FACTORS INFLUENCING SUSTAINABILITY OF BOREHOLES IN CHADIZA DISTRICT

By

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DECLARATION

I, Adamson Sakala hereby declare that the work recorded in this report is my own and has not been published earlier or submitted to any other University or Institute for an academic award and that all the sources of information have been acknowledged by means of references.

Signature:…… Date:……

CERTIFICATE OF APPROVAL

This dissertation has been approved as partial fulfilment of the requirements for the award of the Post Graduate Diploma in Integrated Water Resources Management by the University Of Zambia

Name of Supervisor: Dr. Weston N. Mafuleka

Signature:…… Date:…….

ABSTRACT

The focus of the study was to establish factors which influence sustainability of boreholes managed by communities in Chadiza District. In order to do that, the study intended to answer three research questions which are: (i) How does community participation at the initial stage of the borehole projects influence sustainability? (ii) How do community members' perception towards contributions for maintenance of boreholes influence sustainability? (ii) How does capacity building of water committee members and area pump minders (APMs) influence sustainability of boreholes?

To meet its objective, the study used both primary and secondary data. Primary data was collected using the interview schedule, focus group discussions and an oral interview. Secondary data was sourced from processed data from the Local Authority, the internet, books, reports, articles and journals related to community participation in the implementation of water projects.

The study showed that community participation at initial stage of construction instills the spirit of self reliance in the community members throughout the project cycle. The communities perceived community contribution as a positive way to sustainability of boreholes as it symbolized ownership and hence the authority to make decisions related to water. The communities which had trained water committees did not have problems with contributions and hence maintenance of the boreholes, as compared to those whose water committees were not trained. Further, communities which had trained APMs had reduced downtime on their boreholes.

In order to protect the positive strides made by government to increase the provision of safe and clean water to rural communities, these factors should be made known in areas where sustainability seems to be weak or completely absent, through sensitizations. It is further, recommended that the local authority should continue with the system where a contract for borehole drilling should include a package for toolkits, APMs and water committee training programmes for each borehole. The government should put guide lines in place which will help communities to determine how much to contribute and how often. A research should be conducted to find out how communities determine, how much they contribute towards maintenance of boreholes.

DEDICATION

I dedicate this research report to my late father and mother, Friday Sakala and Josephine Banda Sakala respectively for the love, care and support that they showed to me.

ACKNOWLEDGEMENTS

My sincere acknowledgement goes to the World Bank in collaboration with the Ministry of energy and water development through the department of water affairs for the financial assistance and other logistical support during the post graduate diploma programme.

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Many thanks also go to the RWSSC from Chadiza District Council, Mr. Masauso Tembo making available the necessary data for the research. I would also like to thank my course mates for their constructive criticism every time we discussed our research topics.

My special thanks go to my wife, Grace Mwelwa Sakala, and other family members for their encouragements which saw me pull through the entire IWRM programme.

ABBREVIATIONS AND ACRONYMS

APM	Area Pump Minder
CP	Community Participation
IRC	International Water and Sanitation Centre
MLGH	Ministry Of Local Government and Housing
NGO	Non Governmental Organisation
O & M	Operation and Maintenance
NRWSSP	National Rural Water Supply and Sanitation Programme
RWSS	Rural Water Supply and Sanitation
RWSSC	Rural Water Supply and Sanitation Coordinator
UNICEF	United Nations International Children's Emergence Fund
USAID	United States Agency for International Development
WC	Water Committee

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CHAPTER 1: INTRODUCTION

1 Introduction

This chapter presents the background, problem statement, objectives, research questions, significance of the study and the study area.

1.1 Background

Increase in population has continued to put challenges on the provision of safe, clean and sustainable water supply, especially in developing countries. The challenges faced by different countries vary from not having enough water reserves to inadequate or complete absence of proper systems to manage the water infrastructure once put in place. Experts have suggested a number of management mechanisms to overcome these challenges. The most notable among the suggested models is the demand responsive approach, as opposed to the traditional supply driven interventions (Naiga et al, 2012; Nicole, 2000; World Bank, 1998). The concept is anchored on the idea of Community Participation (CP) which advocates greater beneficiary involvement in water service production and management (Whittington et al, 2009). The demand-responsive approach requires beneficiaries to own the system by constantly making meaningful contributions, either in the form of cash or labor to community-based water projects (Sara & Katz, 1998). It is premised on the belief that such involvement ultimately leads to better designed projects, better targeted benefits and more cost-effective and timely delivery of water.

In developing countries, national and regional governments, local and international NGOs and other concerned organizations invest large sums every year for the implementation of rural water supply projects (Gebrehiwot, 2006). However, construction of water projects does not help if they fail after a short time. In order to make the investment in water supplies more effective, failure rates of these systems should be reduced. Recent figures of operational failure rates from different African countries range from 30 to 60% (Sutton, 2005).

The management of water resources in Zambia dates from 1948 and fails to address key modern day issues such as the use and protection of ground water, shared international waters, or customary law and as such government saw the need to reform the Water Sector, starting in the 1980s (Nyambe, 2005). To address the above challenge, the Government of Zambia, in 1994 formulated the National Water Policy which paved way for the development of the national rural water supply and sanitation programme (NRWSSP) in 2007 which is the guide for sustainable

implementation of the Rural Water Supply and Sanitation in Zambia. The NRWSSP, among other issues, addresses the issues of community participation which is considered as a way of enhancing responsible behaviour by beneficiary communities towards the facilities and own the project from inception; the government has introduced the system of community monetary contribution towards the implementation of the water supply infrastructure in the rural areas.

In 2014, the Ministry of Local Government and Housing (MLGH), through NGO-WASH Forum, conducted a study whose main objective was to review the performance of the system towards rural water supply infrastructure development in order to engage the government and stakeholders in harmonizing community participation approach in the WASH sector. NGO-WASH Forum (2014), in its report, revealed that the selected study districts (Chadiza inclusive) were at different levels in terms of operationalisation of the system of community contribution. Some districts were fully implementing the system, while others were still in the rudimentary stage with no facilities yet developed under this system.

The reduction of failure rates and the differences in levels in community participation when the programme was rolled out at the same time can be achieved by many interventions which include, but not limited, to identifying factors which influence sustainability of water facilities through community contributions. It is against this background that the study investigated factors influencing sustainability of boreholes through community contributions in Chadiza District.

1.2 Problem Statement

Zambia has made strides in the provision of clean and safe water to the rural communities. This is evidenced in the millennium development goals report which indicates that rural water supply coverage was at 75% by the end of 2015. According to an IRC, (2011), study, despite relative success in the provision of new rural water infrastructure in the last two to three decades, studies in many countries show between 30 to 40 per cent of facilities which either do not function or are operating below capacity. A common factor in the failed projects is that all of them are managed by the beneficiary communities. Successful community based Operation and Maintenance (O&M) of rural water facilities, therefore, remains a challenge and threatens reversing the gains made in increasing the coverage of provision of clean and safe water. However, the manifestation of factors which influence sustainability of boreholes through community contributions and their contribution to project failure has not been adequately understood in Zambia. This study,

therefore, investigated factors influencing sustainability of boreholes through community contributions in Chadiza district.

1.3 Objectives

1.3.1 General Objective

To establish factors which influence the sustainability of boreholes which are managed by communities.

1.3.2 Specific Objectives

1. To establish how community participation at the initial stage of the borehole projects influences sustainability

2. To establish how community member's perception towards contributions for maintenance of boreholes influence sustainability

3. To establish how capacity building of water committee members and area pump minders influence sustainability of boreholes

1.4 Research Questions

1. How does community participation at the initial stage of the borehole projects influences sustainability?

2. How does community members' perception towards contributions for maintenance of boreholes influence sustainability?

3. How does capacity building of Water Committee (WC) members and Area Pump Minders (APMs) influence sustainability of boreholes?

