage water supply facilities without external help because the community does not have the expertise to carry out major repairs and the community cannot also meet the cost of spare parts due to high poverty levels in the community.

Traditional leaders are perceived to be playing a critical role in the management of the water supply facility because they assist the water committee to collect user fees from community members.

(3) MINISTRY OF LOCAL GOVERNMENT AND HOUSING (WATER SUPPLY AGENCY)

The responsibility to oversee the rural water supply sector in Zambia has for a long time been under DWA in the Ministry of Energy and Water Development. The responsibility as of 2001 has been shifted to the MLGH.

Information on MLGH was collected from Mrs. Nkoloma, the Coordinator for the rural water supply sector in the MLGH. The respondent has many years of experience in the rural water supply sector. Before her appointment as Coordinator for rural water supply, the respondent worked for the National Water, Sanitation and Hygiene Education (N-WASHE), which was given a mandate by the government of Zambia to form and train District WASHE committees through out the country.

SUSTAINABILITY ISSUES

According to the respondent, the most critical factors that would promote sustainability of rural water supply in Zambia are: first, ensuring that the rural water supply sector is institutionalised in government structures by providing resources in the same way other social sectors like health or education are funded. Secondly, Provincial and District WASHE committees should be given a legal status to enable them mobilize resources, which they find difficult to do at the moment. Thirdly, a mechanism for coordinating rural water supply at the community level should be established to avoid communities being targeted by several organizations, sometimes with conflicting approaches. This creates confusion to community members in terms of best approach to follow. And fourthly, there is need for strong leadership in communities, if water supply facilities have to be sustainable.

The respondent felt that communities that are well organised are more likely to sustain their water supply facilities than communities that are not. And as regard to what determines community participation in the management of a water supply facility, the respondent said high demand for water determines high community participation. She strongly felt that water supply agencies should be conducting situation analyses to determine communities' demand for water. Thereafter, communities should be involved in making decisions about of the water supply facilities before construction starts.

In order to ensure that communities are prepared to manage the water supply facilities, the respondent said the WASHE concept has been introduced in almost all districts. According to the WASHE concept, sanitation and hygiene education activities are integrated with water programs. In addition, communities are required to form water committees to manage each water supply facility, and APMs are identified and trained to repair water supply facilities. Communities are also encouraged to contribute user fees to meet the cost of operation and maintenance.

The respondent strongly felt that community preparation to manage rural water supply facilities, to a great extent, contributes to the sustainability of rural water supply facilities because communities are provided with skills and knowledge to manage water supply facilities.

According to the respondent, partnership between the water supply agency and the community is critical to the sustainability of the water supply facility because (1) there is sharing of roles and responsibilities in the management of water supply facilities; (2) communities contribute locally available resources while the water supply agency provide external resources; and (3) communities would carry out minor repairs while the water supply agencies would carry out major repairs.

As regard to the role that private entrepreneurs can play in the local manufacturing of spare parts, the respondent said local entrepreneurs should be contracted to manufacture minor spare parts. This would contribute to the reduction of the cost of spare parts.

OPERATION AND MAINTENANCE

The respondent informed the researcher that different organisations introduce different maintenance systems. She said that some organisations introduce a two-tier maintenance system. This involves formation and training of a water committee at the community level to manage the water supply facility; and training an APM to carry out repairs for water supply facilities in a particular area. Other organisations promote a three-tier maintenance system, which in addition to what is mentioned-above also includes a district level maintenance team. Apart from handling major repairs, the district maintenance team is also responsible for training area pump minders.

Regarding the appropriateness of the technology that is being promoted, the respondent said that some organisations are promoting India Mark II hand pump while others are promoting the construction of protected wells. She said both technologies are appropriate because communities are

able to acquire skills to operate and maintain them. The respondent said although communities did not have a say on the type of technology they are using, they are able to handle the technology when provided with training.

According to the respondent, the type of the water supply system influences communities' ability to sustain it, because if a complex water supply system were introduced, communities would not have the financial and/or technical capacity to handle it.

Regarding the communities' ability to meet the cost of maintenance, the respondent said that communities that are prepared and who regularly contribute user fees are able to meet the cost of spare parts. But communities that are not organised and do not contribute user fees regularly fail to meet the cost of maintaining water supply facilities when there is a break down. The respondent said it takes three years for a newly installed hand pump to start having breakdowns, in which time communities should have raised enough money to meet the cost of maintaining water supply facilities.

The respondent felt that communities have not been prepared to anticipate and be prepared for the discontinuation of heavy subsidization of spare parts. This is because communities are currently failing to meet the cost of subsidized spare parts let alone unsubsidized spare parts.

According to the respondent, communities will only reach a point where they will be able to maintain water supply facilities on their own when they are adequately prepared. If communities are not prepared to take care of their water supply facilities, they cannot reach a point where they would be able to maintain water supply facilities on their own.

LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

The respondent felt that the legal and policy framework has been adequate than was the case in the past because the government has given a responsibility to the MLGH manage rural water supply sector. Previously this was under DWA under the Ministry Energy and Water Development. She however felt that the Water and Sanitation Act should be amended to include rural water supply sector because at the moment only urban water supply sector is covered. In addition, the Provincial and District WASHE committees do not have a legal status but they have been given the

responsibility to co-ordinate and mobilise resources for rural water supply in the provinces and districts respectively.

