Social capital and community-led management of rural water schemes: Evidence from Mulundu Community Managed Water Scheme in Luapula Province of Zambia

Master's Thesis

Submitted to the Institute for Social Development, University of the Western Cape, in partial fulfilment of the requirements for the award of a Master of Development Studies Degree

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Declaration

I, **Christopher Dominic Katete**, student number 3402467, a Master of Development Studies Candidate in the Institute for Social Development (ISD) of the University of the Western Cape, do hereby declare that the mini-thesis submitted to the Supervisor and Examiners is my original work generated from solid research processes and procedures as per academic requirements, regulations, and norms. I further declare that this mini-thesis has not been submitted before for any degree or examination at any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references. I am therefore liable for any elements of plagiarism and unethical manipulations as may be cited in this piece of work hereto submitted on 7th February 2017.

Date: 07 February 2017

Signature: 

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I give glory to Jehovah God, whose love and word sustained me throughout the time of my study and the writing of this paper. Without His grace, assistance and strength, this study would have been a flop.

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Dedication

I dedicate this mini-thesis to two most important women in my life: my mother, Mrs. Moddy Mvula and my wife Josephine J. Katete.

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Acronyms and abbreviations

AGMs	Annual General Meetings
ARIs	Acute Respiratory Infections
CM	Community Management
CSO	Central Statistical Office
DHID	Department of Housing and Infrastructure Development
FGDs	Focus Group Discussions
IDWSSD	International Drinking Water Supply and Sanitation Decade
IWRM	Integrated Water Resource Management
WRM	Water Resources Management
KMO	Kaiser-Meyer-Olkin
MEWD	Ministry of Energy and Water Development
MLGH	Ministry of Local Government and Housing
MoH	Ministry of Health
NRW	Non-Revenue Water
NRWSSP	National Rural Water Supply and Sanitation Programme
NWASCO	National Water Supply and Sanitation Council
O&M	Operation and Maintenance
RWSS	Rural Water Supply and Sanitation
RWSSU	Rural Water Supply and Sanitation Unit
SC	Social Capital
SSA	Sub-Saharan Africa
UN	United Nations
UNDP	United Nations Development Programme
WASHE	Water, Sanitation, and Health Education
WAZ	WaterAid Zambia
WRAP	Water Resources Action Programme
WSSD	Water Supply and Sanitation Decade
WWF	World Wide Fund for Nature
ZDHS	Zambia Demographic and Health Survey

Abstract

The main objective of this study was to assess the contribution of social capital to community-led management of water schemes – using the Mulundu Community Managed Water Scheme in Luapula Province of Zambia – with the view to provide appropriate conclusions and recommendations on how water schemes can more viably be managed. This came in the backdrop of mixed evidence regarding success of community managed water schemes in Zambia and elsewhere.

A mixed methods approach was adopted in which quantitative data was collected from a sample of 191 households and qualitative data was collected from 5 members of the management committee of the Scheme and 22 community members through focus groups. Quantitative data was analysed using STATA, a computer-based statistical programme. Both descriptive and inferential statistics were employed in analysing the data. Qualitative data was analysed using the meaning condensation method, a derivative of thematic analysis.

Using Factor Analysis, a social capital index was developed, condensing the number of predictors from six (networks, trust, reciprocity, solidarity, cooperation, and concern for the future) to one. Furthermore, the six outcome variables (preventing Non-Revenue Water (NRW) losses, safeguarding service facilities, willingness to pay more for water supply, willingness to contribute labour or materials to the scheme, attending meetings and electing leaders, decision making on tariff setting and O&M) were combined, where if Y1+Y2+Y3+Y4+Y5+Y6>3, then Y=1, otherwise 0. Logit regression modelling was executed, regressing the social capital index against the outcome variable. The formula for the Logit Regression Model was $\log[p/(1-p)] = \beta_0 + \beta_1 * X_i$ where:

1. $\log[p/(1-p)]$ was the outcome (y) variable involvement in community management
2. β_0 was the parameter
3. $\beta_1 * X_i$ was the Social Capital Index

Findings revealed that households with social capital were more likely to get involved in the management of the Scheme, at p-value value of .000. Furthermore, satisfaction with service provision also impinged involvement of community members in the management of the Scheme, at p-value of .001. Education and income levels were not sufficient to influence people's involvement in the management of the community-led water scheme.

It was established that levels of social capital were high among households (between 62% and 75%) and there was community involvement in the management of the Scheme, evidenced

from high levels of willingness to safeguard water service facilities, willingness to prevent non-revenue water losses by reporting water leakages, blockages and damages, willingness to pay more for service provision, willingness to contribute labour or materials to the Scheme, attending meetings and taking part in electing the Scheme's leaders, as well as involvement in decision-making on tariff setting and O&M.

The study further established that the Scheme had largely been successful in that it had no major breakdowns, and that it had extended its network to 22 villages with 300 taps from 72 taps it had when it was handed over to the community. The major challenge faced by the Scheme was essentially limited resources to finance major capital investments such as tanks and standby pumps. The findings revealed that social capital was not in itself a definer of sustainability, because the Scheme was struggling to secure additional capital equipment. Revenue collected from bills was not adequate to finance capital investment. Community members also delayed settling their bills. The resource challenge finding is backed by other studies done previously. Given these, the recommendations from the study are that:

- The government through the National Rural Water Supply and Sanitation Programme (NRWSSP) and Non-Governmental Organisations (NGOs) interested in the water and sanitation sector need to support periodical capital investments if the water Scheme is to remain operational and sustainable. An assessment of all community-led schemes need to be done in the country to ascertain resource needs and to build capacity in the management committees for sustainable management of the rural water supply systems.
- Social cohesion should be nurtured within and across the villages in order to leverage involvement in the management of the water scheme.
- Community engagement initiatives need to be consistent in order for community members to understand and appreciate their roles and responsibilities as regards management of the Scheme. Community members need to be sensitised on the need to pay bills on time to support operational costs of the Scheme.
- Improving service provision should be among the key priorities of the management committee in order to satisfy community members and to thereby create willingness among them to get involved in the management of the water scheme.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Water is unequivocally a crucial component to all life forms (Savenije and Van der Zaag, 2008; Galiani et al, 2005). It is also an essential variable to poverty reduction and socio-economic development (World Bank, 2009; Harvey, 2008; Grey and Sadoff, 2007). Its availability to human and other living beings for their proclivities and survival is thus an unquestionable necessity and a matter of fundamental right. Yet in rural parts of Zambia, access to water remains limited, with only 46.9% of the rural population having access to clean and safe drinking water, compared to 89% of the population in urban areas (Central Statistical Office (CSO), 2015). The most common sources of drinking water in rural areas are unimproved and unprotected dug wells. Many rural households spend 30 minutes or longer to access drinking water due to the inadequate number of water sources.

The management of water resources has been identified as one of the major challenges faced by rural water supply systems. Hence, several legal and institutional reforms have been underway in the country since the 1990s to address the scourge, with community involvement in the management of water supply systems considered a panacea for effective management of the sector (Chitonge, 2011; World Bank, 2009; Mambilima, 2008; MEWD, 1994).

This study comes in the wake of scholarly and empirical work challenging the demand-driven community management model of rural water supply systems (e.g. Harvey and Reed, 2007). Within the context of mixed evidence regarding the success of community-managed rural water schemes (Mugumya, 2013; Lockwood and Smits, 2011), this study seeks to explore the role of social capital on community-driven management of the community water scheme in Mambilima Ward in Mwense District, Luapula Province of Zambia. Named the Mulundu Community Managed Water Scheme, this water supply scheme has been able to register several successes including increasing the number of taps between 2009 and 2015; no major breakdowns of the system have been recorded; there have been no shut downs due to a lack of funds for operations and maintenance; no cases of theft and vandalism have been registered (Ng'oma, 2015), among other achievements. While in the Sub-Saharan African (SSA) success rates of community managed water schemes have been limited (Lockwood and Smits, 2011; Mugumya, 2013), the aforementioned scheme's performance points to the contrary.

There are few studies that have linked social capital to rural community water projects (e.g., Isham and Kahkonen, 2002). This study, therefore, seeks to empirically unravel the usefulness of social capital to the community management of rural water schemes, with the focus on the 22 villages where the Mulundu Community Managed Water Scheme provides water. Through a combination of both quantitative and qualitative strategies, the current study explored how *social capital* contributes to the community-led management (participation, ownership, cost sharing and control) of the water scheme in question.

The next section provides background contextualisation of the study. After that, the problem statement is presented along with the main and specific objectives as well as the research questions and hypotheses. Furthermore, the rationale and significance of the study are discussed. The chapter ends with a presentation of the outline of all the chapters contained in this study report.

1.2 Background contextualization

Zambia is among a few countries endowed with enormous fresh water resources in the SSA region and the rest of the world. The country's water availability is estimated at 8,700m^3 per capita per year, higher than the SSA region's average 7,000m^3 and the entire globe's 8,210m^3 per capital per year (World Bank, 2009: ix). This presents tremendous opportunities for Zambia's economic and human development.

However, beneath the façade of such an important context, access to safe drinking water is limited, with millions of Zambians left with no option but to fetch from unsafe and unimproved sources such as unprotected shallow wells, rivers, lakes, to mention but a few (CSO, 2015; Wishart, 2013). According to the 2013-2014 Zambia Demographic and Health Survey (ZDHS), only 63.1 percent of Zambians have access to improved drinking water (CSO, 2015). While 89.2 percent of the population in urban areas has access to clean and safe drinking water, the situation is dire in rural areas as only 46.9 percent have access to this precious liquid (CSO, 2015). Limited access to clean and safe water is linked to many preventable diseases including acute respiratory infections (ARIs) and diarrhoeal diseases (CSO, 2015; MoH, 2012).

There are several factors behind inadequate access to clean and safe water in rural parts of the country. One of the problems identified by the 1994 National Water Policy in Rural Water Supply and Sanitation (RWSS) was an inadequate national policy on community participation

(MEWD, 1994:19). In light of this and other problems identified in the 1994 National Water Policy, the Government of Zambia and its cooperating partners made rural water supply a priority development issue, with several legal and institutional reforms in the sector undertaken to improve sustainable access to water supply (Chitonge, 2011; World Bank, 2009; Mambilima, 2008; Sikazwe, 2005). The culmination of these reforms was the 1994 National Water Policy, which was also marked as the first step towards the institutionalisation of community involvement in the management of water and sanitation services in Zambia. The country has since made remarkable efforts to address this through legal and institutional reforms.

The policy spelt out a decentralised management regime for the sector with communities centrally placed, among other things, to actively participate in coordinating, managing and mobilising resources for the management of water supply and sanitation systems (MEWD, 1994). The policy embraced comprehensive approaches to tackling water and sanitation issues in rural areas, with decentralised institutional arrangements, thereby spelling out community involvement for the first time in the sector. In its quest to support efforts to increase accessibility to safe water and sanitation facilities to people, the National Water Policy (MEWD, 1994) spelt out goals and strategies centred on the demand-driven community management model, including (i) ensuring that RWSS programmes are community-based through the creation of water and sanitation committees to coordinate, manage and mobilise resources for the RWSS schemes, as well as integrating community education, training, motivation, health and hygiene awareness programmes, and the operation and maintenance of water supply systems; (ii) developing a cost recovery approach as an integral part of RWSS to ensure sustainability by promoting community contribution in cash, labour and local materials but also supporting communities in assessing the cost, determining user fees as well as contributions towards the Operation and Maintenance (O&M) of RWSS schemes.

Following the 1994 National Water Policy and its revised 2010 version, several pieces of legislation, programmes and institutions have been put in place. Some of them include the Water and Sanitation Act of 1997; Rural Water Supply and Sanitation Unit (RWSSU); Water Resources Action Programme (WRAP); National Rural Water Supply and Sanitation Programme (NRWSSP); 2011 Water Resources Management Act; Integrated Water Resource Management (IWRM) and Water Efficiency Implementation Plan; Water, Sanitation, and Health Education (WASHE) Strategy; Decentralisation Policy of 2003 (Uhlendahl et al, 2011;

MEWD, 2011; WaterAid Zambia, 2010; Nyambe, 2010; Kampata, 2010; MEWD, 2008; Kampata, 2007; MEWD, 1997). All these aim at improving the water resources management in Zambia through decentralisation, promotion of community involvement, promotion of regional integration and assurance of resource efficiency in water resource management.

The government of Zambia clearly appreciates the importance of water resources, and through the Integrated Water Resources Management (IWRM) and Water Efficiency Implementation Plan, it makes an overarching vision pronouncement "to achieve equitable and sustainable use, development and *management* of water resources for wealth creation, socio-economic development and environmental sustainability by 2030" (MEWD, 2008:x. *emphasis added*). The country's Revised-Sixth National Development Plan (R-SNDP) and the long term Vision 2030 also set significant targets for the sector (MoFNP, 2014; Kampata, 2010).

Several NGOs are involved in water supply and sanitation as well as water resource management activities in rural parts of Zambia. Among them are Oxfam, World Vision International, WaterAid Zambia, World Wide Fund for Nature (WWF), Zambia Water Partnership, and Village Water (WaterAid Zambia, 2010; Nyambe, 2010). These NGOs support government efforts in implementing policies in the sector and in improving access to water and sanitation services. Mulundu Community Managed Water Scheme is one of the water schemes that was supported by NGOs in the formative stages and later handed over to community members (Ng'oma, 2015).

1.3 Purpose statement

Zambia is still experiencing high levels of water and sanitation poverty. According to the 2013-2014 Zambia Demographic and Health Survey (ZDHS), only 63.1 percent of Zambians have access to improved drinking water (CSO, 2015). While 89.2 percent of the population in urban areas has access to clean and safe drinking water, the situation is dire in rural areas as only 46.9 percent have access to it (CSO, 2015). Poor access to clean and safe water is linked to many preventable diseases including acute respiratory infections (ARIs), diarrhoeal diseases, etc (CSO, 2015; Ministry of Health, MoH, 2012). Statistics suggest that in 2014, under-five mortality rate was at 86 per 1,000 live births (UN, 2015), fairly well at regional level, but still high at global level.

Elsewhere, limited access to water and problems of poor water quality have been attributed to ineffective water management systems (Garande and Dagg 2005; Fonjong et al., 2004). So too is the case with Zambia. Lack of involvement of the beneficiary communities and other stakeholders in the management of rural water supply and sanitation had been noted as one of the major problems faced by the water and sanitation sector and through the reforms which started in the 1990s, the government of Zambia sought to establish legal and institutional frameworks for a demand-driven community management approach (MEWD, 1994). However, evidence is mixed on the success of the approach especially in the Sub-Saharan African region (Mugumya, 2013; Shaw, 2012; Lockwood and Smits, 2011; WAZ, 2010), leading to its being challenged by scholars (e.g., Harvey and Reed, 2007).

While main studies have been done on the sustainability of community-managed water supply systems, little has been done to link social capital to community-driven management of rural water supply systems (e.g., Isham and Kahkonen, 2002). Hence, gaps still exist on how the dynamics of social networks, trust, reciprocity, solidarity, cooperation, play out with the demand-driven community management model. In this regard, the current study attempts to unravel these social relationships among community members and how they affect the management of the Mulundu Community Managed Water Scheme in Luapula Province of Zambia.

The aim of this study is to assess the contribution of social capital to community-led management of water schemes – using the Mulundu Community Managed Water Scheme in Luapula Province of Zambia – with the view to provide appropriate conclusions and recommendations on how water schemes can be managed more viably in the country.

1.3.1 Main objective of the study

The main objective of this study is to assess the contribution of social capital to community-led management of water schemes – using the Mulundu Community Managed Water Scheme in Luapula Province of Zambia – with the view to provide appropriate conclusions and recommendations on how water schemes can be managed more viably.

1.3.2 Specific objectives

The objectives of this study are:

1. To analyse the achievements of the Mulundu Community Managed Water Scheme.

2. To assess management challenges faced by the management committee in running the water scheme.
3. To establish the extent and level of community involvement in the management of the water scheme.
4. To analyse the levels of social capital among community members benefiting from the Scheme.
5. To establish the relationship between social capital and community management of the water scheme.
6. To make recommendations to the government and civil society organisations working in the water sector on community-led management of water schemes in Zambia.

1.3.3 Research questions

What role can social capital play in the community-led management of the Mulundu Community Managed Water Scheme?

The research sub-questions include the following:

1. What are the achievements of the Mulundu Community Managed Water Scheme?
2. What are the management challenges faced by the management committee in running the water scheme?
3. What is the level and extent of community involvement in the management of the water scheme?
4. What is the level of social capital among community members in Mambilima Ward?
5. What is the relationship between social capital and community management of the water scheme?
6. Can social capital be promoted as a framework for fostering the viability of the water supply systems?

1.3.4 Hypotheses

Hypotheses are basically intelligent guesses a researcher advances. They are predictions he/she makes about a relation between the outcome variable(s) and the predictors (Creswell, 2003). Creswell (2003:109-110) names the two types of hypotheses as null hypothesis, which "predicts that no relationship exists between variables" and an alternative hypothesis which "predicts a causal relationship between variables". Below are the hypotheses made by the researcher:

H_1: There is correlation between utilisation of social capital and community involvement in the management of water supply schemes. In this regard, if X (Social Capital) exists, observable change in Y (Involvement in community management) occurs.

H_0: There is no correlation between utilisation of social capital and community involvement in the management of water supply schemes. In this regard, if X (Social Capital) exists, no observable change in Y (Involvement in community management) occurs.

1.4 Rationale and significance of the study

There is unarguably urgent need to address water poverty in rural parts of Zambia, as statistics clearly show water deprivation with only 46.9 percent of the rural population having access to it (CSO, 2015). Yet addressing this problem is impossible if underlying challenges in the sector, which include breakdowns, unwillingness to pay for services, theft and vandalism of service facilities, non-revenue water losses due to unreported leakages, encroachments, etc., are not addressed.

Scholars have argued that water governance generally lacks theoretical analysis (e.g., Franks and Cleaver, 2007). This is perhaps due to relatively limited scholarly attention to the sector. While several studies have been done in Zambia in respect of rural water resource management, many aspects remain untouched. One such aspect is how social capital, or the lack of it, among community members impinges on community management of water schemes and how the former can, therefore, be used to effectively and efficiently manage the water sector in rural parts of Zambia where water governance remains nascent. Hence, this study contributes to water governance research.

An investigation to establish the relationship between social capital and community management of the rural water schemes would help in generating relevant knowledge on how social relationships can influence water resource development and management. The findings of the study provide policy options for the government and other stakeholders on how to improve water governance, thereby creating an environment in which water poverty can decisively be dealt with and water management sustained. The study also contributes toward

the body of knowledge on the nexus between social capital and community management of water service facilities.

1.5 Chapter outline

Chapter 1: **Introduction**

The chapter presents the introduction of the thesis and background contextualisation of the research problem. It also presents the purpose statement, research questions, hypothesis, research aim and objectives as well as the rationale and significance of the study.