1.5 Significance of The Study

The country has been making some effort to improve provision of safe and clean drinking water to the rural population. One of the milestones was formulation of the national rural water supply and sanitation programme 2007 to 2015, which among other things, emphasises community participation as a recipe for sustainability of boreholes in Zambia. Other stakeholders such as the World Bank also put emphasis on community participation. It is often argued by rural water experts, The World Bank (WB) and other donor agencies, that community participation is

fundamental to the success of water supply in rural areas, particularly in developing countries (Schouten and Moriarty, 2003: 8).

Implementation of the NRWSSP saw the participation of communities in maintenance of boreholes, although at different levels as shown by the study which was conducted by the University of Zambia for NGO WASH FORUM in 2014. However, if the factors which influence sustainability of boreholes through community contributions are not investigated, participation will continue to be at the lowest level and this may, in turn, render all the positive efforts by the government, Partners and the non-governmental organizations towards achieving accessibility to clean water useless and wasteful.

The findings of the study will, therefore, contribute significantly to our knowledge and understanding of factors that contribute to the failure of sustaining boreholes maintained by communities through contributions. Improved understanding of factors influencing sustainability will assist the Water Sector to achieve sector goals in improving access to sustainable safe water for Zambians living in the rural areas. The knowledge and understanding will in turn assist stakeholders in the water sector who include, but not limited, to government ,NGOs, donors and community members in coming up with sustainable interventions to increase access to clean and safe water. The findings of the study will also help policy makers in formulating policies related to improving access to safe and clean drinking water and it is further expected to add to the existing body of knowledge by proposing possible areas of future research.

1.6 Study Area

The research was conducted in Phula, Chikoloka and Kamchila villages of Chilenga ward of Chadiza district. Chadiza District is situated in the Eastern Province of Zambia, 72km South of Chipata, the provincial capital and 64km South East of Katete districts. It has sixteen wards and has a population of 60, 423 of which 49% are male and 51% are female. Figure 1 below shows the map of Zambia showing location of the study area.

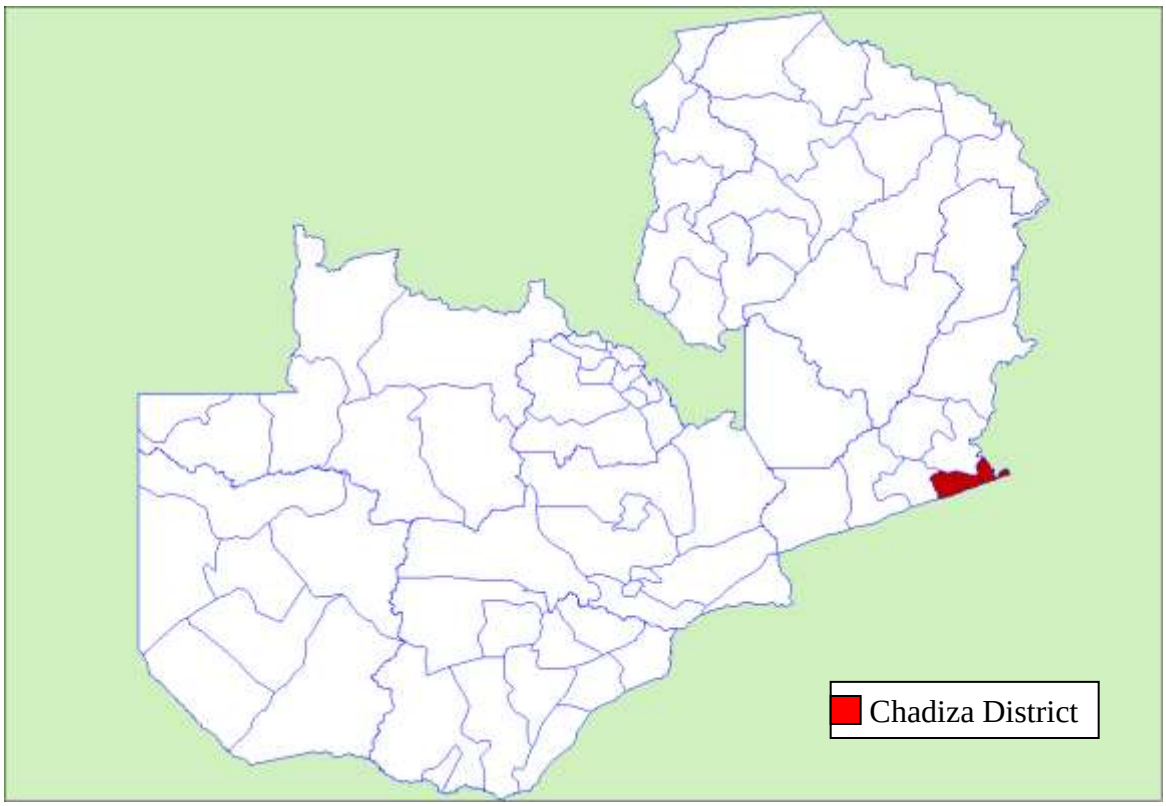

Figure 1: Map of Zambia showing location of Chadiza District

Source: Wikipedia encyclopedia

CHAPTER 2: LITERATURE REVIEW

2 Introduction

This chapter reviews various literatures of other researchers and writers related to factors which influence sustainability of boreholes. It includes the water policy and the NRWSSP.

2.1 Theoretical Literature Review

Sustainability of a rural water system is a function of a number of factors. Sustainability depends not only on factors controlled by the project such as training, technology, the cost of the system and construction quality, but also on factors beyond the control of the project such as the community's poverty level and their access to technical assistance and spare parts.(Jennifer et el, 1997).

The operational mistakes of the 60s and 70s have now long been recognised and there has been a significant paradigm shift which puts more responsibility for implementing, managing and paying for their water supply in the hands of communities. The belief is that by instilling a sense of ownership, promoting participation and sharing costs, the water supply services will be sustainable. The new paradigm emphasized that communities should not just be involved in system inception, but should accept ultimate responsibility for and ownership of the entire lifecycle of the system (IRC, 2004).

Governments, Non-governmental organizations, local and international organizations from all over the world have implemented water projects to promote safe rural water supply and sanitation over the years. However, in most project areas, there is lack of sustainability of these water infrastructures and water supply systems, as most of the communities don't own the projects (Harvey et el, 2007). Harvey and Reed (2007) in their report, further, showed that community issues like perceived lack of ownership, lack of education on water supply and sanitation, poor management system and limited demand are related to low sustainability rates of water supply systems.

Enhancing the capacity of the community in planning, implementation, development and maintenance of rural water supply systems are the first step towards the sustainability development of rural water supply schemes. To examine the impact of the water supply system socio economically, the full impact should be taken under consideration (UNICEF, 1999).

Over the past three decades, experience has shown that water and sanitation activities are most effective and sustainable when they adopt a participatory approach that acts in response to genuine demand, builds capacity for operation and maintenance and sharing of costs, involve community members directly in all key decisions, develop a sense of communal ownership of the project, and uses appropriate technology that can be maintained at the village level. Also important are educational and participatory efforts to change behavioural practices (USAID, 2009).

The key indicators for sustainable community managed rural water supplies include reliability, adequacy, accessibility, water fetching time, establishment of operation and maintenance (O&M) fund, ownership, user committee existence and functioning (Panthi et el, 2008).