Regarding the adequacy of the institutional framework, the respondent said the institution framework is only clear on paper and not in reality. This is because MLGH, which has now been given the responsibility to oversee rural water supply sector, lacks the skills, resources and institutional capacity to oversee rural water supply sector.

The respondent felt that although roles and responsibility are clear, what is lacking in rural water sector is the formulation of rules and guidelines to guide the provision of water supply facilities.

APPROACHES IN THE MANAGEMENT OF WATER SUPPLY SECTOR

According to the respondent, the partnership approach is the most effective management approach that is more likely to promote sustainability of water supply facilities, in comparison to centralized and community management approaches, because it recognises that no single actor can effectively manage rural water supply sector alone.

GENERAL INFORMATION

The respondent felt that traditional sources of water have a negative impact on community participation. She said that some community members do not want to contribute user fees because they know that even if other community members stop them from drawing safe water, they have an alternative source of water to turn to. The respondent also said traditional leaders play a critical role in the management of water supply facilities because they encourage community members to participate in management of their water supply facilities. In addition, traditional leaders will always be in the community unlike water supply agencies that come and go.

Regarding the future of water committees after the water supply programs are phased out, the respondent said water committees have a future after water programs are phased out because they (water committees) have acquired the skills to manage water supply facilities. She however felt that water supply agencies should not determine the nature and form of the water committees if they have to be sustainable. Existing structures at community level could also be used.

APPENDIX B: INTERVIEW SCHEDULES**(1) INTERVIEW SCHEDULE FOR RURAL COMMUNITIES****A. BACKGROUND INFORMATION**

1. Name of the community_____
2. District/Area_____
3. What is the population that uses this water supply facility?
4. When was the water supply facility constructed?
5. Who made the decision to construct the water facility in this community?
6. What were community contributions towards the construction of the water supply facility?
7. How has community participation been since the water supply facility was constructed?
8. Who funded the construction of this water supply facility?
9. What is the condition of your water supply facility?
10. If the water supply facility is not functioning, what has made it not to be functional?
11. For how long has the water supply facility been in this state?
12. What efforts have you made to ensure that is repaired?

B. ABILITY OF THE COMMUNITY TO SUSTAIN THE WATER SUPPLY FACILITY

1. What do you think are the most critical factors that are important in ensuring that a water supply facility is sustainable?
2. Which of the above-mentioned factors have you put in place?
3. What is the community's ability to maintain the water supply facility without outside help?
4. What problems do you face in the maintenance of your water supply facility?
5. How did the water supply agency that facilitated the construction of your water supply facility prepare you to manage and sustain the water supply facility?
6. What do you think is the easiest water supply facility that your community can easily sustain without outside help?

C. MANAGEMENT SYSTEM

1. What management system have you put place to manage your water supply facility?
2. How effective is this management system?

3. What role did the community play in the choice of the technology that you are using?
4. What is the community's ability to handle this technology?
5. Where do you get spare parts for this technology?
6. What is the community's ability to meet the cost of spare parts?
7. How effective is the arrangement put in place for repair of the water supply facility?
8. What type of external support services do you receive to enable you effectively manage your water supply facility?
9. How realistic is the notion by water supply agency that communities should manage water supply facilities on their own without outside help?

D. GENERAL ISSUES

1. What alternative sources of water do you have in the community?
2. When do you use the alternative sources of water?
3. What influence do these alternative sources of water have on community participation?
4. What role do traditional leaders play in the management of your water supply facility?

(2) INTERVIEW SCHEDULE FOR WATER SUPPLY AGENCIES

- 1 Name of the organization represented_____
- 2 District_____
- 3 Position of the respondent_____

A. SUSTAINABILITY ISSUES

1. What do you think are the most critical factors that promote sustainability of rural water supply in Zambia?
2. How sustainable are the water supply facilities you are supporting?
3. What do you think determines high community participation in rural water supply?
4. How are you ensuring that communities you are working with are prepared to manage their water supply facilities?
5. What impact does this preparation have on the ability of communities to sustain their water supply facilities?
6. What do you think of the claim that strong partnership between a community and the water supply agency contribute to the sustainability of a water supply facility?
7. What role do you think private entrepreneurs can play regarding local manufacturing of spare parts?

B. OPERATION AND MAINTENANCE

1. What maintenance system have you put in place?
2. How appropriate is the technology you are promoting in the communities?
3. What say did the community have in the technology you are using?
4. What capacity do communities you are supporting have in handling this technology?
5. How does the type of the water supply system influence the communities' ability to sustain it?
6. What is the ability of the communities you are supporting in meeting the cost of maintenance of their water supply facility?
7. How have you prepared communities to anticipate and be prepared for the discontinuation of heavy subsidization of spare parts?

8. How realistic is the expectation by water supply agencies that communities should reach a point where they will be able to maintain water supply facilities on their own without outside help?

C LEGAL AND POLICY FRAMEWORK

1. How adequate is the current legal and policy framework in rural water supply sector?
2. How adequate is the current institutional framework in rural water supply sector?
3. What role has the legal and policy framework played in clarifying the roles and responsibilities of actors in RWS?

D APPROACHES IN THE MANAGEMENT OF RURAL WATER SUPPLY

1. What do you think is the most effective management approach in rural water supply that is more likely to promote sustainability among the following: centralised, community management and partnership approaches?

E. OTHER ISSUES

1. What influence do traditional sources of water have on community participation in the management of the water supply facilities?
2. What role do traditional leaders play in the management of rural water supply system?
3. What do you think of the future of water committees after the water supply program is phased out?