Chapter 2: **Literature review**

The chapter deals with the body of knowledge available in respect to community management of water supply systems in rural areas of Zambia and elsewhere. Various scholarly arguments and research findings are presented and analysed.

Chapter 3: **Theoretical framework**

This chapter presents a review of social capital, the theory which informs the current study. Several aspects of the theory are presented and synthesised including its conceptual and historical roots, types, levels, forms and critiques.

Chapter 4: Research design and methodology

The chapter discusses the research design, methodology, including the sampling, data collection and analysis techniques employed. It provides as a blueprint of the research process and procedures.

Chapter 5: Analysis and interpretation

The chapter presents the analysis of the data and the interpretation of the findings, linking the latter to the literature review and the theoretical framework.

Chapter 6: Conclusion and recommendation

The chapter concludes the paper and presents recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

There is a great deal of literature on governance and Community Management (CM) of rural water systems (Lockwood and Smits, 2011; Harvey and Reed, 2007; Solanes and Jouravlev, 2006; Lammerink, 1998). This chapter engages scholarly work on and practice of community management of water and sanitation services elsewhere and in Zambia. This involves exploring studies on factors underpinning the viability of community managed rural water supply and sanitation services. The water sector is a key development area as it pervades almost all other development sectors. Hence discussing it and its management models without giving the conceptual background and evolution of development theory and practice is an irregularity this paper evades.

In this regard, this chapter proceeds by first discussing development in its broadest sense and the approaches to it, within which community management of water derives its theoretical and historical origins. Through the review of literature, research gaps have been identified which the current study seeks to fill.

2.2 Community management model: Its space in development theory

The aftermath of World War II in the twentieth century witnessed a plethora of development theories variously conceptualised to explain (under)development in the First World and Third World (Graaff, 2004; So, 1990). Scholars have generally dichotomised development approaches in two functional categories: the traditional (top-down) and the people empowerment bottom-up approaches. The first-line traditional development theories were the modernisation and dependency theories (Graaff, 2004; Gardner and Lewis, 1996), which by their theorisation and application, were in sharp contrast to each other even though they both tried to explain the same social reality and attempted to provide a roadmap for developing the Third World.

Modernisation theorists posited that the third world is underdeveloped because it is deeply entrenched in its traditions and that the best way to attain modernity was to pursue the lane which the First World took to development (So, 1990). Emulating the First World meant abandoning the Third World's traditions and embracing the values and belief systems of the

First World countries (in Europe and North America). On the other hand, dependency theorists argued that underdevelopment should be understood within the historical context of the relationship between the core (First World) and the periphery (Third World) (Hoogvelt, 2001) and the best way to achieve development is through a socialist movement and the complete severance of ties between the two (Graaff, 2004).

The years that followed the adoption and application of the modernisation and dependency theories and their derivatives yielded no significant development outcomes in the developing countries. Critics argued that the traditional development paradigms provided no feasible framework for understanding underdevelopment and their strategies were flawed (Gardner and Lewis, 1996). Hence, as Penderis (2012: 2) notes, "disillusionment with orthodox development theories during the late 1960s and their failure to address poverty […] in the developing world led to a systematic search for alternative conceptual analyses".

Post-modernism signalled resistance to and gradual departure from the dominant grand theories of development (Jennings, 2000). Within it, came a plethora of other approaches suggesting alternative ways of handling poverty, inequality and other such aspects of underdevelopment. In the 1970s and 1980s, participatory approaches were embraced as essential alternative development paradigms with a focus on greater involvement and empowerment of people in their own development agenda (Penderis, 2012; Swanepoel and De Beer, 2011). It is within the ambit of alternative development approaches that participatory/community development has emerged, suffice to say that the modernisation theories still are hegemonic.

At the core of participation is power relations, focussing on issues of powerlessness, decision-making, empowerment, social equality, inclusivity, social justice, accountability, expansion of the human capability space, and other such non-economic issues (Penderis, 2012; Swanepoel and De Beer, 2011). Jennings (2000:1, 2) defines participation as the "involvement by local populations in the creation, content and conduct of a program[me] or policy designed to change their lives". Midgley et al (1986) echo similar sentiments, viewing participation as the consolidation of the capacities of communities to mobilise and support themselves. It involves getting people to take charge of the development process by encouraging them to take part in planning, implementing and evaluating development activities (Gajanayake and Gajanayake, 1993) and not agree to mere involvement in a prescribed way.

Participatory development can be understood as a holistic social transformation paradigm that thrives on the active participation of the poor, the underprivileged and the socially marginalised

to shape their own future. According to Gran (1983: 327) participatory development is "… the self-sustaining process to engage free men and women in activities that meet their basic needs and, beyond that, realise individually defined human potential within socially defined limits". Korten (1990:67) defines development within the context of people-centred development as "a process by which the members of a society increase their potential and institutional capacities to mobilise and manage resources to produce sustainable and justly distributed improvements in their quality of life consistent with their own aspirations". The cornerstone of participatory development is clearly the active involvement in all aspects of the interventions targeted on them. Participatory development is about inclusivity, power and control to the local communities, use of indigenous resources including knowledge and skills, with communities themselves taking centre-stage in the development process while at the same time limiting the roles of third parties to facilitation and the provision of advice. Contribution towards community/participatory development is also based on "trust, norms and cultural values" (Dinbabo (2014:238).

Bhattacharyya (2004) warns that participation should not be used as a device for coercing people to rubberstamp projects designed externally and which do not recognise local talents, knowledge and resources, if, as Jennings (2000) puts it, results of such interventions are to be sustainable. People need to take part in each of the stages in the development process and should not be consulted on a project brought to them and which they see or feel is alien to their needs, interests or values. It is within the framework of participatory development that community management derives its theoretical authority.

2.3 Water resource management

Generally, water governance is traced to the ancient times, between 4000 and 6000 years ago (Gupta, 2007; Gioda and Baker, 2004). It encompasses processes that facilitate the management of water resources by policy-makers and other stakeholders at global level down to the local level (Gupta, 2007). According to the Global Water Partnership, the concept of governance "encompasses laws, regulations, and institutions but it also relates to government policies and actions, to domestic activities, and to networks of influence, including international market forces, the private sector and civil society" (Rogers and Hall, 2003:4). It is within the space of water governance that the conceptual roots of water resource management are founded.

There have been several approaches to water resource management. These approaches are broadly dichotomised into the *supply-driven government-led* and the *demand-driven decentralised* approaches (Uhlendahl et al, 2011; Gupta, 2007; Lockwood, 2004). Debates between these two approaches are more about where power for the management of the sector lies.

Literature shows that, in general, the management of water supply was through the supply-driven centralised model until the 1980s (Lockwood and Smits, 2011; Nicol, 2000). This meant that decisions were made centrally, while communities and other stakeholders had limited or no involvement at all. This model was characterised by strong state involvement in the management of the water sector (Gupta, 2007; Prasad, 2006; Lockwood, 2004; Mulwafu et al, 2003). This top-down approach was, however, being challenged by the 1980s due to poor outcomes of this model (Lockwood and Smits, 2011; Nicol, 2000; Carter et al, 1999).

The 1980s, dubbed the International Drinking Water Supply and Sanitation Decade (IDWSSD), or the Water Decade, witnessed global concerted efforts emphasising a shift towards community participation in the management of the water and sanitation sector (Mugumya, 2013; Lockwood, 2004). This demand-driven decentralised model has been characterised by neo-liberal and empowerment approaches with a limited role of the state and increased stakeholder involvement as well as private sector participation in the management of the sector (Gupta, 2007; Prasad, 2006; Lockwood, 2004; Mulwafu et al, 2003). The approach provides that beneficiaries and other stakeholders should take an increasingly active role in the management of the provision of water and sanitation services. This paradigm shift was considered a panacea for the effective and efficient management of the water and sanitation sector in the developing countries (Uhlendahl et al, 2011; Asthana, 2003).

Community management of water supply systems originated from the concept of community participation which also gained global acceptance in the 1980s (Mugumya, 2013). Mugumya (2013:65,66) contends that community management of rural water supply entails "mainly all aspects of governance that are aimed at ensuring that elected community representatives effectively discharge their responsibilities and stimulate greater sustainability for the projects. Such aspects include formation of committees, their training and capacity building and collection and management of water". However, according to Harvey and Reed (2007), community management is not synonymous with community participation. Harvey and Reed (2007) argue that community participation does not automatically lead to community

management. The argument is that service provision which is not managed by the communities themselves can still be done within the scope of the principles of community participation. Although Harvey and Reed (2007) argue that the two are not synonymous, none can exist without the other. Essentially, community management is the participation of the communities in the day to day running of a project in which decision-making is done collectively among community members and/or their representatives. Hence looking at management as a function, community management is basically a component of community participation.

2.4 Factors of community management of water supply schemes

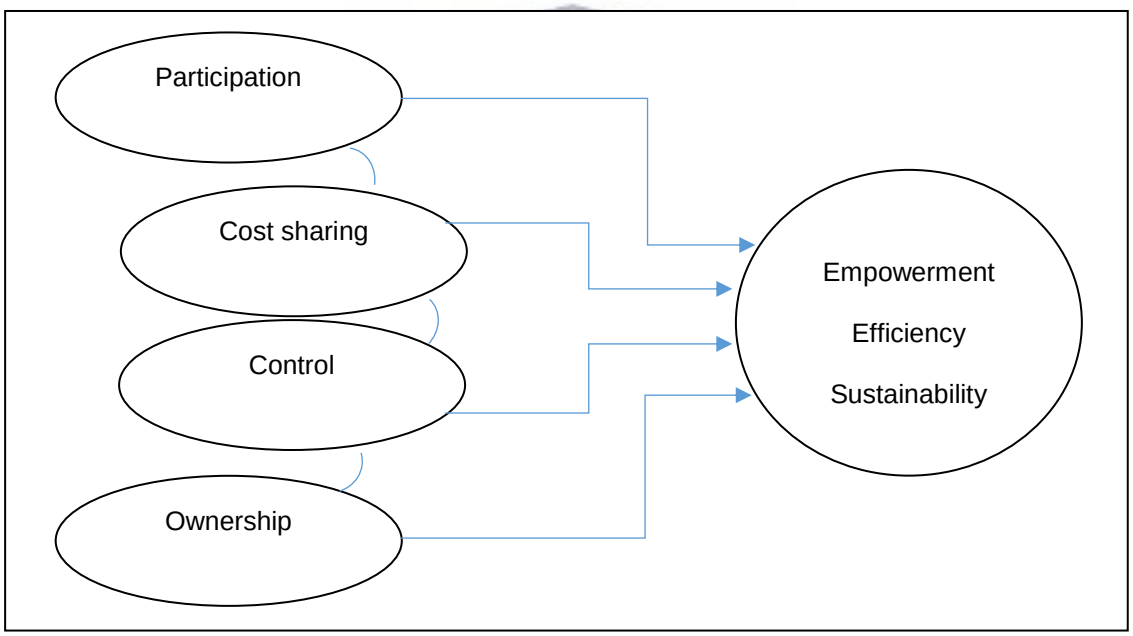
While there are differences in the appreciation of community management in the water sector, consensus has been reached regarding the principles guiding this approach. These are factors which are supposed to be met in order for the community management model to be successful. Lockwood (2004) outlines the following four common principles of community management:

I. **Participation:** continuous community involvement in the development, implementation and management processes;
II. **Control:** where the community directly or indirectly has control over the operation and management of its own water supply system – control is understood as the ability to make strategic decisions about the process, from the design phase to long-term O&M;
III. **Ownership:** although formal legal ownership of physical infrastructure is highly desirable, it may not always be possible in existing legal frameworks. Of equal importance is the perception of ownership by the user community; and
IV. **Cost sharing:** the need for contribution to the recurrent costs of running and maintaining the system; depending on individual circumstances, contributions need not always be financial in nature (Lockwood, 2004:8).

Community management of water supply systems can thus be seen to encompass practices by community members that facilitate the proper functioning of the water supply system including the day-to-day operation and maintenance, as well as collection, utilisation and accounting for the money used in such activities. In the current study, these factors are considered as the key variables on which community management is measured.

Literature suggests three broader objectives of community management of rural water supply. These include ***empowerment*** of the target communities by granting them authority and control of service provision; ***efficiency*** in service delivery and utilisation of the services through local human capacity, volunteerism in water committees, local material inputs and other cost recovery aspects; and ***sustainability*** through community ownership and control of service provision (Mugumya, 2013; Lane and Corbett 2005; Lockwood, 2004; Dungumaro and Madulu, 2003; Lammerink, 1998). Effectively, the actualisation of the principles of community management would suggest that the broader goals of community management are set for achievement. Based on the factors for successful community management of water points, and the broader objectives these factors aim to achieve, a conceptual relationship of these aspects is as in Figure 1 below.

Figure 1: Conceptual relationship between factors of community management and its broader objectives



Source: Author's own compilation

2.5 Community management of water: Case studies in Africa and the world

There are mixed perceptions and evidence with regard to the success of the community management model of water supply management in rural areas. While some studies show that the model has been working well in Asia and Latin America, for instance, other studies suggest that this model of management has had limited success in Sub-Saharan Africa (SSA) (Mugumya, 2013; Lockwood and Smits, 2011; Harvey and Reed, 2007).

Whittington et al (2008) conducted a study to understand the performance of community-managed rural water supply systems in Peru, Bolivia and Ghana, involving a sample of 400 communities in the three countries. Key findings showed the functionality of taps ranging between 90 percent and 95 percent, with no breakdown in other countries. The operational rates of the water points were attributed to the demand-driven, community management model which placed the communities at the centre-stage of the management of the facilities. However, the study also established that households in the villages were never so concerned about improved water services and raising finances for the water committees was thus a challenge.

In another study in Ghana, Opare (2011) sought to establish the sustainability of a two-phase community management approach to rural water supply systems. His findings also showed a possibility of success of the CM approach provided there was strong local capacity prior to full community control of the water supply systems and when the process of relinquishing the responsibilities is done gradually.

The most recent study by Macharia et al (2015: 63) in Kenya sought to establish the extent to which "sustainability" (dependent variable) of Maraigushu rural community water project related to "community participation", "community management factors" and the "technical factors" (independent variables). The ordinal logistic regression revealed a significant relationship between the dependent and independent variables.

Other studies have contrary findings. Lockwood et al (2010), for instance, established that between 30% and 40% of community managed water systems are either non-functional or are functioning below intended designs. Other studies suggest failure rates of up to 60% (Sutton, 2005; Hazelton, 2000). Baumann (2005) similarly estimated that 35% of all the rural water supply systems in the SSA region are not functioning.

2.6 Community management of water: Zambian perspective

The water and sanitation sector in Zambia falls primarily under two government ministries: The Ministry of Local Government and Housing (MLGH) and the Ministry of Energy and Water Development (MEWD) (Nyambe, 2010), although there are several other ministries with indirect bearing on the functioning of the sector (Nyambe and Feilberg, 2012). MLGH is responsible for the delivery of water and sanitation services through local authorities and commercial utility companies under the Department of Housing and Infrastructure

Development (DHID), while MEWD is responsible for water resource management through the Department of Water Affairs, National Water Supply and Sanitation Council (NWASCO) and the Water Board (Nyambe and Feilberg, 2012; Nyambe, 2010).

After the 1994 National Water Policy, the Water and Sanitation Act was enacted in 1997. The aim of the Act was to facilitate the establishment of NWASCO, mandated to establish and regulate urban water supply and sanitation utilities, ensure efficiency and sustainability in the provision of water and sanitation services, among other functions (MEWD, 1997). However, earlier in 1996, the Water, Sanitation, and Health Education (WASHE) concept had been adopted by the government. The WASHE strategy is aimed at facilitating community involvement in the assessment of water and sanitation priorities, management, operation and maintenance, determination of appropriate, sustainable and affordable technologies to adopt, promoting sanitation and hygiene, etc., with the view of improving the delivery of water supply and sanitation services in the rural communities. The District WASHE committees (D-WASHEs) through the Community-based WASHE committees are responsible for the implementation of the WASHE strategy. Furthermore, in 2003 the government established the Rural Water Supply and Sanitation Unit (RWSSU) to support the implementation of the National Water Policy in rural areas (WaterAid Zambia, 2010).

The 1994 National Water Policy was revised in 2010 to bring it in tandem with modern principles and practices of water resource management and to provide a policy framework for addressing a myriad of crosscutting issues and challenges in the sector and to reiterate efforts towards effective water resource management (MEWD, 2010). Further, the Water Resources Management Act was enacted in 2011 to govern water resource management, effectively replacing the defective 1948 Water Act which tended to violate the best practices of water resource management because it promoted a centralised water governance system with inadequate stakeholder involvement, among other weaknesses (MEWD, 2011).

The government also launched WRAP in 2001 to support the sector reforms of the 1990s. WRAP advocated for the underlying principles of the IWRM, founded on the Dublin principles including stakeholder participation in the management of water and sanitation facilities (Kampata, 2007; 2010). However, the IWRM/Water Efficiency Implementation Plan was developed in 2008, six years after the UN's World Summit on Sustainable Development (WSSD) held in Johannesburg in South Africa which had confirmed the importance of water resource management and recommended the implementation of IWRM across the globe (UN,

2002; MEWD, 2008). The MLGH through DHID implements the National Rural Water Supply and Sanitation Programme (NRWSSP) to build the capacity for effective and sufficient improvements in accessing water and sanitation facilities through a decentralised system (Nyambe, 2010; WAZ, 2010). Through NRWSSP, the government and its cooperating partners have since 2005 been implementing the Sustainable Operations and Maintenance Programme (SOMAP) to improve access to water supply in rural communities by increasing the operational rate of water points. The programme promotes community participation in the management of water points.

Several studies have been done in Zambia on demand-driven community-managed water schemes to establish their challenges, successes, and success factors. Evidence is mixed too. According to a 2009 sustainability study of rural community managed water systems conducted by WaterAid Zambia, the results from the study showed that there were failures of about 30 percent of water facilities especially where active or functional Water Committees were non-existent (WAZ, 2010). In another study by Shaw (2012), key findings illustrate that while water point committees were established to manage installed water points, the substantial majority were no longer fulfilling all their roles and responsibilities. Consequently, communities were frequently not collecting or managing sufficient funds to pay for repairs and maintenance. Hence, in the face of mixed evidence, the community management model is being challenged (e.g. Harvey and Reed, 2007). It is compelling, however, to explore the intrinsic success factors of those water systems under community stewardship. Best practices of the successful community managed schemes can potentially be used to ameliorate those schemes that are failing.

It is important to mention that there is limited research done in Zambia or elsewhere linking social capital to community management of rural water supply systems. One of such studies was done in Indonesia by Isham and Kahkonen (2002). This study sought to establish how participation and social capital affect community-based water projects. The researchers found evidence that social capital indicators positively affected the outcomes and impact of the water project for households with piped connections, but there was no association for public wells. The current study differs from the study by Isham and Kahkonen as it focuses on the interplay between social capital and community management and not on project outcomes and impact as the case is with the said study.