2.2 National water Policy

The 2010 National Water Policy embraces modern principles of water resources management and endeavours to deal with the daunting challenges of poverty reduction. Among the objectives of the 2010 national water policy is to promote effective community participation and stakeholder involvement, particularly women and children, in the design, execution and management of water resources, programs and projects (National Water Policy, 2010).

2.3 National rural water supply and sanitation programme

The key policy measures with respect to rural water supply and sanitation include developing a cost recovery approach as an integral part of RWSS to ensure sustainability by (i) Encouraging user communities to contribute part of the investment cost of RWSS schemes. This contribution could be in terms of labour and locally available material to be used in the construction phase (ii) Assisting the communities in the assessment of costs, establishment of revenue (fees and charges) collection mechanisms and determination of contributions towards operation and maintenance of RWSS schemes Component four (4) of the NRWSSP will include institutional development and capacity building activities to ensure effective service delivery at national, district and community levels (NRWSSP, 2007).

Ministry of Local Government and housing through NGO-WASH Forum (2014), reviewed the performance of community contributions towards rural water supply infrastructure development in Zambia and in its report revealed that the selected study districts (Chadiza inclusive) were at different levels in terms of operationalisation of the system of community contribution.

2.4 Knowledge Gap

From the literature reviewed, a study on factors influencing sustainability of boreholes in Chadiza district has never been conducted. Therefore, this study will contribute towards bridging of the knowledge gap.

CHAPTER 3: METHODOLOGY

3 Introduction

This chapter gives the detailed descriptions of the whole research process. This includes the target group, sampling technique employed and sample size, research methods, data collection tools and data analysis methods used.

3.1 Target Group

The target group for this research includes all people living in villages of Chadiza district who make contributions towards the maintenance of their respective boreholes for the purpose of sustainability

3.2 Study Sample

The sample of this research included three (3) Villages of Chilenga ward of Chadiza district. The target of the sample was interviews with ten (10) individual community members from each village, one (1) focus group discussion with community members in each of the three (3) villages, one (1) focus group discussion with the water committee in each of the three (3) villages and one (1) interview with the Rural Water Supply and Sanitation Coordinator from the Local Authority. The research comprised a total of eighty (80) respondents. Focus group discussions and the interviews with the rural water supply and sanitation coordinator were conducted to give considerable confidence in the reliability of the findings in villages. The information provided by the rural water supply and sanitation coordinator and focus group discussions was, therefore, presented in descriptive form only. Therefore, data analysis in figure form was based on 30 respondents who were the direct contributors to maintenance of the boreholes. Table 1 shows the details of the respondents. The sample size is believed to be sufficient for the research and that it was made up of respondents who had relevant information for the research.

Table 1: Sample of Villages, Community members, Water Committee members and the Rural Water Supply and Sanitation Coordinator by Gender

No	Category of Respondent	No of Respondents		Total	% of Respondents	
	Gender	Female	Male		Female	Male
1	Community Members	17	13	30	57	43
2	Focus Group-Water Committee Members	10	9	19	53	47
3	Focus Group -Community Members	15	15	30	50	50
4	RWSS Coordinator	0	1	1	0	100
	Total	42	38	80	52	48

Source: Field Data

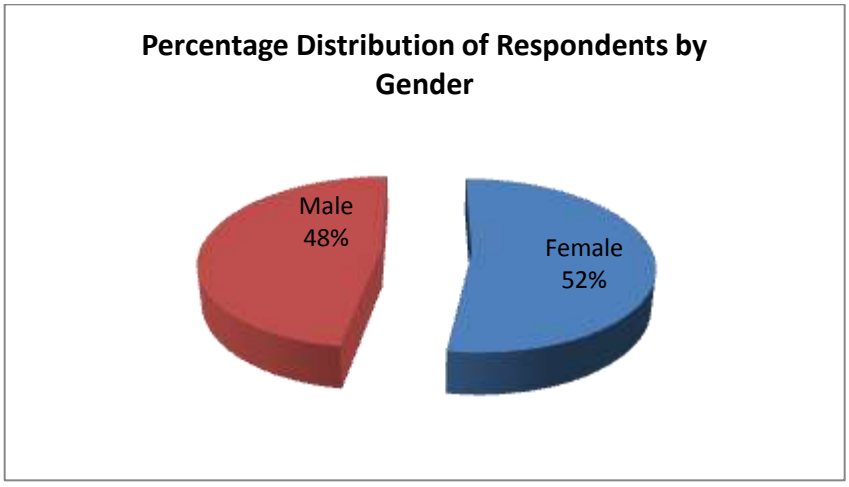

Figure 2: Showing percentage distribution of respondents by gender

The high percentage (52%) of women respondents as indicated in figure 2 above may still be indicative of the fact that women are confined to gender roles that confine women to household chores like fetching water, hence making it easy for them to be reached during the study. However, a significant 48% male response may be evidence of changing values where household issues such as availability of water are no longer left to the female folks. This may reflect the

impact of recent advocacy for gender mainstreaming in the water sector. In addition, this may also be significant for enhancing sustainability of boreholes, as more men are becoming involved in water management related issues.

3.3 Sampling

The research employed the purposive sampling method. The reason for using this method was that the selected villages have been involved in maintenance of boreholes in one way or another.

3.4 Types and sources of data collected

The data used in the research was primary and secondary. The primary data was collected using the interview schedule. The primary data was further collected by conducting focus group discussions, while secondary data was sourced from processed data from the Local Authority, the internet, books, reports, articles and journals related to community participation in implementation of water projects.

3.4.1 Quantitative data

Quantitative data was analysed using Microsoft Excel Spreadsheets to bring out statistical representation of data in tables and figures. It was also used to show relationships between factors which may account for the achievement or failure of sustainability.

3.4.2 Qualitative data

Qualitative data was analysed using thematic analysis to generate the in depth understanding of the study.

CHAPTER 4: DATA ANALYSIS

4 Introduction

To understand the factors that influence sustainability of community managed boreholes, this chapter presents empirical data of the research. It is organized in themes, based on the objectives and questions of the research which were used to guide the investigation.

(i) Influence of community participation at the initial stage of borehole projects' sustainability

The study revealed that some communities made initial capital contributions, while others did not. The contributions were either in form of money or local materials such as sand and crushed stones. Figure 3 below shows that 67% of the respondents made contributions, while 33% did not contribute in the initial stages of the borehole project.

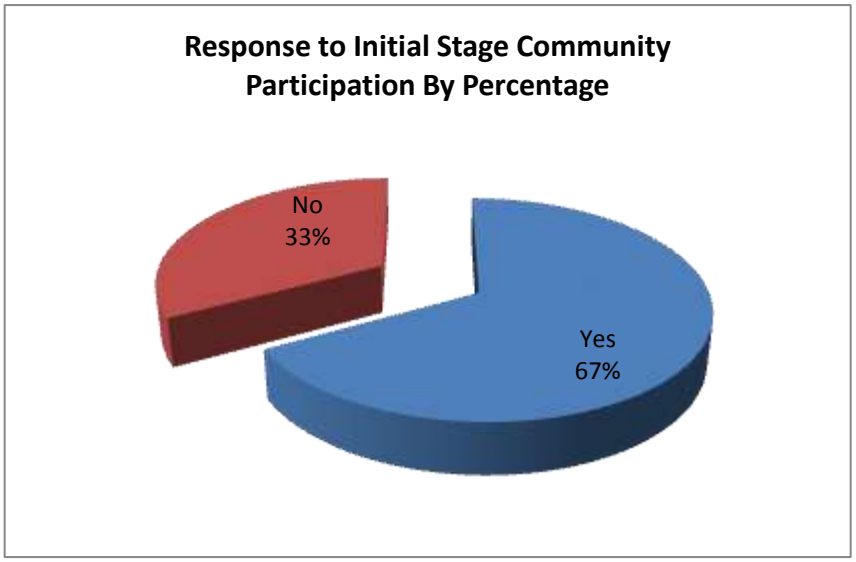

Figure 3: showing response of community members to participation at initial stage

(ii) Perception of community members towards contributions for maintenance of boreholes

Community participation is known to be the major ingredient of sustainability of community projects, water projects inclusive and its perception by community members is of great influence to sustainability of boreholes. Respondents had different views with respect to the way they perceived community participation. 73% of the respondents perceived community participation to

be a good idea. On the other hand, 27% of the respondent perceived community participation as a bad practice. Figure 4 shows the perception of respondents on community participation by percentage. The focus group discussions described community participation as a new way of empowering people to be self reliant and were in support of the concept.