2.7 Overview of the study case

The Mulundu Community Managed Water Scheme is in Mwense District in Luapula Province of Zambia. Historically, the scheme has passed through many administrations. Originally, it belonged to Mwense District Council (1979-1997). It was later handed over to Mambilima Mission who operated it from 2002 to 2009. However, the mission could not continue managing the scheme due to huge expenses and free provision of water to the community. Hence, in 2009 the mission handed over the scheme to the community. Vision Africa Regional Network in partnership with WaterAid Zambia provided equipment, materials and capacity building to the community leading to the establishment of the board and management committees.

Currently, the water scheme is supplying water to 22 villages (divided into five sections) in the entire Mambilima Ward (Ng'oma, 2015). The ward has 378 households with 1,753 people (CSO, 2012). As a community-management scheme, the Mulundu Water Scheme started with 72 communal stand taps in 2009 but its network had expanded to 242 functional taps in 2015 (Ng'oma, 2015). In this regard, there is an average of 11 taps per village. The Scheme has been running since its take-over without major breakdowns. No cases of vandalism and theft have been recorded. Community members also meet to set the tariffs (Ng'oma, 2015).

The Scheme has a board and management committee consisting of six and ten members, respectively. Members of both the board and management committee work on a voluntary basis. Further, the scheme has three full-time waged employees (2 operators and 1 plumber). The Scheme is registered under the Registrar of Societies. The Scheme has a bank account where revenues are deposited regularly (Ng'oma, 2015).

With lack of vandalism, theft, or indeed breakdowns, as well as the expansion of its network and impressive operational rate, it shows that the Scheme is operating well. Additionally, community involvement in the form of voluntary management service, participation in setting up tariffs, suggest community buy-in and good prospects for the Scheme's viability. With this in mind, the study sought to unravel the factors behind the success and establish how social capital has been able to contribute to the success story of this project.

2.8 Chapter summary

Community-led management of water supply systems is a topical issue in Zambia and beyond. This management paradigm emerged in the 1980s following disillusionment with centralised management approaches. This chapter engaged scholarly work on and practice of community management of water and sanitation services in Zambia and elsewhere. This involved exploring studies on factors underpinning the viability of community managed rural water supply and sanitation services. The discussion demonstrated mixed evidence regarding the success of community-led management of water supply systems globally, regionally and in Zambia. Nevertheless, it has been established that there are four factors that underpin the success of community management which are, *participation* of community members, *cost-sharing* for operation and maintenance through contributions in cash or kind by community members, community *control* over operations and maintenance, and a sense of *ownership* of service facilities. The chapter also revealed a gap existing in the literature linking social capital and community-led management of water supply systems.

Building on the literature review above, the next chapter explores the concept of social capital, the theory which informs this study. The discussion of social capital looks at its historical origins, its perspectives, its principles, types, forms and levels.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Introduction

This chapter presents a detailed discussion of social capital, which is the theoretical base of the current study. The discussion first highlights the historical origins of social capital and its multiple definitions. It then presents the perspectives advanced by various scholars and philosophers. Thereafter, the principles of social capital are discussed including trust, networks, reciprocity, solidarity, concern for future generations and expectations about future cooperation. The chapter further presents the types of social capital, followed by the various forms and levels of measurements it renders itself to. Eventually, a critique of the theory is presented after which the conceptualisation and operationalisation of the variables is done.

3.2 Historical origins of the Social Capital concept

The birth of social capital is linked to the work of Lyda Hanifan in 1916 (Vilakazi and Dinbabo, 2014; Woolcock, 1998). Other authors have linked its intellectual origins to the works of early thinkers including Marx, Weber, Becker, Gramsci, De Tocqueville and Durkheim in their contributions to theories on group life, civicness, human capital, ideological hegemony, and social norms of cooperation (Ille and Dinbabo, 2014; Portes, 1998). However, as Woolcock (1998) notes, it is the work of Pierre Bourdieu (1986), Jane Jacobs (1961), Glen Loury (1977), and Jean-Claude Passeron (1970) which have influenced modern understanding of this concept. The concept has been developed further by contemporary thinkers including Alejandro Portes (1998), James Coleman (1988) and Robert Putnam (1993; 1995a, 2000), among others, bringing in more dimensions, applying the concept in practical multidimensional research settings, and heightening the discourse, even controversially.

The understanding of social capital is quite diverse and has shifted from a somewhat simplistic, context-detached and crude rendition to a more context-bound and pragmatic concept (Johnston and Percy-Smith, 2003; Woolcock, 1998). Ferragina (2013) and Portes (1998) also acknowledge this and further note that the concept of social capital is basically a new name for an old idea which attempts to synthesise the values of both communitarian approaches and the individualist rational choice framework. The theory evokes debates because it lends itself to multiple definitions, renditions and uses. Its broadness also avails itself as an ideal framework for interrogating many aspects in social sciences. But Portes (1998) notes that due to its diverse

application, social capital's original meaning and heuristic values have been put to test and may result in the loss of its distinctiveness.

There are three major contemporary perspectives of social capital advanced by three influential thinkers, namely Bourdieu, Coleman and Putnam (Tzanakis, 2013). The underlying differences in the ideologies of these three thinkers make the integration of social capital an uphill battle, but suffice to say that there are common traits in their conceptions.

3.3 Perspectives of social capital

3.3.1 Bourdieu's perspective

The first perspective of social capital was advanced by Bourdieu (1986), a French sociologist who was interested in explicating social space and reproduction of the society and how the dominant social classes maintained their hegemonic position on the ladder of the social structure. According to Bourdieu (1986: 88), social capital is "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership of a group – which provides each of its members with the backing of the collectively-owned capital, a 'credential' which entitles them to credit, in the various senses of the word". Bourdieu (1986) identifies three forms of capital, namely, economic capital, cultural capital, and social capital. Social capital, according to Bourdieu, does not come from, nor is it a form of either of the other capital, but it can be converted to economic capital. Social capital together with other forms of capital "explain the structure and dynamics of differentiated societies" (Bourdieu and Wacquant, l992: 119).

The emphasis of the Bourdieuian perspective is networking. Bourdieu (1986) posits that the size of social capital an individual has depends on the size of his/her networks and the size of capital (be it economic, cultural or symbolic) possessed by those networks. Bourdieu clearly sees social profit making as the core reason for people to engage and maintain networks. While social capital cannot be reduced to other forms of capital, it is nevertheless not independent because as Bourdieu (1986: 89) states, it "exerts a multiplier effect on the capital [people] possess". But as Portes notes (1998:4), Bourdieu's conceptions suggest that a person's social capital gains them direct access to economic resources such as "subsidized loans, investment

tips, protected markets". As such, Portes (1998: 3,4) further notes that social networks need to be institutionalised in group relations by investing in "economic and cultural resources".

Bourdieu's economic reductionism is portrayed in his use of financial metaphors such as "returns" and "investment cost" to elucidate social capital. This financial origin is also expanded by Giddens' (1990) analogue, by looking at social capital as:

> Trust networks that individuals draw on for social support, just like financial capital can be drawn upon to be used for investment. Like financial capital, social capital can be expanded – invested and reinvested. (Giddens, 1990: 78).

The analogue of social capital to economic capital basically commodifies social relationships and attaches financial value to it. The commodification of this resource however, has implications for those who would be creating social relations with the aim of gaining financial resources. What happens if the economic gains do not materialise? It is not always that social capital leads to financial gains, and reciprocity is not always time-bound or instantaneous much as it may be guaranteed.

According to the formulation of social capital by Bourdieu (1986), social actors occupy differentiated positions in the structure and their predispositions in the social space have an implication on the possession and activation of the resources (capitals). The differential positions of the social actors in the social space result in the reproduction of all forms of capital which in turn lead to the furtherance of the actors' positions. Hence not only does Bourdieu admit that social capital can lead to inequalities but in fact formulated his theory on Social and Cultural Capital to show how it led to inequality and strong class differentiation in France in the 20th century (Siisiäinen, 2000; Davies, 2001; Baum, 2000).

3.3.2 Coleman's perspective

The second perspective is by James Coleman. Coleman's (1988) formulations were more refined and largely influenced by Glen Loury (Portes, 1998) and were concerned with the role of social capital on the formation of human capital and academic outcomes (Narayan and Cassidy, 2001; Johnston and Percy-Smith, 2003; Coleman, 1988; Portes, 1998). Coleman (1988) defines social capital by its functions as:

> [A] variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors -whether persons or corporate actors - within the structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible. [Coleman, 1988: S98]

For Coleman (1988), (i) social capital is embedded in the social structure; and (ii) the goals of the social actors are to maximise utility in order to achieve their self-interest (Coleman, 1988: S95). Hence, Tzanakis (2013) deduces that Coleman's conception is basically in the middle line of two theoretical perspectives which are functionalist and rational theory. According to Tzanakis (2013), the functionalist aspect of Coleman's formulations are entrenched in the social action and social structure dichotomy whereas the rational theory is basically reflected in Coleman's argument that social actors are motivated by utility maximisation to achieve their ends.

While Coleman agrees with Bourdieu that social capital is intangible with indefinite character, he does digress from Bourdieu's formulation by arguing that it is a "public good" with those creating it only enjoying a limited portion of its benefits (Coleman, 1988: S116-S118). In other words, according to him, social capital does not benefit only those who create it, but even those who do not take part in generating it, the bystanders.

Coleman's appreciation of social capital as a "public good" (Coleman, 1988: S116-S118), with those generating it enjoying limited benefits of it, and with the benefits as such accruing to even those who did not in the first place participate in creating this good clearly isolates his formulations from those of Bourdieu who sees the creator(s) of social capital as the sole beneficiaries of its outcomes.

From his definition, it is clear that to Coleman, the concern is on production to meet particular ends which are impossible to achieve without its existence. His view clearly draws parallels between social capital and other forms of capital which are also concerned with production as the primary end. Coleman (1988: S98) further notes that social capital is not universal in that it can be useful in one aspect of social agency but not useful, or even "harmful" in other aspects of social actions. He however argues that as opposed to other forms of capital, social capital is embedded in the structure of social relations existent between and among social actors, not in the "actors themselves or in physical implements of production" (Coleman, 1988: S98).

3.3.3 Putnam's perspective

Robert Putnam's perspective is the third one. Putnam's (1993, 1995a, 2000) formulations are inspired by Coleman's theoretical principles (Tzanakis, 2013) and he is seen to be the most prominent advocate of social capital (Portes, 1998: 18). Putnam's perspective of social capital is underpinned by a communitarian model (Anderson and Larsen, 2006), and fundamentally a network-centred perspective (Putnam et al, 1993: 174). Putnam (1995a: 2) defines social capital as "features of social organisations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit". For him, human associations – face-to-face interpersonal relations generate networks, trust and norms of reciprocity (Keen et al, 2005).

In his formulations, Putnam (1993, 1995a, 2000) argues that civic engagement is the condition for coping with socio-economic challenges in the society. In his studies, Putnam (1993) established a relationship between social capital and successful regional governments. His findings showed that communities with abundant social capital achieved developmental goals, more so than those without or with low social capital.

Putnam adds a collective character to social capital by positing that "[w]orking together is easier in a community blessed with a substantial stock of social capital" (Putnam 1993: 35-36). Putnam ultimately applies social capital to studies on participatory democracy, civic engagement and draws a link between these and the achievement of development outcomes. Putman's (1993, 1995a) work provides evidence of the relationships between civic engagement and development, drawing from a wide array of his studies in Europe and America as far back as the 1970s. His extensive studies have produced empirical evidence showing the relationship between civic engagement and the social capital principles of norms and networks. His formulation clearly brings into focus the participatory perspective, with communities partaking in civic engagement seen to greatly benefit from it as it "powerfully affects the performance of representative government" (Putnam, 1995: 2).

Bourdieu, Coleman and Putnam do not have the monopoly in the contribution to the conceptualisation of social capital. However, they are the lead contributors and hence their work has been highlighted as the conceptual bases of the concept in this paper. The three definitions and conceptual arguments, as noted above, have levels of intolerance towards each other. However, there are common features in the conceptions which include reciprocity, networking and mutual support, trust, solidarity, and cooperation. Farr (2004: 9) aptly

summarises that "social capital is complexly conceptualized as the network of associations, activities, or relations that bind people together as a community via certain norms and psychological capacities, notably trust, which are essential for civil society and productive of future collective action or goods, in the manner of other forms of capital". People's behaviour towards each other are based on expectations to share particular norms and values and to get involved in activities which are mutually beneficial and reciprocative. Social capital should be understood as social relationships that individuals have, the values that individual social actors gain from the connections they have to their families, groups, communities and the social structure in general.

Pretty much like Coleman's functionalist's stance in his conception, Putnam's formulation is aligned to the functionalist theory (Block, 1975). In this view, Putnam views the society as functioning in harmony and collectively. However, this view undermines the relevance of Putnam's theory in the modern world's "highly stratified capitalist societies" (Vilakazi. 2013: 23). Putnam negates the unequal power relations, and as Franklin (2007, cited by Vilakazi and Dinbabo, 2014: 493) puts it, Putnam "undermines (the power) of social conflict and contradictions that persist".

The three definitions and conceptual arguments, as noted above, have levels of intolerance towards each other. Despite the various perspectives and contradictory conceptual bases, Narayan and Cassidy (2001) and Portes (1998) observe that "relations" lay at the heart of social capital theory. Social capital then is basically relational capital which is built by the behaviour of social actors and their interaction with each other and with the social structure. Several common features recur in all the formulations presented above. The features include reciprocity, networking and mutual support, solidarity, cooperation, concern for the future, and trust. It would be assumed, therefore, that the presence of these elements among community members and the water committees suggest the existence of social capital.

From the conceptions of Putnam, Bourdieu, and Coleman, it is evident that social capital is a crucial resource in the creation, maintenance and sustenance of relations at individual, family, community, as well as organisational or institutional level.

Social capital as a resource does not get exhausted with usage, but it does decrease with non-usage (Krishna, 2002). This makes this resource quite distinct from other forms of capital such as economic capital which tends to diminish with usage. This reaffirms the need to constantly

and consistently grow this resource through "repetitive interaction" (Landry et al 2001: 75) in order to increase its size and to gain even more benefits that come with it.

Apart from seeing it as a resource, social capital also promotes efficient use of other resources. According to Durlauf and Fafchamps (2004), the use of social capital promotes efficiency by bypassing irrelevant bureaucracies, and also saves costs and time. The caveat though, is that it can promote nepotism and corruption, as Hinman (1998) notes. Hence a clear line needs to be drawn between social actors, even corporate actors, and their actions or interactions in the social structure to ensure that social capital does not breed abuse or menaces such as corruption which are counter-productive at any level of development.

There are interesting views on the benefits of social capital. While Bourdieu (1986) sees social capital as a scarce and privately owned resource and whose benefits accrue only to those who generate it, Coleman (1988) sees it as a public good accruable to even bystanders who did not in the first place participate in generating it. But Putnam and Goss (2002) believe that this resource can be both a private and public good. Great exception needs to be taken in the case of the Bourdieuian viewpoint. Firstly, if social capital only accrues to those occupying advantageous positions in the society, those at the lower strata are starved of this resource leading to inequality and poverty, as Tzanakis (2013) also observes. Social capital needs to be non-excludable and therefore accessible/accruable to all. Secondly, private ownership of the resource creates social capitalists who potentially could abuse those with low social capital by making them subservient. This again is a recipe for social struggle and counterproductive to the very cause of social cohesion. Where there is a master-slave relationship, reciprocity and trust automatically disappear and so do social relations.

Ultimately, viewing social capital as a capital resource enables us to appreciate it as a key ingredient to creating networks at individual, community and organisational levels and in achieving efficiency and effectiveness in the use of other resources.

3.4 Principles of Social Capital

3.4.1 Trust

Trust is quite prominent in the discourses of social capital theory. While in other sectors of the literature it has been seen as an outcome (Woolcock, 2001), other scholars have depicted it as a constitutive component of social capital (Cote and Healy, 2001). For instance, Putnam (2000:

9) portrays "trustworthiness" as the most fundamental aspect of social capital, which is conspicuously less talked about in Bourdieu's conception. Putnam (2000: 21) thus says that "trust is the lubricant of social life". However, even he has not analysed trust in greater detail other than just seeing it as an endowment of the theory. Mollering (2001: 404) defines trust as "a state of favourable expectation regarding other people's actions and intentions" which is however, as Anheier and Kendall (2000: 9) assert, "fragile, once violated, [and] difficult to re-establish". Landry et al (2001: 75) view trust as the degree of confidence generated as a result of predictable and expected behaviour of social actors extending over a period of "repetitive interaction". According to (Cox, 1995; Dinbabo, 2013; Carciotto, & Dinbabo, 2013) trust enables tolerance and that communities or groups with it are better able to deal with social frictions which can arise as a result of having divergent interests during the course of their interactions. Cox's (1995) assertion basically migrates from the functionalist thinking of social capital by acknowledging that social conflicts are inevitable in collective settings. Further, because of its base on "expectations", individuals need to constantly fulfil what is expected of them in order to nurture trust. People also need to have a predictable pattern of behaviour in order to establish trust with others.

Putnam (2000) presents two types of trust. The first one is thick trust, which people have in individuals they are familiar with. The second one is thin trust, which people have in the people they do not know in the community, also called generalised trust (Putnam, 2000). In the generalised trust, people participate in collective actions not because they know each other but because they expect some form of reward from their actions (Newton, 2001). This kind of trust, as Siisiäinen (2000) notes, is basically a product of modern societies and shifts from the spheres of familiarity to somewhat complex and risky spheres where intimacy cannot work. When Beugelsdijk (2003: 141) says, "trust lubricates cooperation [and] cooperation itself breeds trust", it clearly implies that there is a bilateral, or rather symbiotic relationship between these aspects of social capital. Without trust, collective life and agency is impossible.

Trust is not static, but rather dynamic and ever-changing (Putnam, 2000; Stahl, 2009). Due to this, Flam and King (2005: 31) note that individuals can "detach[ed] themselves from old loyalties" and establish new social bonds. Trust then needs to be going through constant renewal through continued interaction because it is a volatile resource which easily fades with time.

Trust does have its problems. Flores and Solomon (1998: 207) for instance, note that while trust can be good, some people find it "burdensome" and "coercive". Hinman (1998) further notes that trust can lead to nepotism and corruption, perhaps as a result of too much trust which push people into collective illicit activities.

Mollering (2001: 404) notes that trust and reciprocity share the same linguistic identity with similar characteristics of "sharing, giving, expectation". This basically shows that trust and reciprocity have a mutual relationship. The next concept to discuss here, therefore, is reciprocity.

3.4.2 Reciprocity

Reciprocity is a term which has featured prominently in social capital theory. Gouldner (1959: 70) defines it as a "social rule that maintains, among other things that people should return favours and other acts of kindness". This is basically tied to expectations, or trust, as discussed above, where one has to return a favour *expected* by another social actor who previously performed an act of favour or kindness. The difference between trust and reciprocity is that the former is merely an expectation while the latter is an expectation that has been met.

Putnam acknowledges the importance of reciprocity in social networks and considers it as a "highly productive component of social capital" (Putnam, 1993:172). According to him, norms of reciprocity enhance social exchanges in dense social networks (Putnam, 2000). Referred to as generalised reciprocity, Putnam (2000:134) and Putnam and Goss (2002:7) describe it metaphorically as a question of "I'll do this for you now without expecting anything immediately in return, because down the road you (or someone else) will reciprocate my goodwill". Beugelsdijk (2003:141) defines generalised reciprocity as "a continuing relationship of exchange that is at any given time unrequited or imbalanced, but that involves mutual expectations that a benefit granted now should be repaid in the future". The fact that it is not time-bound sets reciprocity apart from legally-bound institutions or norms. It basically is a moral volition of individuals or a group of social actors to reciprocate for the favour or kindness they received at some point in the past. In this case, reciprocity becomes a lubricant in social exchange.

Similarly, for Coleman (1988: S102), reciprocity is essentially a "credit slip" – an obligation to pay back favour for the one received by a social actor. Analysing Coleman's view of

reciprocity, Tzanakis (2013) writes that the analogue of credit slip shows that social capital can be changed into tradable (fungible) resources which can then be obtained in a form different from the ones incurred in the first place. Bourdieu also acknowledges reciprocity, discussing it as gift exchange (Swartz, 1997). Bourdieu (1986) argues that social actors are strategists who manipulate and conform to the principle of gift-giving and counter-giving.

The practice of reciprocity has been connected to human existence from times immemorial. Molm et al (2007:205) contend that reciprocity has existed "from the kinship structures of primitive peoples, […] to the vast sharing of software and information on the modern internet, systems of generalized exchange have always been a ubiquitous part of social life". This connection to the orthodox heritage shows that the quest to return favour for favour and kindness for kindness is an old socially constructed tradition of humans and it is as old as human existence, and not a naturalist phenomenon as Putnam's (2000: 19) work tends to suggest.

3.4.3 Networks

Networking is at the core of social capital. Bourdieu (1986), Coleman (1988) and Putnam (1993, 1995a, 2000) all acknowledge that networks facilitate social relationships. Networks are defined as "a set of interconnected nodes" where an individual interacts with other individuals (Castells, 1996, cited in Baron et al, 2000:19). They essentially facilitate co-operation within or among social actors. This interaction facilitates the flow and exchange of information between or among the social agents. Putnam (1993) asserts that networks enhance civic engagement and allow for the mobilisation of resources for beneficial use and outcomes. Putnam (2000) further asserts that networks are based on reciprocity and trust. Put simply, therefore, networks are links among social agents which are based on the norms of reciprocity and trust. In regard to the current study, the availability of networks, trust and reciprocity would suggest the presence of social capital among community members.

3.4.4 Cooperation, solidarity and concern for the future

According to Tuomela (1993), cooperation is a function of joint social action based on mutual agreement, explicit or implicit, with a 'we-attitude' and 'we-intention' among the social actors. The agreement does not necessarily need to be a formal agreement (Axelrod, 2006). Clearly, cooperation is the unity or togetherness of the people in a community emanating from their associations. This oneness encourages participation of community members for the benefit of

all the members. Putnam (2000) notes that networks, reciprocity and trust produce cooperation for mutual benefit. The standard hypothesis among social capital scholars is that cooperation enhances welfare in that collective gains positively benefit group members (Knack, 2002).

Pretty much like cooperation, literature suggests that solidarity towards a common cause and concern for the future are all products of networks, reciprocity and trust (Putnam, 1995; Newton, 2001; Krishna and Uphoff, 2002; Carciotto and Dinbabo, 2013; Ille and Dinbabo, 2014). They are also critical aspects of social behaviour on which social capital is founded. While being considered as products of trust, reciprocity and networks, various social capital scholars have measured them separately from these three aspects of social behaviour (e.g. Krishna and Uphoff, 2002; Dinbabo, 2013). In view of the current study, reciprocity, trust, networks, cooperation, solidarity, and concern for the future have been measured separately, following precedence from other social capital scholars.

3.5 Types of Social Capital

The literature suggests three types of social capital which include bonding, bridging and linking (Dinbabo, 2012; Dinbabo, 2013; Ille and Dinbabo, 2014; Fine, 2010; Hero, 2007; Sabatini, 2006; Woolcock and Sweetser, 2002; Putnam, 2000; Granovetter, 1973). Sabatini (2006: 22) explains *bonding* social capital as "informal networks of strong family ties", *bridging* social capital as "informal networks of weak bridging ties connecting friends and acquaintances" and *linking* social capital as "formal networks connecting members of voluntary organizations". Other scholars agree with him (Dahal and Adhikari, 2008; Hero, 2007; Woolcock and Sweetser, 2002). A detailed explanation of these types of social capital follows.

3.5.1 Bonding social capital

Scholarly work shows that bonding social capital is a vital form of social capital (Fine, 2010; Putnam, 2000; Woolcock, 2000; Dinbabo, 2011). However, the word *bonding* is not new in social theory as its presence can be traced to the sociological works of Hirschi (1969) in the 1960s. Bonding, according to Hirschi (1969, cited by Vilakazi, 2013: 30) is the "attachment to, commitment to, involvement and belief in" people one is familiar or related to. Hirschi's (1969) definition is quite close to the ones advanced by most contemporary social capital scholars, and also suggests the presence of trust and reciprocity just like Putnam's (2000) conception of social capital.

Woolcock and Sweetser (2002: 26) describe bonding social capital as connections individuals have with other people, be it "family, relatives, kinship". This type of social capital is in essence the relationships existent within groups that are homogenous. Hero (2007: 28) notes that Putnam conceives bonding groups as those that are "exclusive and inwardly focused". Hill and Matsubayashi (2005: 218) operationalise bonding groups as "fraternal organizations, labour unions, fraternities, sororities, farm organizations, study clubs, and professional societies". According to Putnam (2000), in bonding social capital, ties are stronger, mostly homogenous and important to social actors in "getting by".

Bonding social capital, in a greater sense presents itself as the first level of social capital accumulation. Its significance can be understood from the sociological concept of socialisation, in which family members, for instance, provide the first level of the socialisation process of an individual (Kendall, 2007). Bonding social capital can also be looked at as the basis for two other types of social capital, bridging and linking. Hence it is a very vital space in the process of accumulating other types of social capital. Additionally, bonding social capital as the first level in the socialisation process means it is also a primary source of emotional support and growth, essential to social actors.

The limitations of this type of social capital may be in the form of free-riding tendencies, where people feel others would provide resources for them just because they are connected to one another. In other words, other people may suffer from abuse as a result of closer relationships with others, while some sections of the society may develop dependency on others. This argument is quite applicable when social capital is understood to be the basis on which other forms of capital resources can be accessed. Lastly, bonding social capital can be monotonous in the sense that people would be engaging with the same people (i.e. family, relatives and kinship) over and over again, especially where this form of social capital does not provide linkages to bridging and linking social capital. Hence, Rumbaut (1977, cited by Portes, 1998: 17) deduces that "family ties bind, but sometimes these bonds constrain rather than facilitate particular outcomes". Social capital when perverted can trigger several other negativities including power struggle and, as noted by Colletta and Cullen (2002) violent conflict as was the case in Rwanda. Hence bonding social capital can and does work against itself.

3.5.2 Bridging social capital

Bridging social capital denotes connections individuals have with others unlike them, demographically speaking (Woolcock and Sweetser, 2002: 26). It brings people of different backgrounds as well as diverse social statuses together. According to Putnam (2000), there are weaker and heterogeneous ties in bridging social capital but enable people in "getting ahead". Putnam agrees with Granovetter (1973) that bridging social capital tends to have weak ties, as opposed to bonding social capital which is characterised by strong ties. Siisiäinen (2000: 4) indirectly refers to this type of social capital as "a world dominated by contingency, complexity and risk" and asserts the need for trust in order to lubricate bridging. It encompasses people with distant relationships such as workmates and loose friendships.

Hero (2007: 28) notes that Putnam conceives bridging groups as "inclusive, open groups that reach out to others and that are ostensibly focused on a larger public good". It involves bringing together social actors who are unfamiliar with each other, such as loose friends and acquaintances (Woolcock and Sweetser, 2002: 26). Hill and Matsubayashi (2005: 218) operationalise bridging social capital by identifying bridging groups as "service clubs, veterans' organizations, political organizations, sports associations, school service organizations, and hobby organizations". Membership in such groups suggests that social actors have bridging social capital.

Putnam's (2000) thesis of social capital suggests a high level of wellbeing of the society where civic engagement and civic association embody bridging more than bonding. In this sense, bridging is seen to have an edge over closer ties which characterise bonding social capital. However, other studies argue that bridging social capital involves risk-taking because people tend to be unfamiliar to one another, a tendency which breeds low levels of trust (Siisiäinen, 2000). In this case, the interpretation and perhaps the perceptions of the social actors are crucial in the creation of bridging capital – the choice to take risks.

Bridging social capital has been seen to be most vital in solving community problems through networking of the diverse groups which are faced with similar challenges (Carroll, 2001), but it requires higher levels of trust and reciprocity (Bourdieu, 1986). This is perhaps as a result of weak ties which come because of unfamiliarity with each other within the heterogeneous groups. Putnam (2000) asserts that bridging social capital is relevant in leveraging resources in the communities through collective actions of the social actors sharing the same memberships.

3.5.3 Linking social capital

Linking social capital exists when people have connections to those in positions of "power", be it financial or political (Woolcock and Sweetser, 2002: 26). According to Cote and Healy (2001: 42), linking social capital happens when there are "relations between individuals and groups in different social strata in a hierarchy where power, social status and wealth are accessed by different groups". For instance, a community member's relationship with the District Commissioner in Mwense District would exemplify linking social capital. In other words, linking social capital is the connectedness to formal structures such as the private sector, and government agencies, representatives of the public, etc. Fine (2010: 29) notes that linking social capital is used "variously, and at times ambiguously, to refer to links across hierarchies, power relations, and from 'lower' to 'higher' levels, as in connecting the state to civil society or local government". People utilising linking social capital have leverage to various socio-economic resources from formal institutions beyond their close ties or communities (Woolcock, 2001).

Linking social capital clearly is hinged on formal relationships, as opposed to bonding and bridging social capital which are largely informal relationships between or among social actors. It also juxtaposes people based on class – the haves and the have-nots – and it is more hinged on power relations. Linking social capital also acknowledges social inequality by recognising the existence of social classes, but also suggests that relations are unidirectional, with those at the lower strata benefitting from those in the power strata but not the other way round. In terms of the level of "trust and reciprocity", Granovetter (1973: 1373) notes that linking social capital has far weaker ties than bonding and bridging social capital.

From the discussion of the three types of social capital, it appears that these are the levels of social capital to a greater extent, and are connected to each other. For instance, bonding social capital is the entry point in the accumulation of social capital. It can be argued that bonding social capital potentially leads to bridging social capital. Bridging social capital appears to be an intermediary space and connects those with bonding and bridging capital to those with power and influence at the top of the hierarchy, leading to the linking social capital. In this case, an individual with bonding social capital can gain access to civil society organisations in the bridging social capital and civil society organisations connect that individual to formal structures such as government institutions. It is of course not as simplistic as said above, and studies need to be conducted to interrogate this assumption.

The current study focuses on the first two types of social capital, bonding and bridging, thereby considering social relationships at both household and community levels. Considering that the target area is rural, ties are likely to be strong and homogenous within villages, while weaker and heterogamous across villages.

3.6 Social Capital forms and levels of measurement

Social capital takes two forms – cognitive and structural (Grootaert and van Bastelaer, 2002; Krishna and Uphoff, 2002). According to Grootaert and van Bastelaer (2002), cognitive social capital focuses on norms, trust, attitudes, values, and beliefs shared by people and it is normative and intangible. Structural social capital on the other hand "facilitates information sharing and collective action and decision-making through established roles and social networks supplemented by rules, procedures, and precedents" (Grootaert and van Bastelaer, 2002:3). As opposed to the cognitive social capital, structural social capital is relatively objective and externally constructed. These two forms of social capital can be complementary. Cognitive bonding at household level can have effects on structural arrangements within the community and the community organisations where people share memberships.

There are three levels at which social capital can be utilised and measured. Ferragina (2013:51) asserts that the three levels include "individual [or household], meso- (communities/organizations) or macro- (states/regions) levels". The outcome at each level, Ruuskanen (2004) notes, is used to quantify the impact of social capital. The unit of analysis in this study is the household.

3.7 Critique of the theory

Social capital theory has been criticised for "economic determinism" (Tzanakis, 2013:3) because of its focus on the economic value of social relations and seeing it as the ultimate purpose and source. Navarro (2002) also problematises the theory for its obsessive focus on capital accumulation as the primary purpose of social action. The Bourdieuian perspective has been reprimanded for attributing human action as being interest-bound and utilitarian-orientated (Swartz, 1997:78, 100), placing self-interest and/or individualism of social actors in their pursuit of capital in whatsoever form it presents itself. The communitarian approaches advanced by Coleman's and Putnam's formulations have received a considerable amount of

criticism owing to their functionalist overtones and failure to recognise inequalities and conflict (Tzanakis, 2013).

The business of measuring social capital is also tricky. As a multidimensional concept, Sabatini (2006) notes that researchers have not agreed on particular standardised indicators for measuring it, hence their empirical work derives from diverse measures which make it difficult to assess due to incomparability of the study designs and formulations. Worku (2008) asserts that quantifying social capital presents a difficult econometric problem. Its multidimensional nature problematises it, let alone its conceptual fuzziness as a result of failure to clarify the transition from one level of social capital to the other (Portes, 1998).

Fine (2010:111) also sharply criticised social capital, seeing it as a tool and political stratagem used by the World Bank to legitimise the shift from the Washington to the post-Washington Consensus at the "expense of the (developmental) state that had proved so effective in questioning the Washington Consensus, especially by reference to the East Asian NICs". Essentially, Fine (2010) argued that social capital was promulgated by the World Bank to achieve its political ends.

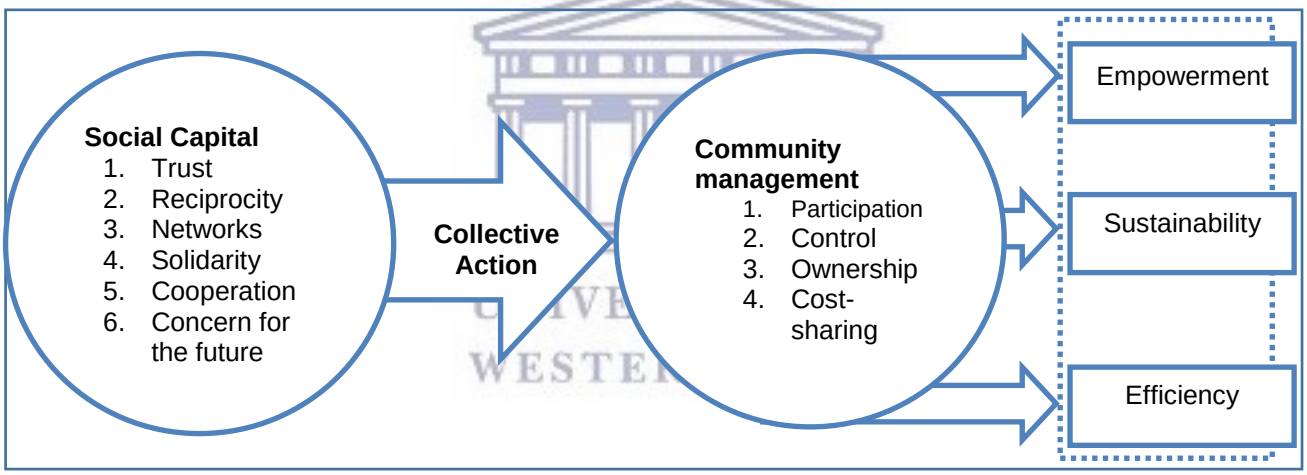
The conflict in Rwanda, which saw one ethnic group rising against another group depicts the dark side of social capital and how power relationships can undermine peace and social cohesion (Colletta and Cullen, 2002). Thus, in so far as social capital has overly been idealised as a magic wand for social cohesion and upliftment, there are instances where it can and does work against itself and lead to violent conflict when it is perverted.

Lastly, the theory has been criticised for not appreciating negative social capital, as the case of the Italian mafias and the Ku Klux Klan in the United States of America with "abundant negative externalities" (Fukuyama, 2001:8). Woolcock (1998:165) also notes that [bonding] social capital can be negative for placing "high particularistic demands on group members, thereby restricting individual expression and advancement". These criticisms do not impede the application of the theory in the study, as its functionalist aspect is the main interest sought in the study.

3.8 Conceptualisation and operationalisation of concepts

According to Babbie (2007:133), conceptualisation is the "refinement and specification of abstract concepts". It involves specifying what it means by particular concepts. In this study, the concepts "effective community management" and "social capital" are given specific nominal definitions to fit the current inquiry. Related to the conceptualisation is operationalisation. Operationalisation involves the specification of the concepts into measurable terms called indicators (Durrheim and Painter, 2006). It involves developing specific procedures that would lead to empirical observations of the real world represented by the concepts. In other words, it is a stipulation of what the researcher should do and the type of data to be collected to measure the variables. Below is the conceptual model showing the interplay between social capital and community management.

Figure 2: Conceptual model of the interplay between variables



Source: Own illustration

3.8.1 Community management

This is the practice of facilitating the proper functioning of a community project by community members. With regard to the application of this concept to the water sector, the study takes the principles of community management (participation, control, ownership and cost-sharing) as discussed above as the key variables operationalised as follows:

a. Cost-sharing: The contribution made by a household to sustain the operations and maintenance of the water scheme (measured by willingness to pay more for service

delivery and willingness to contribute materials and labour towards the operation and maintenance of the scheme).

b. Participation: The active involvement in the activities of the water scheme (measured by attending meetings and taking part in electing the management committee).
c. Control: The direct or indirect engagement in strategic decision-making regarding the operations and maintenance of the water supply system (measured by making decisions on tariff setting and O&M).
d. Ownership: The awareness that the water supply system belongs to the community and taking conscious efforts to safeguard water facilities and efficiently using the water resource (measured by prevention of Non-Revenue Water (NRW) by reporting on leakages, damages, blockages; and safeguarding service facilities by reporting on vandalism and theft).