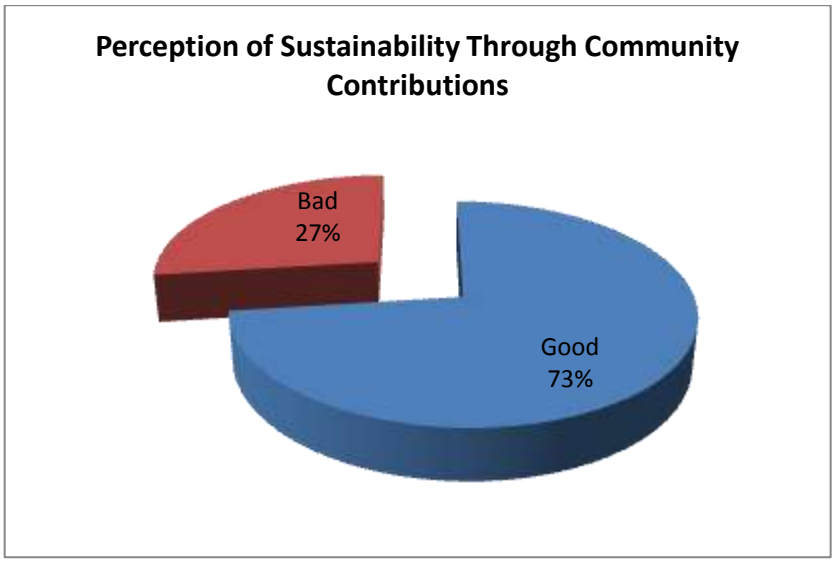

Figure 4: Showing the perception of respondents on community participation

The research also showed that different communities have different frequencies of making contributions. Some contribute on monthly basis, while others contribute on annual basis. Some communities contribute only when the boreholes have broken down. 44% contribute monthly, 33% contribute annually, while 23% contribute when the boreholes have broken down as shown in Figure 5.

The focus group discussions revealed that the idea of contributing when the boreholes have broken down came in when the water committees could not give satisfactory financial reports to the community members.

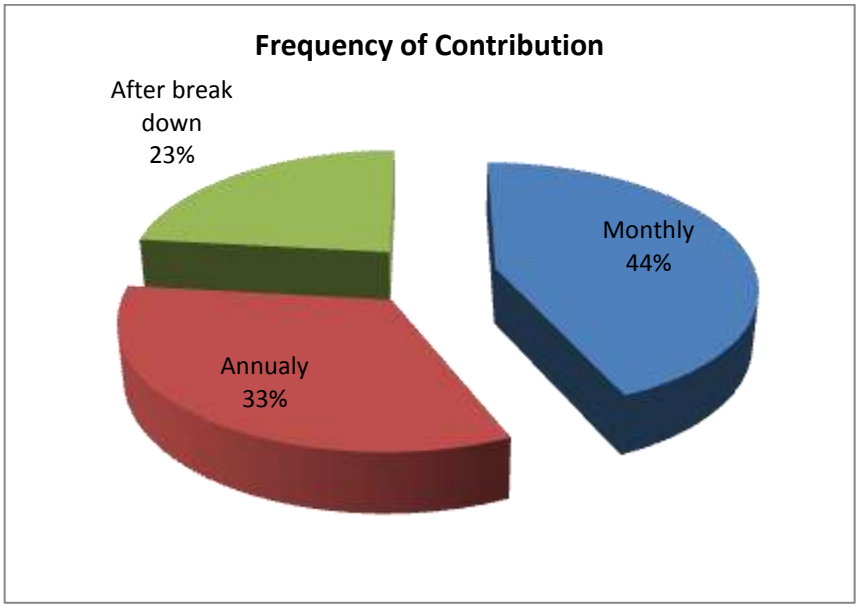

Figure 5: Showing the frequency of contributing towards maintenance of the boreholes

The results of the research further indicated that community members contributed towards maintenance, despite the fact that the contributions were at different frequencies and that others did not meet their obligation of contributing.

A borehole will stand a taste of time if the community members realize that the facility belongs to them. The research indicated that some community members have it in their minds that the boreholes belong to them because they made contributions and applied for them and that the government responded by giving them. Others added that the boreholes belonged to them because they were the users.

The findings of the research showed that 7% of the respondents feel that the boreholes are a property of the government, while 93% of them said the boreholes are a property of the communities as shown in figure 6 below.

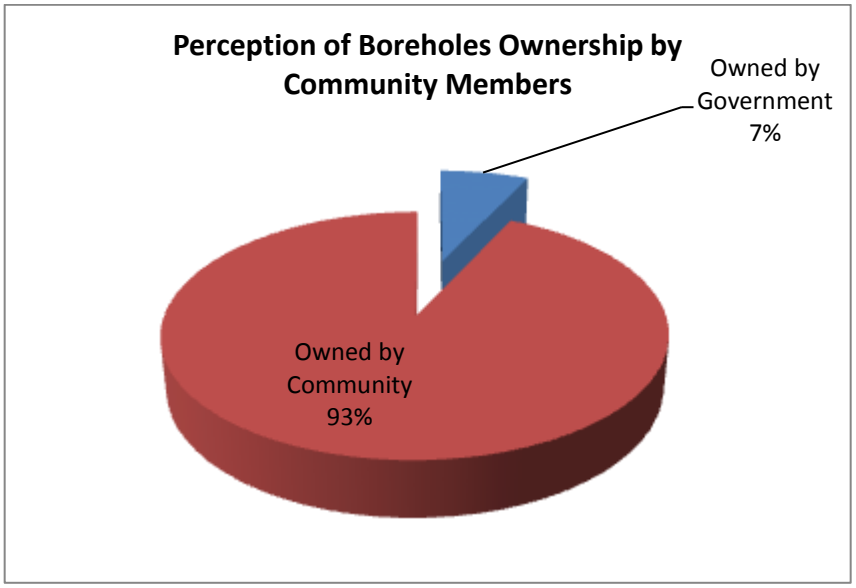

Figure 6: Showing perception of borehole ownership by community members

Ownership also means that the community members should be at the centre of making decisions related to boreholes. The researcher, through the interviews, wanted to know who determined what to contribute and how often the contributions were made. According to the study, 57% of the respondents said that the decisions were made by community members through meetings, while the remaining 43% said the water committees were the ones who made the decisions. The study further showed that the traditional leaders did not impose the amounts to contribute and the frequency of contributing as indicated in figure 7.