3.8.2 Social Capital

This definition is based on Putnam's (1995a: 67) widely used definition, involving "features of social organisation, such as networks, norms and trust that facilitate action and cooperation for mutual benefit". Putnam's definition encompasses both forms of social capital – cognitive (norms, trust) and structural (networks). This study considered both the cognitive and structural forms of social capital and the dimensions which formed the Social Capital Index (y variable) were as follows:

a. Trust: According to Mollering's (2001:404) definition, trust is "a state of favourable expectation regarding other people's actions and intentions". It was measured by asking respondents in whose charge they would leave their children in the event that they left the village for Lusaka City (over 800 kilometres) for a day or two to visit their sick relative.
b. Reciprocity: This is a social rule which places obligation on an individual to return favour or kindness. It was measured by looking at how strongly respondents agreed or disagreed with the statement that, "People here look out mainly for the welfare of their own families, and they are not much concerned with the welfare of this community."
c. Networks: It was measured based on how people would respond to natural disasters (rainstorms and floods), where households would have to respond either as individuals or collectively as a community in the event that rainstorms hit the area and Luapula River flooded, causing damage, injury or death to property, people and animals.

d. Solidarity: This refers to the willingness to put aside one's own welfare and that of one's family to concern oneself mainly with the welfare of one's community.
e. Expectations about future cooperation: This has bearing on the willingness of the households and community members to come together to protect/preserve resources for their own activities in the future.
f. Concern for future generations: This is the willingness among households to exploit resources for present needs or the preservation for future generations.

3.9 Chapter summary

Social capital is quite a broad theory which lends itself to multiple applications and renditions. The discussion of social capital in this chapter highlighted the theory's historical origins and its multiple definitions. The discussion reviewed the various perspectives of social capital, particularly those advanced by Bourdieu, Coleman and Putnam. Despite the differences in these perspectives, networks, trust and reciprocity undergirded the formulations of social capital in all perspectives. The principles of social capital discussed included trust, networks, reciprocity, solidarity, concern for future generations and expectations about future cooperation. The chapter further presented the types of social capital followed by the various forms and levels of measurements it renders itself to. The various types and forms of social capital impinge on the density of networks as well as the thickness of trust.

The next chapter presents a detailed methodology and research design employed in the current study. The methodology provides a scientific blueprint or procedure through which the study was conducted.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

Every research project ought to have some form of a blueprint, in other words, a design. Jensen (2002) asserts that an empirical inquiry needs to have theoretical and methodological structuring. He thus posits that "to design an empirical study is to identify and delimit a portion of reality – which is to be examined with reference to a theoretically informed purpose, or conceptualisation, and according to a systematic procedure of data collection and analysis" (Jensen, 2002:237). This chapter presents the methodology and research design employed in the study. Thereafter, a discussion follows on sampling, data collection and data analysis techniques as well as how fieldwork was done. Ethical considerations and limitations of the study are also presented.

4.2 Study design

This study employs a single-case mixed method research design. The literature shows that mixed methods either combine, integrate, or mix qualitative and quantitative methods (Morgan, 2007; Henn, 2006). Johnson and Onwuegbuzie (2004:14) contend that mixed methods lead to "superior research" because of the methods' "methodological pluralism and eclecticism". The use of mixed methods in this study allowed the researcher to arrive at insightful conclusions and to expand the understanding of the phenomenon under investigation through in-depth and numerical data as well as triangulation of data reflecting both the objective and subjective realities concerning the relationship between social capital and involvement in community management of the water scheme. The mixed method approach also allowed the researcher to take advantage of the ontological and epistemological strengths of both qualitative and quantitative designs to describe, analyse, and interpret the data.

4.3 Sample size and sampling

Sampling is a process of selecting observations (Babbie and Mouton, 2001). It allows researchers to arrive at required sample elements of the population of study on which conclusions are made. The study population in the 22 villages was 378 households in Mambilima Ward (CSO, 2012). Using an online sample calculator, sample size was calculated

to be 191 households, at accepted margin of error of ±5% and confidence level at 95% (Creative Research Systems, undated).

In terms of sampling techniques, the two methods employed in this study included (i) systematic random sampling for the quantitative part; and (ii) purposive sampling for the qualitative part (focus group discussions (FGDs)) with community members and the management committee of the water scheme.

According to Babbie (2007), systematic random sampling is a type of probability sampling technique in which every k^{th} element in the total list is chosen (systematically) for inclusion in the sample, with a random start. With this sampling technique, the selection process is free from bias as every member of the population has equal chances of selection. In the current study, a list of all households was obtained from the village headmen in each village. The villages did not have the same number of households, but for purposes of having equal representation from each, the 191 households sample was divided among the 22 villages, obtaining an average of 9 households per village which were systematically picked from the lists to participate in the study.

Purposive sampling on the other hand is a non-probability sampling technique which involves choosing respondents based on the researcher's knowledge of the population and research aims (Babbie and Mouton, 2001). This type of sampling is essentially based on the researcher's judgement and most commonly used in qualitative research. Five water committee members were purposively selected for focus group discussions. They included the committee vice chairperson, secretary, treasurer and two ordinary members. The management committee members were chosen based on their positions in the scheme and experience in managing the scheme's activities. Furthermore, 22 community members from 22 villages were purposively sampled for FGDs. It should be noted here that the goal was to have between 10 and 12 participants. However, due to massive interest among community members, there was oversubscription, and people could not be turned away.

4.4 Data collection methods and fieldwork

During the fieldwork stage, quantitative data was gathered using a questionnaire. Langdridge and Hagger-Johnson (2009) contend that a questionnaire is a very valuable method for collecting data from a large number of research participants for the purpose of statistical

analysis. In the current study, 191 questionnaires were administered to 191 households. The data collection tool was pre-tested for quality assurance and adjustments were made to reduce/condense the number of items**.** Following the adjustments to the questionnaire, fieldwork commenced with five Assistant Data Collectors. Data collection took six days.

Focus Groups were another technique used to collect qualitative data. Bloor et al (2002:7) assert that discussions through "focus groups provide rich data on *group meaning* associated with a given issue" (*Italics in original*). Kamberelis and Dimitriadis (2005:902) contend that focus groups allow researchers to "explore group characteristics and dynamics as relevant constitutive forces in the construction of meaning and the practice of social life [and] to explore the nature and effects of ongoing social discourse in ways that are not possible through individual interviews or observation". Focus groups essentially provide a platform to collect rich data from participants through their engagement with each other and through collective introspection and retrospection. Hence, this technique was used to collect qualitative data. The purpose of Focus Group Discussions (FGDs) was to gather detailed information from community members and the management committee. The respondents were engaged using topic guides to guide the group discussions in bringing out collective salient dimensions through interactional dynamics. The interviewers were allowed to gain deeper understanding of the management processes of the Mulundu Community Water Scheme and the challenges of the management team and to understand the collective meanings of community members with regards to the scheme's water supply, their relationship with the management committee and the rest of the community. Each FGD lasted about one-and-a-half hours. Each FGD was recorded using a digital recorder. Consent was obtained from the participants to record the FGD's. Field notes were also taken for follow-up questions. The recorded data was then transcribed for analysis.

4.5 Data analysis

4.5.1 Quantitative data analysis

Data analysis refers to a search of patterns embedded in the data (Babbie and Mouton, 2001). Quantitative data was analysed using both descriptive and inferential statistics. Logit Regression modelling was used to establish the relationship between the y and x variables. A statistical computer-based programme for data analysis called STATA (Hamilton, 2012) was used for analysis. However, due to the quality issues of graphs from STATA, some data processed in STATA was inputted in Microsoft Excel to produce better graphs.

Table 1: Table showing the outcome variable and the independent variable

VARIABLES	ASPECT MEASUREMENT
Y = {Y1,Y2,Y3,Y4,Y5,Y6} Where if Y1+Y2+Y3+Y4+Y5+Y6>3 then Y=1, otherwise 0. **Involvement in Community Management**	Y1 = Willingness to pay more (Cost Sharing) Y2 = Willingness to contribute labour/materials (Cost sharing) Y3 = Attending meetings and electing leaders (Participation) Y4 = Decision making on tariffs and O&M (Control) Y5 = Preventing NRW losses (Ownership) Y6 = Safeguarding facilities (Ownership)
X_i = {X1+X2+X3+X4+X5+X6} **Social Capital Index**	X1 = Networks X2 = Trust X3 = Reciprocity X4 = Solidarity X5 = Cooperation X6 = Future Concern

All responses on dependent variables were coded as 0 and 1; 0 for a negative response and 1 for a positive response. For further analysis, instead of having six different dependent variables, a total score of all of them was considered, where if the total score was more than three for each observation, it was coded as 1 (probability of success), otherwise coded as 0 (probability of failure).

Social capital has been measured in different ways. Some studies have tended to use specific individual dimensions of social capital such as generalised trust, reciprocity, associational members (networks), to ascertain social capital, for instance, Putnam (1993), Knack and Keefer (1997), and Vilakazi (2013). Others have used social capital indices produced or advocated using Factor Analysis (FA) or Principal Component Analysis (PCA) to condense the number of variables (e.g., Vella and Narajan, 2006; Krishna and Uphoff, 2002; Grootaert, 1999). In this study, a Social Capital Index was generated using the six variables of networks, trust, reciprocity, solidarity, cooperation and future concern. The Social Capital Index variable was then regressed against the outcome variable using the Logit Regression Model. Furthermore, the Social Capital Index was regressed against the original six outcome variables. The choice of logistic regression was due to the fact that the outcome variable is binary. The general formula for the Logit Regression Model is $\log[p/(1-p)] = \beta_0 + \beta_1 * X_i$ where:

4. $\log(p/(1-p))$ is the outcome (y) variable 'involvement in community management'
5. β_0 is the parameter
6. $\beta_1 * X_i$ is the Social Capital Index

4.5.2 Qualitative data analysis

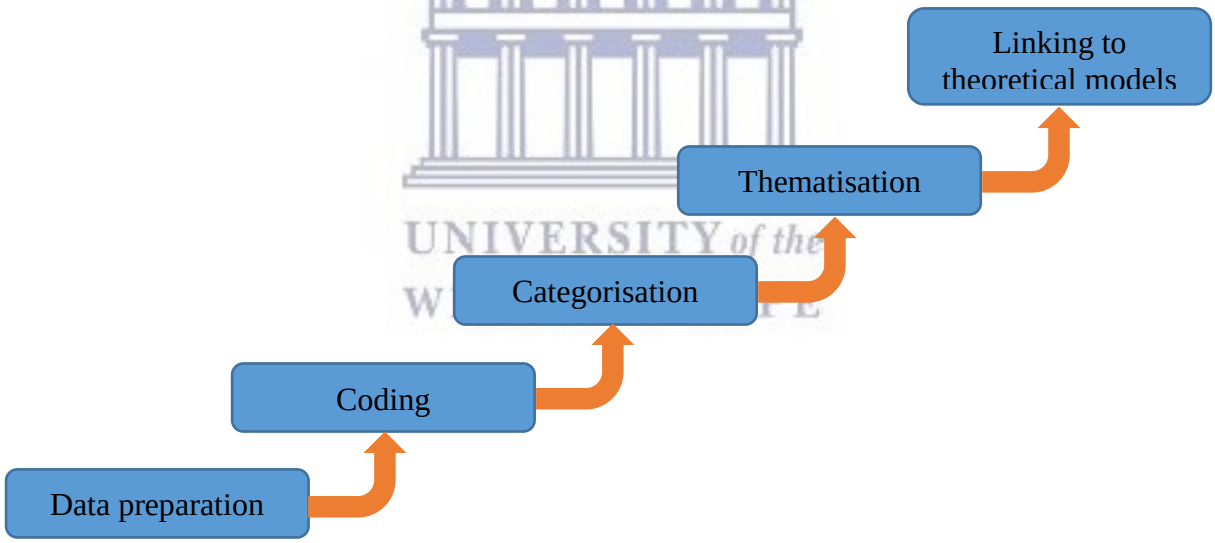
Qualitative data was analysed using the *meaning condensation* method (Kvale and Brinkmann, 2009) in order to extract the meanings inherent in the participants' responses. According to Kvale and Brinkmann (2009:207), in the *meaning condensation* method, "long statements are compressed into briefer statements in which the main sense of what is said is rephrased in a few words". The method involved the following steps:

Table 2: Steps in performing meaning condensation

Step 1	Reading and reviewing of each transcript to understand content. Helps in getting a sense of the expressed viewpoints
Step 2	Determining the natural meaning units of the text
Step 3	Sorting the statements found in step 2 into different themes
Step 4	Relating the meaning units and themes to the purpose of the study. Here, themes are examined and serve as answers to the research question[s]
Step 5	Tying together the essential themes of the interviews and writing a descriptive statement.

Source: Kvale and Brinkmann (2009:205 - 207)

Flowchart 1: Illustration of the stages of qualitative analysis



Source: Researcher's own illustration

4.6 Ethical statement

Conducting research places an obligation on the researcher not to harm the research participants either intentionally or otherwise. Babbie and Mouton (2001:521) note that carrying out research "often, though not always, represents an intrusion into people's lives". Invasion of privacy may sometimes be unavoidable. However, in this study, all necessary precautions were taken not to injure participants through invasion of their privacy or disclosure of any personal details to third parties. Assistant Data Collectors underwent a rigorous one-day training exercise to equip

them with the requisite skills for conducting ethical research. Hence, during fieldwork, they were able to discuss with each participant the purpose of the study and how the collected data would be used. Consequently, willing participants signed a binding consent document to protect both the researcher and the subjects. Names, addresses and other such biographic data of the respondents were concealed. Ultimately, no bodily or psychological harm was inflicted on participants based on their participation in the study as all precautions were upheld.

4.7 Limitations of the study

- Communities differ, and the case study being in a rural area, findings may not be generalisable to urban communities.
- Most data, particularly the dependent variables, were collected as categorical data which limited the space for manipulation.
- Not all households were ordered, so it was difficult to get to some sampled households, suffice to say the sample size was met.

4.8 Chapter summary

The study was premised on both the positivist and interpretivist paradigms. A single-case mixed method research design was thus employed to take advantage of methodological pluralism and eclecticism of both quantitative and qualitative methods. A total of 191 households were sampled from a population of 378 households in 22 villages. Sampling was done through both systematic random sampling for the quantitative part of the study and purposive sampling for the qualitative part. Quantitative data collection was done through a questionnaire and data thereof was analysed through both descriptive and inferential statistics in STATA. A logit regression model was developed for inferential statistical analysis. Qualitative data from the scheme's management committee and community members was collected through focus group discussions and analysed using meaning condensation. As per requirement for conducting ethical research, all ethical considerations including privacy and confidentiality were taken heed of, to eliminate any chances of harm to research participants.

The next chapter presents the analysis of the data collected as per methodological procedure stipulated in this chapter. The analysis also links the research findings to existing literature and theoretical models.

CHAPTER 5: ANALYSIS AND INTERPRETATION

5.1 Introduction

This chapter presents results from a detailed analysis and interpretation of data which was gathered through both quantitative and qualitative approaches. The presentation of the findings covers all aspects which were covered during data collection clustered into categories including demographics, household water usage, household expenditure and income, social capital, and involvement in community management. The regression model showing the relationship between the dependent and independent variables is also presented.

A total of 191 sampled households from 22 villages participated in the household survey. As stated in the previous chapter, the sample was from a total of 378 households. Furthermore, there were two focus group discussions (FGDs) as follows: (i) one FGD involved five management committee members of the water scheme; (ii) another FGD involved 22 community members. The planned number of participants for the FGD was between 10 and 12 people but community FGDs over-subscribed due to the high interest to take part in the discussions, hence they could not be turned away.

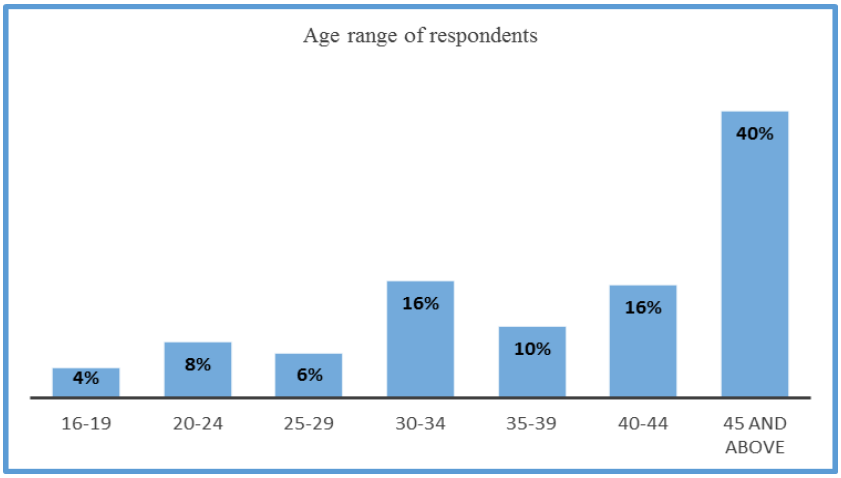
5.2 Demographic information

The main demographic information during the survey included an assessment of respondents' status in the household (head or not head), age, education level, gender, household expenditure, household income levels, as well as employment status.

5.2.1 Age of the respondents

Forty percent (40%) of the respondents interviewed were 45 years of age and above, 16% were between 40 and 44 years of age, and 26% were between 30 and 39 years of age. Furthermore, while 4% of the respondents were aged between 16 and 19 years, 12% were aged between 20 and 29 years of age. Given the age ranges, the right targets were reached to provide concrete and valid responses to the enumerators and to make logical and solid conclusions from the investigations.

Chart 1: Percentage distribution of respondents by age



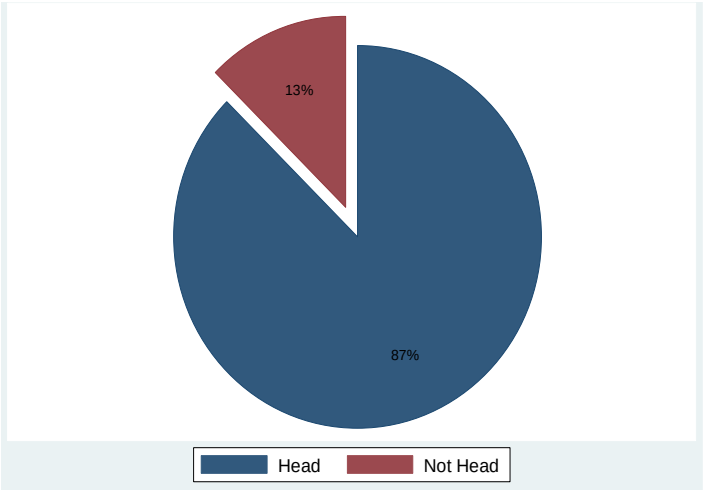
Source: Field Survey, 2016

5.2.2 Position of respondent in the household

Pie chart 1 shows that 87% of respondents were heads of households while only 13% were not, as they were either wives, children, caretakers, or dependants. Since the survey targeted individuals with some degree of experience in the management of household resources and in making decisions as well as participating in community activities, the findings affirmed the preferred audience interviewed. The position of the respondents in the household was important in ascertaining the quality of responses with regard to issues including household expenditure, income levels, participation in community activities and decision-making, etc.

Source: Field Survey, 2016

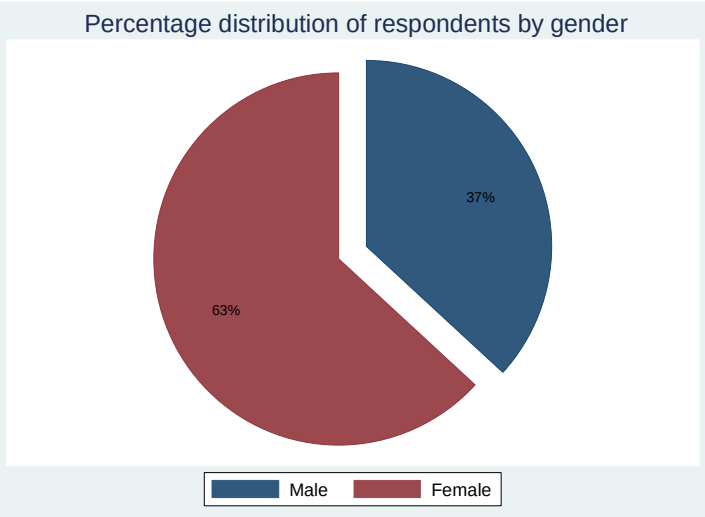
Chart 2: Percentage distribution of respondents by their position in the household



5.2.3 Gender of the respondents

Gender segregation is important in social sciences as gender affects many socio-economic issues including decision-making and participation in some socio-economic activities. Considering that issues of access to water greatly affect women and girls most often than men, knowing the number of females who participated in the survey was crucial. As captured on Chart 3, 63% of respondents were females while only 37% were males. This also affirms the fact that the survey was done on the right target audience who are usually found in the communities and who are affected by water issues on a daily basis.

Chart 3: Percentage distribution of respondents by gender

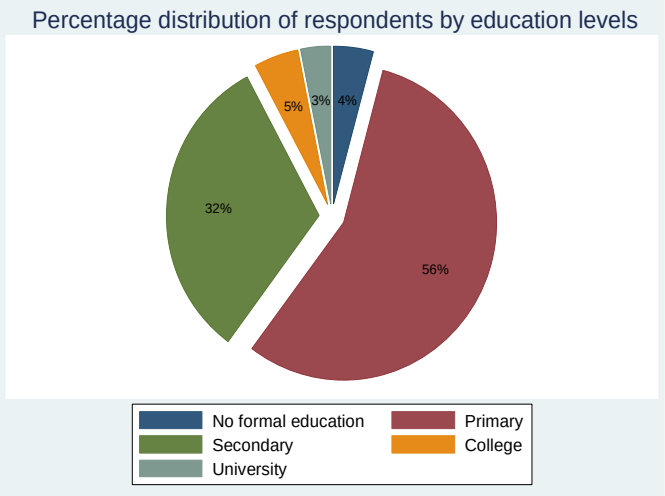


Source: Field Survey, 2016

5.2.4 Education level

Education is an important variable in surveys as it also impinges on the quality and solidity of the data collected. In the current study, it was established that the majority of respondents (56%) had attained primary education, while 32% had reached secondary school level. Furthermore, 5% reached college level while 3% reached university level. Only 4% of respondents did not have any formal education. With 96% of the respondents having an education of between primary and university level, there is reaffirmation that the questions were understood and the collected data met scientific research standards, within permissible margins of error.

Chart 4: Percentage distribution of respondents by education levels

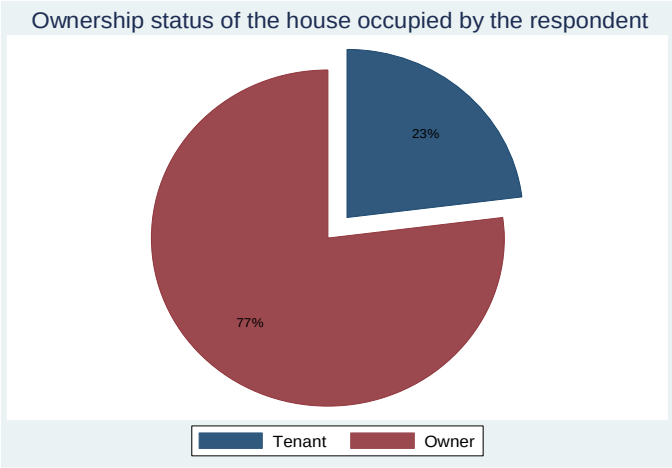


Source: Field Survey, 2016

5.2.5 House Ownership

Ownership status of the house or household has a bearing on issues to do with participation in community activities, willingness to pay, decisions regarding how much to pay for a water supply, whether to connect the household to individual connection or to rely on communal stand taps, or indeed what to contribute towards the management of water schemes. Hence, this variable was considered in the current study. The findings indicate that 77% of respondents were owners of the households while only 23% were tenants. The small percentage of tenants is essentially because the majority of the households are in the villages where renting houses is an uncommon phenomenon. With owners being the majority of respondents, clearly the target audience was reached to solicit appropriate responses on social capital and community management issues.

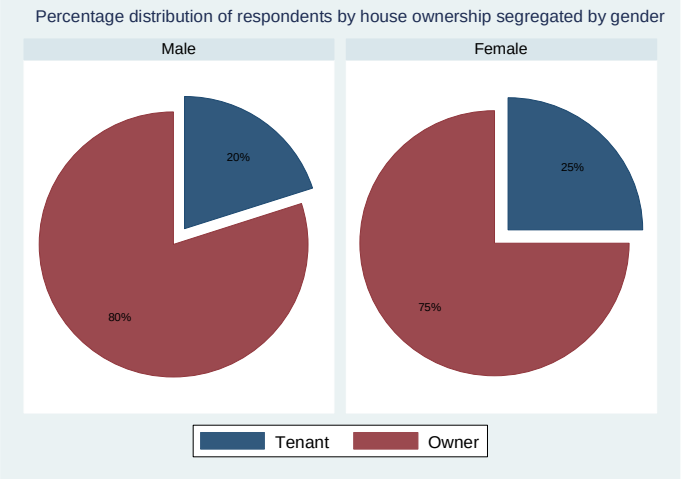
Chart 5: Percentage distribution of respondents by house ownership status



Source: Field Survey, 2016

Gender does not significantly affect house ownership. As can be seen from Pie Chart 6 below, while 80% of male respondents were house owners, 75% of female respondents were also house owners. Although there is a tilt towards males in house ownership, the difference is quite minimal as it would be expected that a significant difference would prevail especially considering that this is a typically rural patriarchal society. Women in this area are almost on par with men regarding the ownership of houses.

Chart 6: Percentage distribution of respondents by house ownership and gender

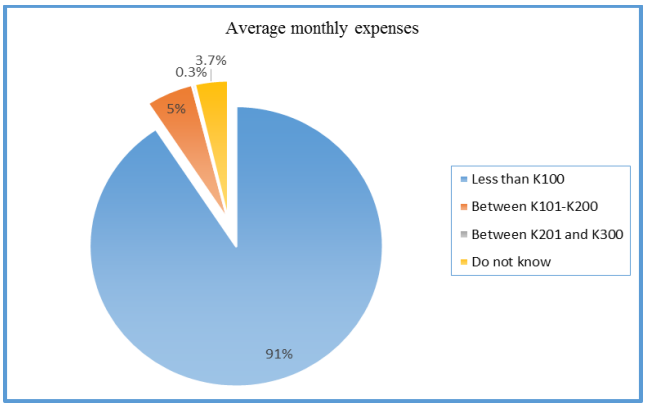


Source: Field Survey, 2016

5.2.6 Daily Expenses

One of the indicators of wellbeing and socio-economic status of people is their expenditure. Probing expenditure can provide a clue into how much people earn on average. It can also affect decisions regarding the pricing of goods and services. In the current study, 91% of households had their expenses of less than K100 (US$10) a day; 5% had average daily expenses of between K101 and K200; 1% were spending between K201 and K300 a day and 4% did not know their average expenses per day. With the rising cost of living, expenses of less than US$10 per day depict an unpleasant socio-economic indicator for this area. However, considering that the majority of the households were farmers, such low daily expenses are justifiable in that majority of the people are not spending that much on food, as they get it directly from their farms.

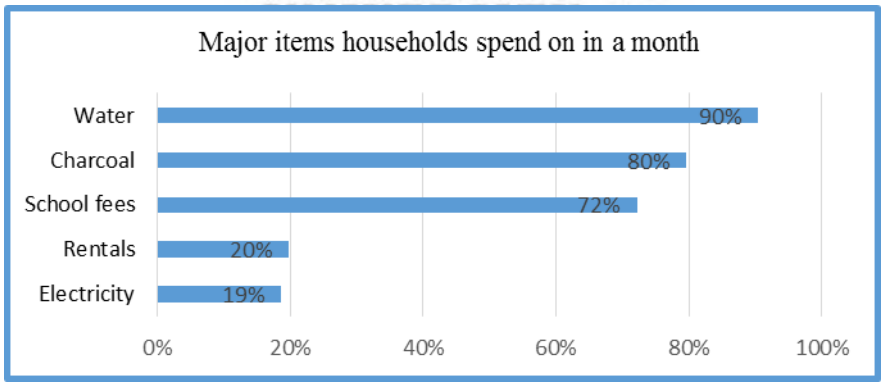
Chart 7: Percentage distribution of households by average daily expenses



Source: Field Survey, 2016

In terms of household spending, a multiple response question was posed to the respondents. Other than on food and groceries, the majority of households (90%) spent on water; 80% of households spent on charcoal while 72% of households spent on school fees. A total of 20% of households spent on rentals and lastly, 19% of all households spent on electricity. What comes out of these findings is that water is among the main commodities people spent on in almost all households. It needs to be noted that as a multiple response question, percentages do not add up to 100% as some respondents had expenses across more than one option.

Chart 8: Percentage distribution of households by what they spend on



Source: Field Survey, 2016

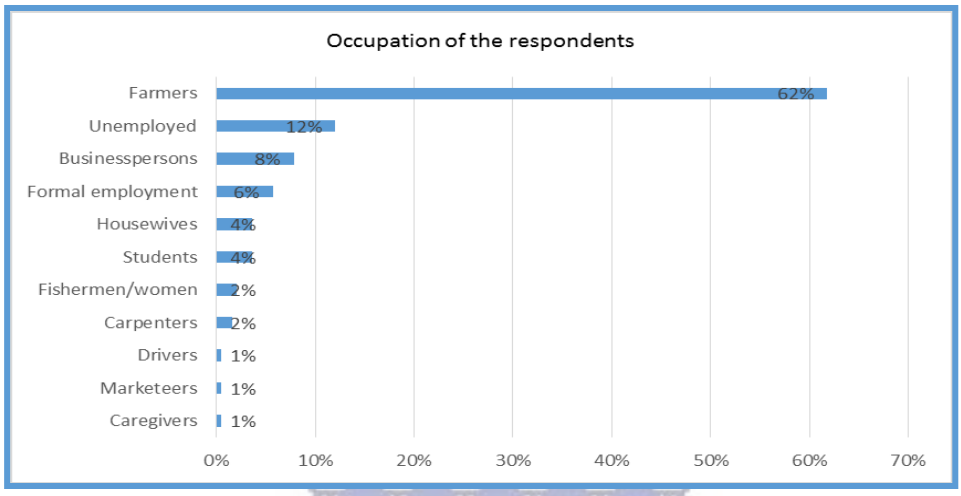
5.2.7 Employment status

In terms of employment, 62% of respondents were farmers, lower than national level statistics indicating that 89.4% of the rural population was engaging in agricultural activities (CSO, 2016). The findings also show that 8% of respondents were business persons. Furthermore, 6% of respondents were in formal employment, lower than national rate of formal employment

which is 11.4% of the employed population (CSO, 2013); 12% of respondents were not employed. The unemployment rate in the case area is slightly higher than the national rate which was at 9.2% (CSO, 2016). High levels of unemployment affect people's spending behaviour and their willingness to pay. The types of occupations clearly explain why the majority have low-income levels as discussed in sub-section 5.2.8.

Source: Field Survey, 2016

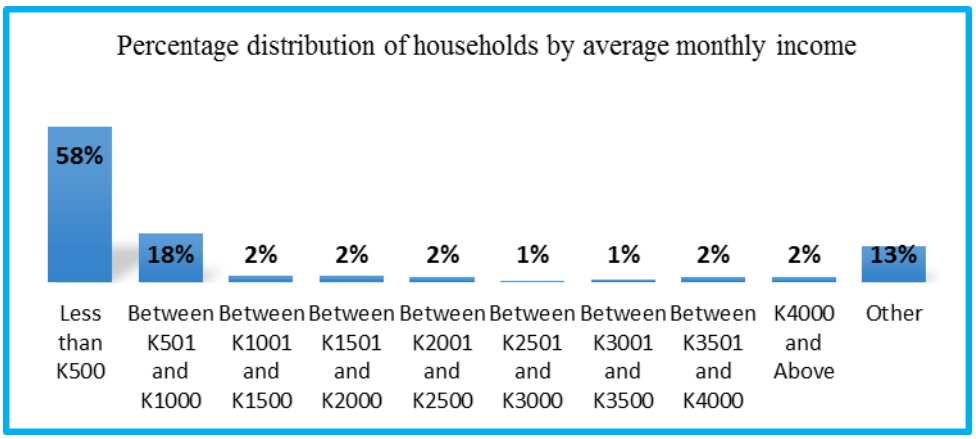
Chart 9: Percentage distribution of respondents by employment status



5.2.8 Income levels

The majority of households (58%) earn an average monthly income of less than K500 (US$50), while 18% earn between K501 and K1000 (US$50-US$100), and 10% earn between K1001 and K4000 (US$100 to US$400) per month. Only 2% earn above US$400. 13% of households earn some amount not specified on the data collection tool. According to the Living Conditions Monitoring Survey summary report for 2015, the average monthly income for the rural

Chart 10: Percentage distribution of households by average monthly income



Source: Field Survey, 2016

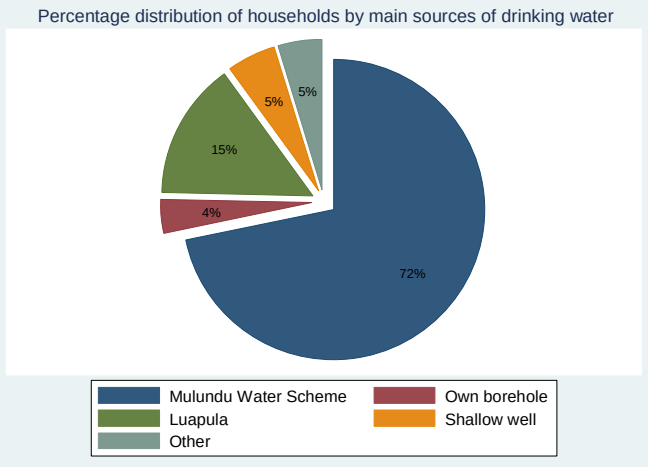
dwellers was K810 (US$81) (CSO, 2016), meaning that the majority of households in the current study were earning lower than the national average incomes.

5.2.9 Household Water Usage

5.2.9.1 Households' main water source

Of the 191 households surveyed, 72% reported Mulundu Water Scheme as their main source of drinking water, 15% said Luapula River was their main source. Furthermore, 5% reported shallow wells, and 4% reported private boreholes as their main sources of drinking water. 5% of households reported other sources of drinking water, mainly communal boreholes. Clearly, the scheme is the major source of drinking water and its operational status is crucial in ensuring that people have access to safe and clean drinking water.

Chart 11: Percentage distribution of households by main source of drinking water

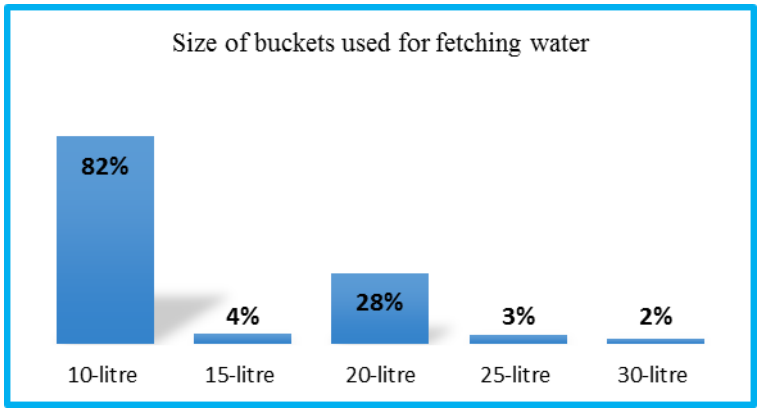


Source: Field Survey, 2016

5.2.9.2 Number of buckets used per day

In terms of the number of buckets of water used per household per day, on average 7 buckets are used, although the range of buckets used is between 1 and 11 buckets. Furthermore, in terms of the litre-sizes of the buckets used, these range between 10 litres and 30 litres, with the majority of households (82%) reporting that they use 10-litre buckets, while 28% of households reported using 20-litre buckets as captured on Chart 12. Given that an average of 7 buckets are used per household per day, of which the majority of households use 10-litre buckets, a total average of 70-litres are used per household per day.

Chart 12: Percentage distribution of households by litre-size of buckets used

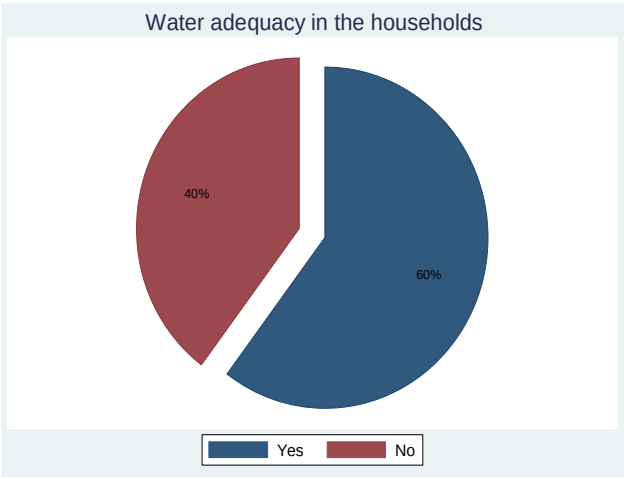


Source: Field Survey, 2016

5.2.9.3 Adequacy of water

The adequacy of the water was assessed based on households' perceptions of the adequacy of the commodity. According to the 2013-2014 Zambia Demographic and Health Survey by Zambia's Central Statistical Office, only 46.9% of the rural population have access to clean and safe drinking water (CSO, 2015). In the current study, 60% of households whose main water source is the scheme, said that the water is adequate for drinking and other domestic uses, 40% said it was not enough. Clearly, more people in the case area had access to water compared to the national rates for rural areas. Nevertheless, adequacy levels show that the scheme needs to improve the supply of water in order to make it adequate for more people.