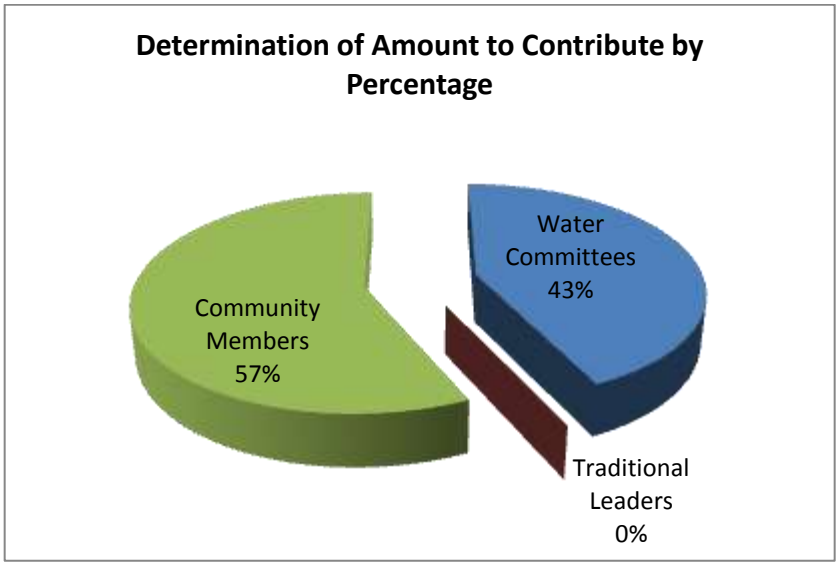

Figure 7: Showing who determines the amount to contribute

The focus group discussions revealed that the decisions of what to contribute and how often were basically made by the community members at meetings but were guided by the water committees. The members who said the water committees made the decisions never attend the meeting mostly.

Down time or the time taken to repair the borehole when it breaks down is also critical to show ownership of the boreholes. 63% of the respondents said it takes two (2) to four (4) days to repair the boreholes when they breakdown, while 20% and 17% said it takes one (1) day and five (5) days or more respectively as shown in figure 8.

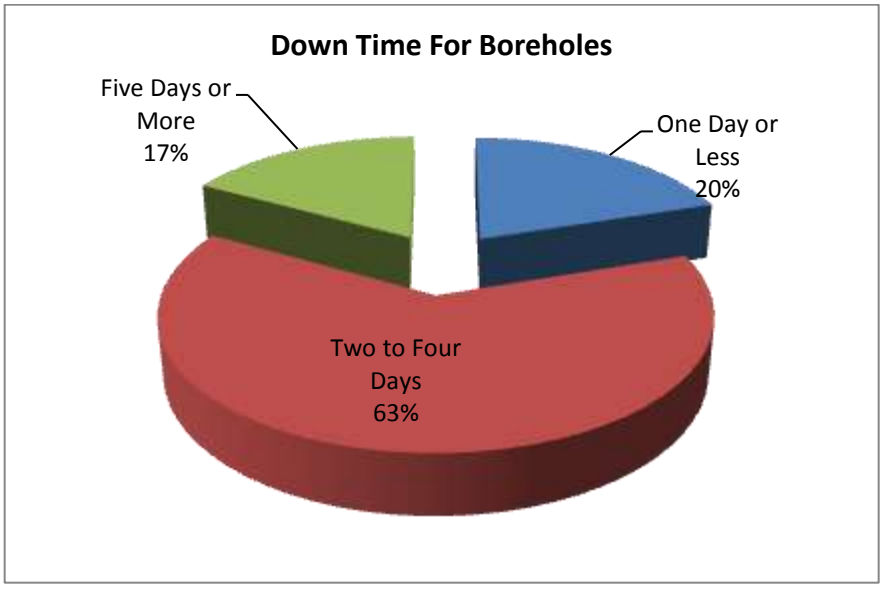

Figure 8: showing the down time for boreholes

(iii) Presence and Capacity building of water committee members and area pump minders

The study showed that 3% of the communities did not have the presence of water committees, while 97% had the water committees in place. This is shown in figure 9 below. The absence or presence of the water committees has a serious bearing on sustainability of the boreholes.

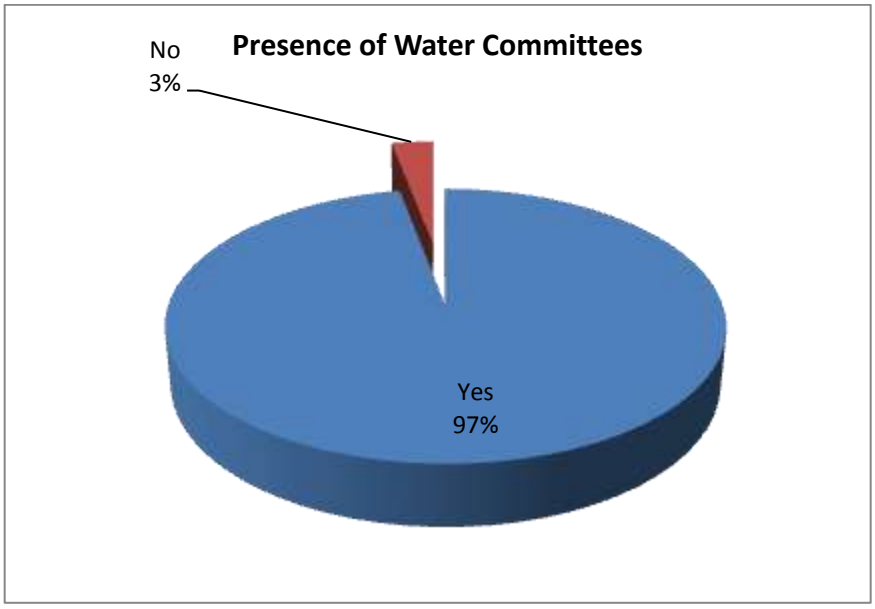

Figure 9: Showing presence of water committees in the communities

The study further revealed that 60% of the communities had trained water committees, while 40% didn't have trained water committees, as shown in figure 10. Focus group discussions revealed that some communities had already put water committees in place but they have not yet been trained.

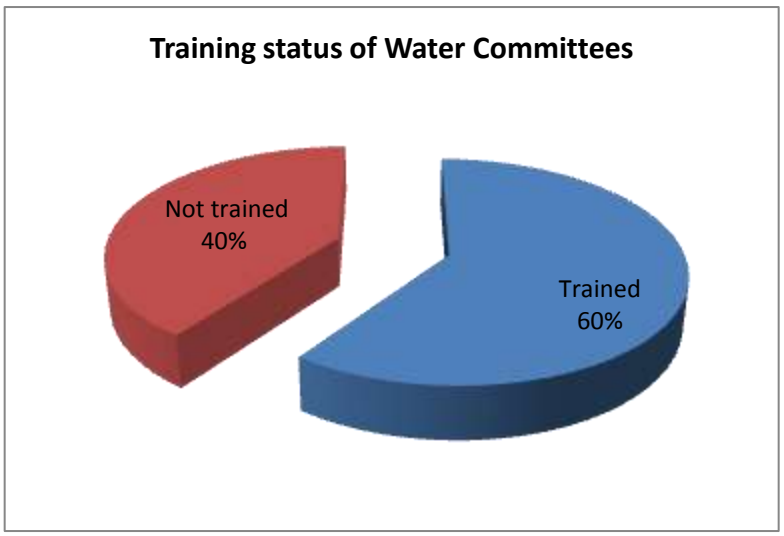

Figure 10: Showing training status of water committees

On the part of area pump minders (APMs), the research revealed that only 43% of the respondents said their communities had trained APMs, while 57% said the APMs were not trained. This is shown in figure 11 below.

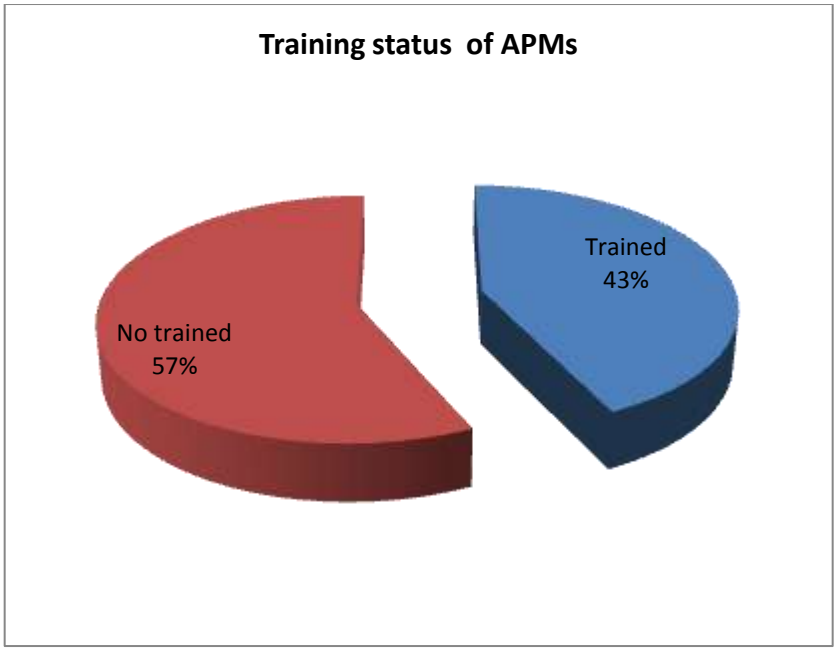

Figure 11: Showing training status of APMs

CHAPTER 5: DISCUSSION

5 Introduction

This chapter presents discussion of the findings. It is also organized in themes, based on the objectives and questions of the research which were used to guide the investigation.

5.1 Discussion

(i) Influence of community participation at the initial stage of borehole projects to sustainability

Some community members made contributions at the initial stage while others did not. The initial contribution shows demand, ability to contribute for maintenance and enhance ownership of the water facility. The percentage of community members who did not contribute is quite big (33%). This may greatly influence community contributions negatively, if left untended to.

The study revealed that the community which did not take part in contributions at the initial stage had the borehole broken down and had serious issues related to contributions for maintenance and repair of the facility. Most respondents who felt that the boreholes were a property of the government belonged to the community which did not contribute the initial capital for the borehole. On the other hand, communities who contributed in form of money or local materials had their boreholes in good working conditions. This shows that participation at the initial stage has some influence on the sustainability of the borehole and is in agreement with USAID (2009), who said that over the past three decades, experience has shown that water and sanitation activities are most effective and sustainable when they adopt a participatory approach that acts in response to genuine demand, builds capacity for operation and maintenance and sharing of costs, involve community members directly in all key decisions, develop a sense of communal ownership of the project, and uses appropriate technology that can be maintained at the village level. Also important are educational and participatory efforts to change behavioural practices.

(ii) Communities' perception of community participation

A larger proportion of the communities regarded community participation as a good approach to effective maintenance of boreholes. They cited reasons such as being able to make decisions on their own and being able to repair the boreholes within a short period when they break down since the government officers took too long to attend to boreholes as they have a lot of other

things to attend to. This is in line with one of the objectives of the 2010 national water policy seeks to promote effective community participation and stakeholder involvement, particularly women and children, in the design, execution and management of water resources, programmes and projects. On the other hand, the minority of the respondent perceived community participation as a bad practice. They gave reasons such as the government being responsible for its citizen and that the responsibility should be extended to service delivery such as maintenance of boreholes while the focus group discussions described community participation as a new way of leading people to being self reliant.

The findings show that the perception that the community members have towards community participation has great influence on sustainability of the boreholes. Most of the respondents who perceived community participation as a good approach came from communities which took part in initial stages of the water projects, their boreholes are in good working condition and had no serious problems when it came to making contributions except with a few individuals. On the other hand, most respondents who were against community participation came from communities which had their boreholes broken down. This indicates that contributions for maintenance from such communities are not easy to collect thereby affecting sustainability of the boreholes negatively.

Perception has a bearing on ownership of the boreholes. Ownership in turn influences sustainability of the boreholes. The majority of the community members agreed that the boreholes were theirs since they applied for them and contributed the initial capital for the project. Community contributions and, therefore, maintenance of the boreholes in the communities where respondents owned the facilities, were not problems. The findings of the study was in agreement with Harvey and Reed (2007) who in their study said that in most project areas there is lack of sustainability of these water infrastructures and water supply systems, as most of the communities don't own the projects.

Ownership of the facilities also has a bearing on decision making. Another important factor which was related to ownership in the study was the down time of the boreholes. The study showed that most community members made their own decisions on what and when to contribute, although others felt that the water committees were at the centre of making decisions. Determination of what to and when to contribute is quite difficult for communities, as there are no laid down guide lines.

(iii) Influence of capacity building of water committee members and area pump minders on sustainability of boreholes

Communities which did not have committees in place had serious problems of ownership and, in turn, influencing contributions towards maintenance negatively. They gave different responses as to why they had many problems related to contributing towards maintenance. The reasons included lack of leadership to give guidance on importance of community contributions and lack of transparency in the utilization of money by those who were entrusted with handling contributed money. On the other hand, communities which had trained water committees were progressing well in terms of contributing towards maintenance of boreholes, while those which had not been trained were struggling with what they termed as "doing the right thing" but were doing everything possible to coordinate activities related to sustainability of the boreholes.

The communities which had trained APMs had reduced down time of their boreholes, while those who did not have trained APMs depended on APMs from other communities and as such, down time of their boreholes was increased. It sometimes went up to more than five (5) days. The presence of a trained APM in a community means breakdowns are attended to within a short period of time, while the absence of a trained APM means breakdowns take a good number of days to be attended to. The other factor which had a bearing on the down time was the toolkits. Individual communities did not have toolkits. the RWSSC coordinator revealed that most communities had tool kits which were provided by Plan international, an NGO which provided a number of boreholes in the district but some APMs personalized the same tool kits and were difficult to trace due to lack of records, as the said NGO didn't leave the records at the handover of the facilities to the local authority. He further said that had ten (10) tool kit centres throughout the district which are in strategic locations.

Panthi and Bhattarai (2008), in their study, showed that the key indicators for sustainable community managed rural water supplies include reliability, adequacy, accessibility, water fetching time, establishment of operation and maintenance (O&M) fund, ownership, user committee existence and functioning. The findings indicate that capacity building of water committees and APMs influence the sustainability of borehole significantly. The findings are agreeing with Panthi and Bhattarai (2008)'s studies.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6 Introduction

This chapter presents the conclusion and recommendations of the findings of the research based on what was found and analysed on each objective and research question of the study.

6.1 Conclusion

The efforts made by government to provide water to rural communities would be protected and, therefore, increase Coverage of water if community participation was enhanced with respect to factors that influence sustainability taken into account at the initial stage of construction of the boreholes and after handing them over to communities.

The findings of the study are in line with most of the literature that was reviewed, for example (USAID,2009), experience has shown that water and sanitation activities are most effective and sustainable when they adopt a participatory approach that acts in response to genuine demand, builds capacity for operation and maintenance and sharing of costs, involve community members directly in all key decisions, develop a sense of communal ownership of the project, and uses appropriate technology that can be maintained at the village level. Also important are educational and participatory efforts to change behavioral practices.

The study revealed that community contribution at the initial stage of construction greatly influence sustainability of the boreholes because it instils the spirit of self reliance in the community members. In most communities where boreholes were in good working condition, initial stage participation took place. Community participation at the initial stage of construction can simply be termed as a pre requisite to sustainability of boreholes.