Chart 13: Percentage distribution of households by adequacy of water from the Scheme



Source: Field Survey, 2016

5.2.9.4 Paying for water supply

All households whose main water source was Mulundu Community Managed Water Scheme indicated that they do pay some amount for water supply, while 22 households (about 12% of all households surveyed) whose main source of drinking water was not the scheme indicated that they do not pay for drinking water, representing an average of one household in each village not paying for water. In terms of households whose main water source was the water scheme, the range they paid for water was between K2 and K120 (US$0.2 and US$12) a month. The average amount each household pays per month for water is K22.68 (about US$2.3). The qualitative findings indicated that community members were being charged K50 (US$5) per month. The tariffs are within the 2016 NWASCO tariffs for low income households pegged at K85 for un-metered customers and K3.2 (US$0.3) per cubic meter of water from a communal water point (kiosks) (NWASCO, 2016).

Table 3: Household expenditure on water per month in Zambian Kwacha (K)

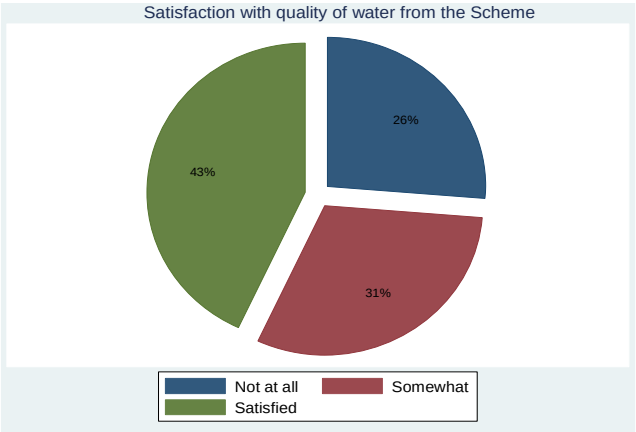
Variable	Obs	Mean	Min	Max
Expense on water per month	137	K22.68248	K2	K120

Source: Field Survey, 2016

5.2.9.5 Satisfaction with quality of water supplied by the Scheme

With regard to satisfaction levels pertaining to the quality of water supplied by the scheme, 43% of respondents were satisfied, while 31% were somewhat satisfied. However, 26% were not satisfied at all. The scheme needs to up the quality of service provision in order to improve satisfaction among community members as it has in previous studies been established that satisfaction affects community involvement (Mugumya, 2013).

Chart 14: Percentage distribution of respondents by satisfaction with quality of water from the Scheme



Source: Field Survey, 2016

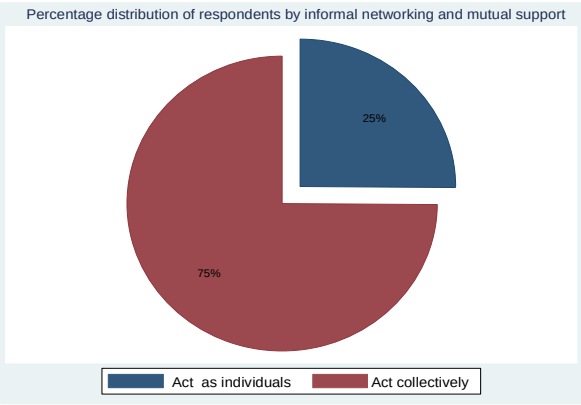
5.3 Independent variable - Social Capital

The six social capital dimensions considered for analysis included networks, trust, reciprocity, solidarity, expectations about future cooperation, and concern for future generations, in relation to Krishna and Uphoff's (2002) study.

5.3.1 Networks

Networking is a fundamental dimension in social capital. According to Putnam (1993), networking enhances civic engagement and facilitates resource mobilisation for beneficial use and outcomes. Grootaert and van Bastelaer (2002) further add that networks facilitate collective action. Several social capital scholars have measured or proposed to measure networks through memberships to associations and collective actions (e.g., Krishna and Shrader, 1999; Narayan and Pritchett, 1999; Eastis, 1998; Portney and Berry, 1998; Sampson et al., 1997). In the current study, networks as a variable was measured through people's responses to natural disasters (rainstorms and floods), where households would have either to respond as individuals or collectively as a community in the event that rainstorms hit the area and Luapula River flooded, causing damage to property and injury or death people and animals. A total of 75% of households indicated that they would act as a united community to support each other in responding to the calamity, while 25% said they would act individually and not together with the rest of the community. It does show that the majority of households have a sense of community and would join forces in order to lessen the burden of the disaster. Community members are connected to each other and willing to work together. The inspiration to measure networks through collective action was drawn from Krishna and Shrader's (1999) proposal and Krishna and Uphoff's (2002) study.

Chart 15: Percentage distribution of households by networking and mutual



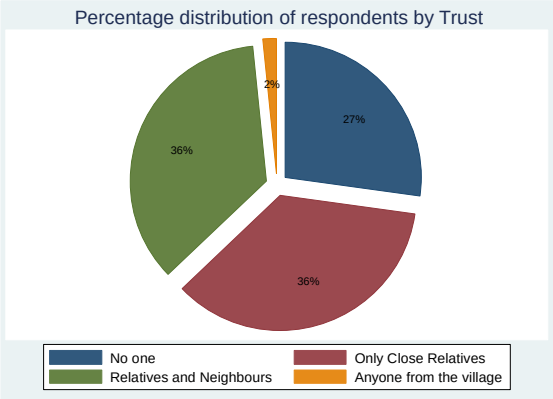
Source: Field Survey, 2016

5.3.2 Trust

Trust is another key dimension in as far as measuring social capital is concerned. The concept has been viewed differently by different social capital scholars. For instance, Putnam (1993) sees trust as a source of social capital, while Fukuyama (1995) equates it to social capital, and Coleman (1988) sees it as a form of social capital. To analyse and understand the concept in the current study, trust was considered as a component of social capital, just as it has been treated by other scholars (e.g. Krishna and Uphoff, 2002; Vilakazi, 2013). It was measured by asking respondents in whose charge they would leave their children in the event that they left the village for Lusaka City (over 800 kilometres) for a day or two to visit their sick relative.

The analysis revealed that 36% of respondents would leave their children with relatives and neighbours, while another 36% said they would leave their children with close relatives only. Furthermore, 27% said they would not leave their children with anyone, while only 2% said they would leave them with anyone from the village. The revelations point to the fact that the degree of trust varies, with a cumulative total of 73% of respondents showing some level of trust (willing to leave their children with someone) and 27% showing no trust at all. Previous cross-national studies have shown that trust is higher in less-polarised countries (e.g., Zak and Knack, 2001; Knack and Keefer, 1997). While the current study is not a cross-national study, high levels of trust can be attributed to the fact that Mambilima Ward is less stratified, with the majority of people having an average income of less than K500 and the majority of them in the same kind of occupation, farming. The levels of trust in the case area can also be attributed to the fact that the area is rural in nature with villages generally ethnically homogenous and with people having close ties.

Chart 16: Percentage distribution of households by Trust



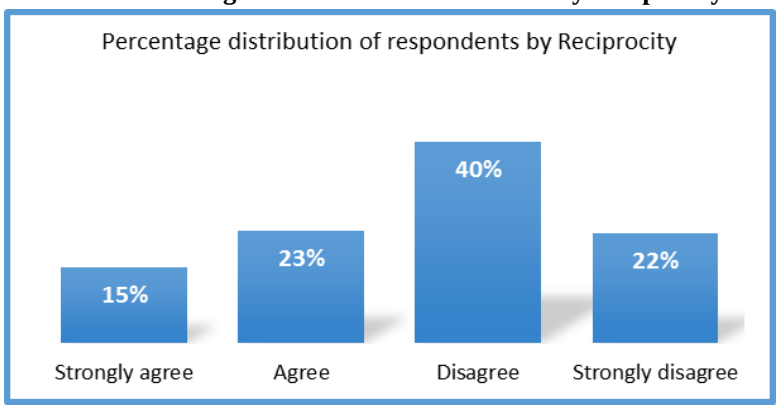
Source: Field Survey, 2016

5.3.3 Reciprocity

According to Gouldner (1959) reciprocity is essentially a social rule which places an obligation on people to return acts of favour and kindness. Putnam (1993) considers reciprocity as a highly productive dimension of social capital. It enhances social exchanges. The concept was analysed by looking at how strongly respondents agreed or disagreed with the statement that "People here look out mainly for the welfare of their own families, and they are not much concerned with the welfare of this community." Of the total sample of 191 households, 22% strongly disagreed with the statement while 40% disagreed. However, 15% strongly agreed with the statement, while 23% agreed that people look out mainly for the welfare of their own families, and they are not much concerned with the welfare of their community. Agreeing and strongly agreeing with the statement suggests lack or limited sense of reciprocity among 38% of all respondents, while disagreeing and strongly disagreeing with the statement suggests the presence of a sense of reciprocity among 62% of the 191 respondents.

Source: Field Survey, 2016

Chart 17: Percentage distribution of households by Reciprocity



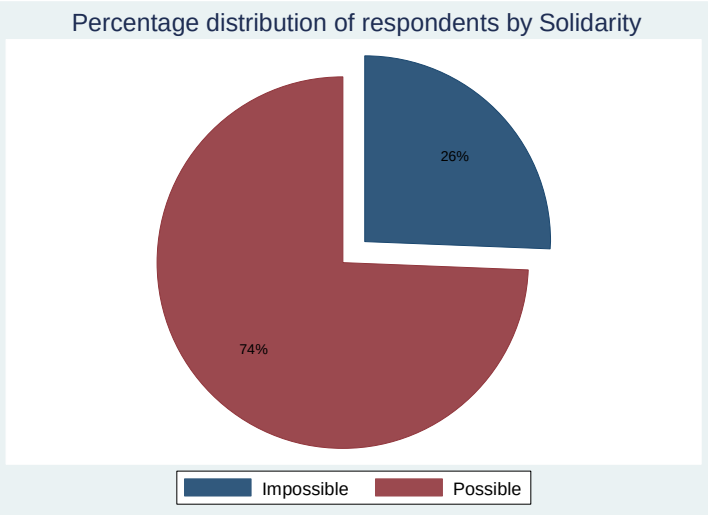
5.3.4 Solidarity

Solidarity is essentially goodwill or acts of collective responsibility among social actors (Adler and Kwon, 2002; Woolcock and Narayan, 2000). While some scholars view solidarity as a component of social capital (Krishna and Uphoff, 2002), others view it as a product of it (Adler and Kwon, 2002). In order to understand and analyse solidarity in this study, research participants' perceptions were investigated by asking them whether or not they thought it was possible to conceive of civic/traditional leaders who put aside their own welfare and that of their families to concern themselves mainly with the welfare of their community. Out of 191 respondents, 74% said it was possible, while 26% said it was not possible. Considering that the 22 areas targeted were villages with community ties and ethnic homogeneity, engagement with

traditional leaders is likely to be high as traditional leaders tend to live within the same communities and often meet with their subjects during events such as funerals, collective community actions, traditional weddings, and other cultural events.

Source: Field Survey, 2016

Chart 18: Percentage distribution of households by Solidarity

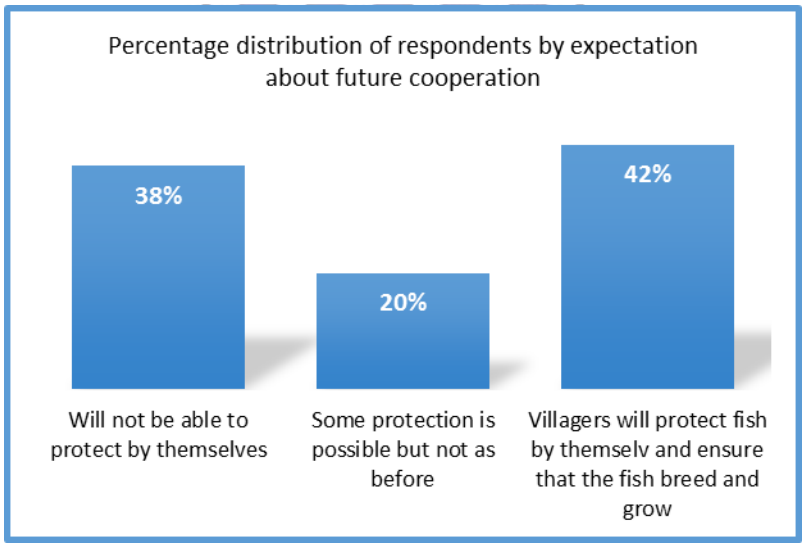


5.3.5 Expectations about future cooperation

Krishna and Uphoff (2002) posit that 'expectations for future cooperation' is a dimension of social capital. According to Boixi and Posnerii (1996), expectations build the will among social actors to cooperate with each other. Sell and Wilson (1999) assert that if individuals believe that the maintenance of common resources or public goods is crucial for their welfare, their propensity to cooperate in safeguarding such goods is high. In this study, 'expectations about future cooperation' was analysed by asking participants the following questions: "What do you feel is likely to happen once government stopped implementing the fish ban during the breeding season of fish? How likely is it that villagers will come forward to protect/preserve fish stocks in the river and allow them to breed and grow for fishing activities in future?"

The analysis revealed that 42% of respondents said villagers would protect fish by themselves and ensure that the fish breed and grow; 20% said some protection is possible, but not as much as before; while 38% of respondents said villagers would not be able to protect fish by themselves. Participants who said people would not be able to protect the fish stocks practically showed lack of expectations for future cooperation while those who opted for the other two options (62%) showed a varying degree of expectations. This finding is interesting, considering that unemployment rates are quite high in the area and the majority of people are not in high income occupations, hence there is supposedly a conflict between coming forward to allow fish to breed and grow (which in the short term limits their income sources) and going ahead to fish throughout the year to earn an extra income (which in the long term poses a danger of a vanishing fish species). However, the finding regarding levels of expectations about future cooperation is contrary to rational-choice theory and does indicate reasonable stocks of social capital which cause people to play down immediate gratification and/or consumption to invest in future demands.

Chart 19: Percentage distribution of households by expectations about future cooperation



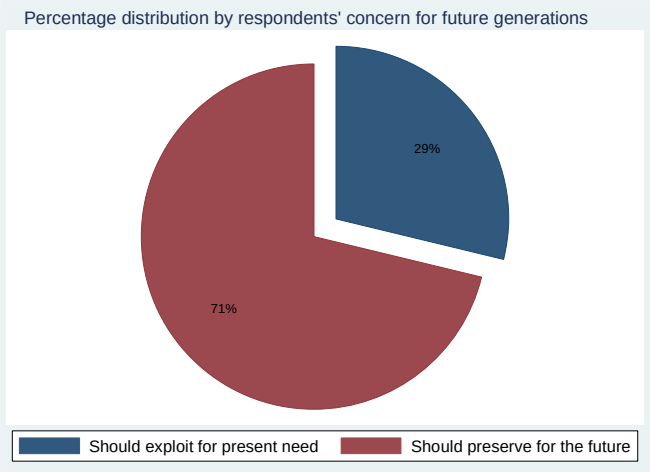
Source: Field Survey, 2016

5.3.6 Concern for future generations

Sell and Wilson (1999) note that some individuals view the future to be more important than others and based on their valuation of the pubic goods or common resources, they would preserve such resources for future use. Concern for future generations is essentially a key aspect of sustainability. Its inclusion by scholars (such as Krishna and Uphoff, 2002) as a dimension

of social capital entails that sustainability is an equally important aspect in the practice of social capital. Concern for future generations was analysed by asking respondents whether they agreed with the following statements: "When people have urgent economic needs, they should be expected to continue fishing from Luapula River in order to meet their needs even during the fish ban period," or "Fish belong to future as well as present generations, so people should never exploit them so as to diminish them for the future". The findings show that the majority (71%) of respondents were in support of preserving fish stocks for future generations while 29% supported exploiting the stock to meet current needs. Clearly, concern for the future was quite high among the community members. It can be argued that being what they are as villages, the surveyed areas have close networks based on family relations and there is priority on preservation of natural resources to meet both current and future needs.

Chart 20: Percentage distribution of respondents by their concern for future generations



Source: Field Survey, 2016

In summary, from the descriptive analysis of the independent variables, it is clear that there is high social capital among people from the 22 villages surveyed as summarised in the table below, although the degree differs from one dimension to the other.

Table 4: Percentage distribution of households by the six dimensions of social capital
Source: Field Survey, 2016

	Social Capital dimensions					
Yielded responses (%)	Networking	Trust	Reciprocity	Solidarity	Cooperation	Concern for the future
Positive (presence of SC)	75%	73%	62%	74%	62%	71%
Negative (absence of SC)	25%	27%	38%	26%	38%	29%

5.3.7 Cronbach reliability test of independent variables

The Cronbach alpha reliability test measures the internal consistency of test or scale items, showing the extent to which all variables are connected and inter-related and measure the same concept/construct in a test (Tavakol and Dennick, 2011). The test is expressed between 0 and 1, where if the result is closer to 1, then the items hang together well, and when they are 0 or closer to 0, then the variables do not have internal consistency (Tavakol and Dennick, 2011). An internal reliability analysis was conducted on the six independent variables. The six items hang together pretty well and the Cronbach alpha coefficient of .7506 is accepted. Table 5 shows the Cronbach alpha coefficient.

Table 5: Cronbach Alpha reliability analysis of the independent variables

```
. alpha Networks Trust Reciprocity Solidarity Cooperation FutureConcern, item

Test scale = mean(unstandardized items)

                                                          average
                                 item-test     item-rest  interitem
Item                  Obs  Sign  correlation   correlation  covariance     alpha
-------------------------------------------------------------------------------
Networks              191     +     0.7640       0.6843     .1630918     0.6922
Trust                 191     +     0.8013       0.6415     .1220254     0.6666
Reciprocity           191     -     0.5422       0.2072     .1865473     0.8403
Solidarity            191     +     0.8099       0.7425     .1572196     0.6812
Cooperation           191     +     0.6639       0.4656     .1552439     0.7225
FutureConc~n          191     -     0.7933       0.7179     .1571342     0.6827
-------------------------------------------------------------------------------
Test scale                                                   .156877     0.7506
-------------------------------------------------------------------------------
```

Source: Field Survey, 2016

5.3.8 Social Capital Index

Before developing Social Capital Index using Factor Analysis, KMO and Bartlett's test of sphericity were performed on all the six independent variables. This was to determine the suitability of the dataset for factor analysis. As captured in Table 6, the KMO was .847. Statistically, the closer the KMO of a particular dataset is to 1, the better (Hodgetts et al 2006), hence it was justified to use factor analysis in the current study. The Bartlett's test of sphericity shows a very small significance value of .000, which means we reject the null hypothesis that the correlation matrix is an identity matrix. This meant, therefore, that there was some justification and scope of reducing the number of dimensions in the dataset. The output of the factor test in Stata included the *det* option for the determinant of the correlation matrix which is 0.050. The intention of including *det* is to show that the determinant is not 0, otherwise if it

was, then there would be computational problems with the factor analysis and the analysis would not be completed.