The other factor which has a significant influence in sustainability, according to the study, is the perception that community members have towards community contributions for the purpose of maintaining the boreholes. Perception has a bearing on ownership of the boreholes which, in turn, affects decision making. Communities which perceived community contribution as a good way of sustaining the boreholes also believed that they owned the water facilities and as such they made their own decisions on matters related to boreholes. Their boreholes were in good working condition, as opposed to those who perceived community participation as a bad approach, and believed that the government owned the facilities.

The communities which had trained water committees did not have problems with contributions and hence maintenance of the boreholes, as compared to those whose water committees were not trained and those who didn't have water committees completely. Communities which had trained APMs had reduced downtime on their boreholes, as compared to those who didn't have trained APMs. The absence of toolkits from the respective communities also had a bearing on the downtime of the boreholes.

The study further observed that education or capacity building of water committees, APMs and communities is the backbone for sustainability of boreholes.

6.2 Recommendations

In order to protect the positive strides made by government to increase the provision of safe and clean water to rural communities, these factors should be made known in areas where sustainability seems to be weak or completely absent through sensitization programmes. It is recommended that the local authority should make a deliberate programme to visit and sensitize the communities whose boreholes were drilled before initial contributions were made and those who are failing to sustain the system of community contribution.

The only thing that can help change people's perception of community contributions for sustainability of the boreholes is education. As such, it is recommended that the local authority should continue selling the idea of community participation to the communities through strengthening community structures such as water committees who will, in turn, reach the communities. Further, it's recommended that the government should put guide lines in place which will help communities to determine how much to contribute and how often. As for now, a research should be conducted to find out how communities determine how much they contribute towards maintenance of boreholes.

The local authority should also consider training more APMs and procure tool kits for every borehole drilled in order to increase the efficiency of borehole repairing. The local authority should, in addition, ensure that they guide the communities which did not have water committees on the selection criteria and further train them.

REFERENCES

Gebrehiwot M. (2006) An Assessment of Challenges of Sustainable Rural Water Supply: The Case of OflaWoreda in Tigray Region. Msc Thesis, Regional and Local Development Study (RLDS). A.A.U. Ethiopia.

GRZ (ministry of energy and water development), 2010, *National Water Policy*, Lusaka government printers.

GRZ (ministry of local government and housing), 2007, *National Rural Water Supply And Sanitation Programme*, Lusaka Government Printers.

Harvey P.A and Reed R.A, 2003. 'Sustainable rural water supply in Africa: Rhetoric and reality.' *Towards The Millennium Development Goals – actions for water and environmental sanitation.* In: proceedings of the 29th Water, Engineering and Development Centre International Conference, Abuja, Nigeria.

IRC**,** (2004), *community water management: history of the concept***.** Download at http://www2.irc.nl/management/whatisit/history.html

IRC International Water and Sanitation Centre.(2011). *Lessons for Rural Water Supply***.** Assessing progress towards sustainable service delivery, Ethiopia.

Katz, Travis, and Jennifer Sara. (1997). "*Making Rural Water Supply Sustainable*: Recommendations from a Global Study." Water and Sanitation Program, Washington, D.C.

Naiga, R., Penker, M., & Hogl, K. (2012). From supply to demand driven water governance:

challenging pathways to Safe Water Access in Rural Uganda.

NGO-WASH Forum (2014), Review of the performance of community contributions towards rural water supply infrastructure development, University of Zambia Lusaka.

Nicole, A. (2000). Adopting a sustainable livelihoods to water projects: Implications for policy

and practice. OD1 Working paper 133, Overseas Development Institute, London UK.

Nyambe I.A.,2005. Integrating IWRM in Zambia's Fifth National Development Plan,Zambia.

Panthi, K, and Bhattari, S. (2008). *A Framework to Assess Sustainability of Community Based Water Projects using Multi-Criteria Analysis.* First International Conference on Construction in Developing Countries. Advancing and integrating construction Education, Research and Practice. August 4-5, 2008. Karachi, Pakistan

Sara, J., & Katz, T. (1998). *Making rural water supply sustainable*: Report on the impact of project rules. Washington DC. The World Bank.

Schouten, T. and P. Moriarty (2003) *Community Water, Community Management*, London, UK.

Sutton, S. (2005). The Sub-Saharan Potential for Household Level Water Supply Improvement: Maximizing the Benefits from Water and Environmental Sanitation, 31st WEDC Conference, Kampala, Uganda, WEDC, Loughborough University, UK..

USAID, (2009), Environmental guidelines for small-scale activities in Africa: Chapter 16 water and sanitation.

UNICEF, (1999) *Water Hand Book*: Water, Environment and Sanitation Technical Guidelines Series - No. 2

Whittington, D., Lauria, D. T., Okun, D. A., & Mu, X. (1989). Water vending activities in developing countries: a case study of Ukunda, kenya. *International Journal of water* Resources Development, 5(3), 158-168.

World Bank (1998). Demand Responsive Approaches to community water supply; Moving from policy to practice, East and Southern Africa World Bank.

APPENDICES

Appendix 1

Interview Schedule

The government of the republic of Zambia, with the help of cooperating partners has been drilling boreholes in Chadiza district, through the ministry of local government and housing but these boreholes have not been lasting due to a number of reasons among which is lack of community participation. In order to ensure sustainability of the boreholes, the ministry of local government and housing came up with the national water supply and sanitation programme which spells out that community members need to participate fully in the maintenance of boreholes to ensure sustainability.

Introduction

My names are Adamson Sakala, a student at the University of Zambia, pursuing a post graduate diploma in integrated water resources management. I am conducting a research titled: *Factors Influencing Sustainability Of Boreholes In Chadiza District.* You have been selected to take part in this research by answering the questions in this Interview schedule. The information you will give out will be used for academic purposes only and will be treated with utmost confidentiality.

Thanking you in advance for your cooperation.

Section A: Personal Details

1. What is your gender?
   Female ( )
   Male ( )
2. What is your age group (in years)
   0 to 20 ( )
   21 to 30 ( )
   31 to 40 ( )
   41 to 50 ( )
   51 and above ( )
3. What is your occupation? .....
4. Ward……

5. Village……..……

Section B: Community participation at the initial stage of borehole projects

6. Did you participate in the initial planning and implementation of the project?
   (i) Yes ( )
   (ii) No ( )
7. If yes, was the participation voluntary, or you were forced
   (i) Yes ( )
   (ii) No ( )
8. Was there some sensitization on importance of contributing towards the project before inception of project?
   (i) Yes ( )
   (ii) No ( )
9. If you participated, what did you contribute? You can tick more than one response
   (i) Money ( )
   (ii) Labour ( )
   (iii) local materials such as sand, crushed stones ( )

10. Is initial stage community participation is important for sustainability of your project?
    (i) Yes ( )
    (ii) No ( )

Explain……
……

Section B: influence of community member's perception towards contributions for maintenance of boreholes on sustainability

11. Is community participation towards maintenance of boreholes important?
    (i) Yes ( )
    (ii) No ( )
    Explain……
    ……
12. Do you contribute towards maintenance of the borehole?

(i) Yes ( )

(ii) No ( )

13. How often do you make contributions?

(i) When the borehole breaks down ( )

(ii) Every month ( )

(iii) Every six months ( )

(iv) Every year ( )

14. How much do you contribute for maintenance of the borehole?

(i) K5 or Less than ( )

(ii) K6 to K10 ( )

(iii) K11 to 20 ( )

(iv) K21 and above ( )

How long does it take to have the borehole repaired when it breaks down?

(i) 1 day ( )

(ii) 2 to 4 days ( )

(iii) 5days and more ( )

15. How are the decisions made on how much and what are should be contributed?

(i) Through meetings

(ii) By water committees

(iii) By community leaders

16. Who is the owner of the borehole?

(i) Government ( )

(ii) Community ( )

(iii) Non Governmental organisation ( )

Briefly give reasons for your answer

……

……

17. Are there any problems that you face as a community in contributing for maintenance of the borehole?

(i) Yes ( )

(ii) No ( )

18. If yes, briefly explain what those problems are…….....

……
…….

19. What measures do you suggest should be put in place to overcome these problems so that sustainability is enhanced?.....

……

Section C: Capacity building of water committee members and area pump minders.

20. Is there a working water committee in place that is in charge of coordinating the borehole activities?
    (i) Yes ( )
    (ii) No ( )
21. In your opinion, is the water committee necessary in the management of the borehole?
    (i) Yes ( )
    (ii) No ( )
    Give reason(s)……
    ……
22. who chose the water committee members?
    (i) Traditional leaders ( )
    (ii) Community ( )
    (iii) Government/Non Governmental organisation ( )
23. Doe the person who chooses the water committee members have a bearing on the sustainability of the boreholes?
    (i) Yes ( )
    (ii) No ( )

Explain……
……..

24. Did the water committee undergo some training?

(i) Yes ( )

(ii) No ( )

25. Does the water committee have adequate skills to manage the water facility?

(i) Yes ( )

(ii) No ( )

26. Does the committee share information related to maintenance of the borehole?

(i) Yes ( )

(ii) No ( )

27. Is the information helpful in relation to sustainability of the borehole? Explain……
……

28. Does the community have a trained the APM?

(i) Yes ( )

(ii) No ( )

29. Does the APM have adequate skills to repair the water point?

(i) Yes ( )

(ii) No ( )

30. Does the community have a Tool Kit meant for maintenance of the borehole?

(i) Yes ( )

(ii) No ( )

31. Does the existence or absence of the toolkit have a bearing on the sustainability of the borehole?

Explain……
……

Appendix 2

Focus Group Discussion Guide with community members

My name is Adamson Sakala and my assistnt is Chrispine Mboyonga. I am a student at the University of Zambia pursuing a post graduate diploma in integrated water resources management. My assistant works with the department of water affairs.

I am conducting a research titled: Factors That Influence Sustainability Of Boreholes In Chadiza District.

One of the objectives of the revised national water policy (2010) is to promote effective community participation and stakeholder involvement. On the other hand, the Government, through the ministry of local government and housing came up with the national water supply and sanitation programme which spells out that community members need to participate fully in the maintenance of boreholes to ensure sustainability. Therefore, I would like to know what factors influence sustainability of boreholes which are managed by communities through contributions in Chadiza District.

You have been selected to take part because your community is among those who are involved in maintenance of the boreholes to ensure sustainability. There are no wrong answers but rather differing points of view. Please feel free to share your point of view even if it differs from what others have said. Keep in mind that we're just as interested in negative comments as positive comments.

We won't use any names in our reports and the information you will give out will be used for academic purposes only and will be treated with utmost confidentiality

Section A: Community participation at the initial stage of borehole projects

1. Did you participate in the initial planning and implementation of the project?
2. If you took part, did people participate voluntary, or you were forced
3. If people participated, in what forms were contributions?
4. Is community participation in the initial stages of borehole projects is important for sustainability of the project?

Section B: community member's perception towards contributions for maintenance of boreholes influence sustainability?

5. How does community participation towards maintenance of boreholes influence sustainability?
6. Do you contribute towards maintenance of the borehole?
7. How often do you make contributions?
8. How much do you contribute for maintenance of the borehole?
9. How long does it take to have the borehole repaired when it breaks down?
10. How are the decisions on how much and what to contribute arrived at?
11. Who is the owner of the borehole?
12. Are there any problems that you face as a community in contributing for maintenance of the borehole? If yes, briefly explain what those problems are
13. What measures do you suggest should be put in place to overcome these problems so that sustainability is enhanced?

Section C: Capacity building of water committee members and area pump minders.

14. Is there a working water committee in place that is in charge of coordinating the borehole activities?
15. Is the water community necessary in the management of the borehole?
16. Who chose the water committee members?
17. Does the person who chooses the water committee members have a bearing on the sustainability of the boreholes?
18. Did the water committee undergo some training?
19. Does the water committee have adequate skills to manage the water facility?
20. Does the committee share information related to maintenance of the borehole?
21. Is the information helpful in relation to sustainability of the borehole? Explain
22. Does the community have the APMs?
23. Do the APMs have adequate skills to repair the water point?
24. Does the community have Tool Kits meant for maintenance of the borehole?
25. Does the existence or absence of the toolkit have a bearing on the sustainability of the borehole?

Appendix 3

Focus Group Discussion Guide with Water Committees

My name is Adamson Sakala and my assistant is Chrispine Mboyonga. I am a student at the University of Zambia pursuing a post graduate diploma in integrated water resources management. My assistant works with the department of water affairs.

I am conducting a research titled: Factors That Influence Sustainability Of Boreholes In Chadiza District.

One of the objectives of the revised national water policy (2010) is to promote effective community participation and stakeholder involvement. On the other hand, the Government, through the ministry of local government and housing came up with the national water supply and sanitation programme which spells out that community members need to participate fully in the maintenance of boreholes to ensure sustainability. Therefore, I would like to know what factors influence sustainability of boreholes which are managed by communities through contributions in Chadiza District.

You have been selected to take part because your community is among those who are involved in maintenance of the boreholes to ensure sustainability. There are no wrong answers but rather differing points of view. Please feel free to share your point of view even if it differs from what others have said. Keep in mind that we're just as interested in negative comments as positive comments.

We won't use any names in our reports and the information you will give out will be used for academic purposes only and will be treated with utmost confidentiality

Section A: Community participation at the initial stage of borehole projects

1. Was the committee formed before the project started?
2. Did community members participate in the initial planning and implementation of the project?
3. If yes, was the participation voluntary or were forced
4. Is community participation in the initial stages important for sustainability of the project?

Section B: community member's perception towards contributions for maintenance of boreholes influence sustainability?

5. What influence does community participation have towards maintenance of boreholes ?
6. Do community members contribute towards maintenance of the borehole?
7. How often are contributions made?
8. How much is contributed for maintenance of the borehole?
9. How long does it take to have the borehole repaired when it breaks down?
10. How are the decisions on how much and what to contribute arrived at?
11. How much do community members contribute for maintenance of the borehole?
12. How long does it take to have the borehole repaired when it breaks down?
13. Are there any problems that you face as a committee in relation to contributing for maintenance of the borehole?
14. What measures do you suggest should be put in place to overcome these problems so that sustainability is enhanced

Section C: Capacity building of water committee members and area pump minders.

15. Is the water community necessary in the management of the borehole?
16. Who chose the water committee members?
17. Does the person who chooses the water committee members have a bearing on the sustainability of the boreholes?
18. Did you as a water committee undergo some training?
19. What kind of training did you have?
20. Is the training helpful in relation to sustainability of the borehole? Explain
21. Do you as a water committee have adequate skills to manage the boreholes?
22. What can be done to enhance your skills to better ensure sustainability of the borehole?
23. Do you as water committee share information related to maintenance of the borehole?
24. Does the community have the APM?
25. Did the APM undergo some training?
26. Does the APM have adequate skills to repair the water point?
27. Does the community have a Tool Kit meant for maintenance of the borehole?
28. Does the existence or absence of the toolkit have a bearing on the sustainability of the borehole?