Table 6: KMO and Bartlett's test of Sphericity

Determinant of the correlation matrix (Det)	0.050
Chi-square	561.866
Degrees of freedom	15
p-value	0.000*
Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	0.847

*H_0 Variables are not intercorrelated

Source: Field Survey, 2016

The sample size of 191 households was also fairly fine for factor analysis, using Hutcheson and Sofroniou's (1999) rule of 150 – 300 cases as recommended minimum sample size (in Shah, 2012). Hence, factor analysis was appropriately used in this study. After running the factor analysis to generate the Social Capital Index, six factors were produced of which only one had its eigenvalue of more than 1.00 (see table 7). The researcher used Kaiser's stopping rule which states that the only factors which need to be retained for analysis are those with eigenvalues which are greater than 1 (Hayton et al, 2004). Hence, only Factor 1 with eigenvalue of 3.06566 was retained for analysis.

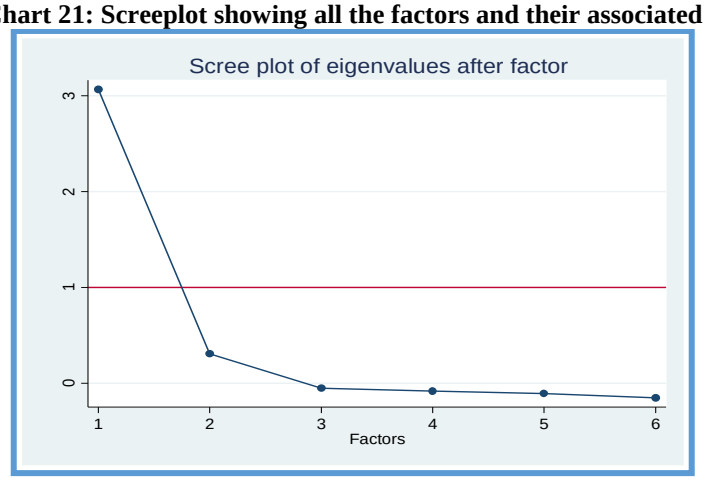
Table 7: Results of the Factor Analysis of the six social capital dimensions

```
. factor Networks Trust Reciprocity Solidarity Cooperation FutureConcern, mineigen(1)
(obs=191)

Factor analysis/correlation                      Number of obs    =        191
    Method: principal factors                    Retained factors =          1
    Rotation: (unrotated)                        Number of params =          6

    Factor  |  Eigenvalue   Difference        Proportion   Cumulative
------------+------------------------------------------------------------
    Factor1 |      3.06566      2.75724            1.0284       1.0284
    Factor2 |      0.30842      0.35882            0.1035       1.1319
    Factor3 |     -0.05040      0.03226           -0.0169       1.1149
    Factor4 |     -0.08266      0.02538           -0.0277       1.0872
    Factor5 |     -0.10803      0.04394           -0.0362       1.0510
    Factor6 |     -0.15198            .           -0.0510       1.0000
------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(15) =  564.87 Prob>chi2 = 0.0000
```

Source: Field Survey, 2016

The Screeplot of eigenvalues below displays the six factors generated and their associated eigenvalues. The plot enabled the researcher to visually assess which factors explain the most of the variability in the data.

Chart 21: Screeplot showing all the factors and their associated



Source: Field Survey, 2016

Each variable loaded fairly well on Factor 1 except Reciprocity (See Table 8). Comrey and Lee (1992) rate the variable loadings on a factor with loadings of .32 regarded as "poor", .45 as "fair", .55 as "good", .63 as "very good" and .71 or higher as "excellent". Hence, using Comrey and Lee's (1992) rating, only Reciprocity has a poor loading on the retained factor among all other variables.

Source: Field Survey, 2016

Table 8: Factor loadings of each variable on Factor 1

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
Networks	0.7597	0.4228
Trust	0.6936	0.5189
Reciprocity	-0.2282	0.9479
Solidarity	0.8843	0.2181
Cooperation	0.6434	0.5860
FutureConc~n	-0.8715	0.2406

The extracted factor was rotated for a better fit of data using an orthogonal rotation method called Varimax. The rotation of the factors was meant to alter the factor loadings in order to make the factors independent from each other, thereby avoiding multicollinearity. Varimax rotation simplifies interpretation of the factors (Abdi, 2003). Table 9 below shows the rotated factor loadings and unique variances. As seen in Table 9 below, the rotated factor loadings are the same as the original loadings above. This could be because only the retained factor (with

eigenvalue of more than 1.00) was rotated. The loading for Reciprocity has been blanked because it is less than .30. In terms of unique variances, the greater the uniqueness, the lower the relevance of the variable to the factor model (Abdi, 2003). Again Reciprocity has the highest variance not accounted for by other variables (95%), which means that the variable is not relevant to the factor model.

Table 9: Rotated Factor loadings and unique variances of each variable on Factor 1

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
Networks	0.7597	0.4228
Trust	0.6936	0.5189
Reciprocity		0.9479
Solidarity	0.8843	0.2181
Cooperation	0.6434	0.5860
FutureConc~n	-0.8715	0.2406

(blanks represent abs(loading)<.3)

Source: Field Survey, 2016

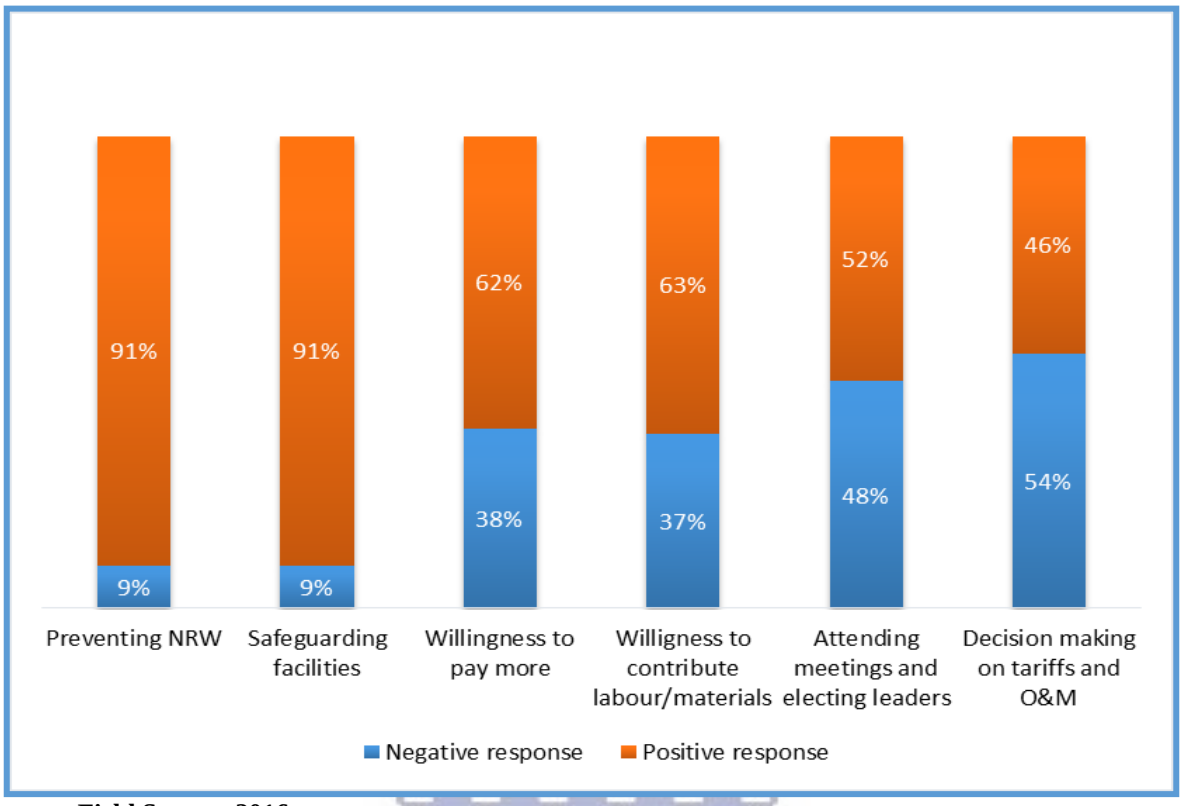
We consider variables with higher factor loadings as purer measure of the factor. Five of the six variables correlate highest on Factor 1. Factor 1 was thus the Social Capital Index, the X variable named SocialCapitalIndex in Stata.

5.4 Dependent variable – Involvement in community management

The six dependent variables were generated from the four common principles of community management (Lockwood, 2004) as follows:

- **Cost-sharing** (measured by willingness to pay more for service delivery and willingness to contribute materials and labour towards operation and maintenance of the scheme)
- **Participation** (measured by attending meetings and taking part in electing the management committee)
- **Control** (measured by making decisions on tariff setting and O&M)
- **Ownership** (measured by prevention of Non-Revenue Water (NRW) losses by reporting on leakages, damages, blockages; and safeguarding service facilities by reporting on vandalism and theft).

Chart 22: Percentage distribution of households' responses on each dependent variable



Source: Field Survey, 2016

A sense of ownership of service facilities has been touted as one of the precursors of sustainable development (Opare, 2011; Swanepoel and De Beer, 2011). In the current study, 91% of households reported that if they found pipe leakages or broken taps, they would prevent Non-Revenue Water losses by reporting these leakages, damages and blockages to the management committee. Furthermore, 91% of households reported that they would safeguard service facilities by reporting to police or management committee any cases of vandalism, encroachment or theft they would find. It is worth mentioning that community members have not witnessed any cases of vandalism, encroachment or theft and therefore the focus was on what they would do in the event that they found such things happening. There is clearly a high sense of ownership in the communities in that households are willing to prevent water losses and safeguard service facilities by reporting leakages, blockages, vandalism, encroachment and even theft to law enforcement agencies and to the management committee of the water scheme.

Financial, material and labour contribution towards management of community schemes is an important contributor to the success of the schemes (Lockwood, 2004). As regards cost sharing, 62% of households were willing to pay more for water supply, while 38% were not willing. Furthermore, 63% were willing to contribute labour or materials towards operations and maintenance of the water scheme, while 37% were not willing at all. In terms of contribution

of either labour or materials, in Java fewer households were willing to contribute compared to 96% of households that were making similar contributions, as per evidence from Isham and Kahkonen's (2002) study. Cost sharing is a crucially important aspect of community management of a water scheme as it would serve as a base for sustainability of the operations of the scheme.

Participation is an important aspect in community development as it tends to allow community members to determine their future (Jennings, 2000). In the current study, 52% of respondents indicated that they attend meetings where they were taking part in electing the management committee, while 42% said they do not attend. Clearly, participation is average among households. However, when it came to decision-making on tariff setting and O&M, only 46% reported taking part. This clearly suggests low levels of *control* among the general community membership when it comes to taking decisions.

All dependent variables responses were coded as 0 and 1; 0 for the negative response and 1 for the positive response. For further analysis, instead of having six different dependent variables, a total score of all of them was considered, where if the total score was more than three for each observation, it was coded as 1, otherwise it was coded as 0.

5.5 Logit Regression Analysis

Logit regression analysis, also called logistic regression analysis, is a nonlinear regression model which is performed on binary dependent variables (0 or 1), in which 0 represents failure and 1 represents success or probability that some event happens (Agresti, 1996; Aldrich and Nelson, 1984). According to Agresti (1996) and Peng et al (2002) the logit model is the most popular and suitable regression model for testing the hypothesis regarding the relationship between a categorical outcome and a continuous (or categorical) independent variable or a group of such predictors. Since in the current study the dependent variable is dichotomous (coded as 0 or 1), the logit regression model was considered to analyse the relationship between involvement in community management (outcome variable) and social capital (predictor).

The dependent variable was regressed against the SocialCapitalIndex using the Logit Regression Model. The general formula for the Logit Regression Model is $\log[p/(1-p)] = \beta_0 + \beta_1 * X_i$ where:

1. Log[p/(1-p)] is the outcome variable Involvement in Community Management
2. β_0 is the parameter
3. $\beta_1 * X_i$ is the Social Capital Index

The regression model in Table 10 below is significant at chi2 value of .000, which means that the model is significant at all significant levels. In scientific research, p-value is used to determine the significance and reliability of the relationship between the outcome variable and predictor(s), whereas if the p-value is less than .05, the results are accepted as significant and reliable, while if it is greater than .05, then there are no significant variations between the outcome (y) variable and the predictor (x) variable (Durrheim and Tredoux, 2004; Steyerberg et al, 2001). In this regard, tests with p-value of <0.05 were considered significant and reliable.

Table 10: Logit regression between outcome variable and predictor

```
. logit DependentVariable SocialCapitalIndex, or

Iteration 0:   log likelihood = -127.95615
Iteration 1:   log likelihood = -86.562981
Iteration 2:   log likelihood = -86.301326
Iteration 3:   log likelihood = -86.300616
Iteration 4:   log likelihood = -86.300616

Logistic regression                             Number of obs   =        191
                                                LR chi2(1)      =      83.31
                                                Prob > chi2     =     0.0000
Log likelihood = -86.300616                     Pseudo R2       =     0.3255

------------------------------------------------------------------------------
 DependentVariable | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------+----------------------------------------------------------------
SocialCapitalIndex |   5.786806   1.424106     7.13   0.000     3.572417    9.373798
             _cons |   1.539127   .3007057     2.21   0.027     1.049474    2.257237
------------------------------------------------------------------------------
```

Source: Field Survey, 2016

5.5.1 Social capital results in involvement in community management

In the model above, social capital is correlated to involvement in community management, at p value (P>|z|) of .000. This entails that households with social capital are more likely to get involved in the management of the community-led scheme. The Odds Ratio (the strength of the association between variables, specified in Stata as 'or') in the model shows that households with social capital are 5.786 times more likely to be involved in the management of the community water scheme. This evidence is consistent with Krishna and Uphoff's (2002) findings of robust and substantial relationship between social capital index and collective

action for development. It also corroborates Isham and Kahkonen's (2002) evidence showing that households in some Indonesian villages with high levels of social capital were more likely to participate in the design of water supply facilities and in putting in place monitoring mechanisms.

The R-square value shows that 32.6% of variations between involvement in community management and social capital are explained by the model. In other words, the R-square shows 32.6% of variance in the dependent variable is predictable from the independent variable. There is significant variation (67.4%) not explained by the model which needs to be explained. However, based on the model above, it can be concluded that social capital plays a significant role in influencing community members' involvement in community management.

5.5.2 Satisfaction affects involvement in community management, not education levels and income

Considering that the model above explained only 32.6% of the variations between the outcome variable and the predictor, certainly there were other factors affecting involvement in community management of the scheme. Satisfaction with the quality of water from the scheme, income levels, and education of the respondents were then included in the model (see Table 11 below). At p-value of .001, satisfaction was also found to impact on households' involvement in community management, implying that households that were satisfied with service provision by the water scheme were more likely (2.305 times more likely) to participate in the management of the scheme. This is consistent with the qualitative findings by Mugumya (2013). Additionally, at p-value of .939, education levels did not have significant influence on involvement in community management, consistent with evidence from the literature (e.g., Mugumya, 2013). Income levels at p-value of .361 did not significantly affect involvement in community management of the scheme. Income is clearly not sufficient in itself alone to warrant community involvement, consistent with findings by Carson and Mitchell (1993, cited by Mugumya, 2013) who established that household earnings did not significantly influence willingness to share costs for public service provision.

However, since social capital and satisfaction still only explained 38% (R-square at .3781) (see Table 11) of the variations, there is a need to establish other factors that affect involvement in community management among community members.

Source: Field Survey, 2016

Table 11: Logit regression between outcome variable and predictor and confounding variables Satisfaction, Income levels and Education levels.

```
. logit DependentVariable SocialCapitalIndex Ave_income Satisfaction Education, or

Iteration 0:   log likelihood = -127.95615
Iteration 1:   log likelihood = -79.936518
Iteration 2:   log likelihood = -79.579586
Iteration 3:   log likelihood = -79.578485
Iteration 4:   log likelihood = -79.578485

Logistic regression                               Number of obs   =        191
                                                  LR chi2(4)      =      96.76
                                                  Prob > chi2     =     0.0000
Log likelihood = -79.578485                       Pseudo R2       =     0.3781

------------------------------------------------------------------------------
 DependentVariable | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------+----------------------------------------------------------------
SocialCapitalIndex |   5.630205   1.442138     6.75   0.000     3.407963    9.301511
        Ave_income |   .9994735   .0005766    -0.91   0.361     .9983441    1.000604
      Satisfaction |   2.305919    .568445     3.39   0.001      1.42236    3.738338
         Education |   .9817892   .2351339    -0.08   0.939     .6139875    1.569918
             _cons |   .3744877    .277992    -1.32   0.186     .0874115    1.604378
------------------------------------------------------------------------------
```

5.5.3 Confirmation and rejection of hypotheses

Based on the findings above, the null hypothesis is rejected for the alternative hypothesis in this study. Below are the hypotheses:

> *H_1 (alternative hypothesis): There is correlation between utilisation of social capital and community involvement in the management of water supply schemes. In this regard, if X (Social Capital) exists, observable change in Y (Involvement in community management) occurs.*

> *H_0 (null hypothesis): There is no correlation between utilisation of social capital and community involvement in the management of water supply schemes. In this regard, if X (Social Capital) exists, no observable change in Y (Involvement in community management) occurs.*

5.6 Qualitative analysis (Focus Group Discussions (FGDs))

The aim of the qualitative analysis of FGDs was to illustrate, complement and triangulate the results of statistical analysis, with specific focus on unravelling community involvement in the management of the water scheme and management capacity and management challenges faced by the management committee. The qualitative analysis responded to the following research questions:

1. What are the achievements of the Mulundu Community Managed Water Scheme?
2. What are the management challenges faced by the management committee in running the water scheme?
3. What is the level and extent of community involvement in the management of the water scheme?

5.6.1 FGDs Analysis - Management committee

a. Community management and planning: The scheme was managed through a participatory approach. Participatory approaches to development have been known to be important tools for achieving sustainable development and for community empowerment as community members take charge of their development process (Penderis, 2012; Jennings, 2000). According to Swanepoel and de Beer (2011), community participations create a sense of ownership of development projects. In Mambilima Ward, communities' sense of ownership had been developed, with a high sense of responsibility over the project assets. Furthermore, the management committee endeavoured to exhibit high levels of transparency and accountability by engaging with community members on issues affecting the scheme and on decisions regarding operations and maintenance, tariff setting, revenue and others. One participant explained that:

> *We do raise funds to run the scheme through water bills. We do not have sponsors or donors working with us. Our services entirely depend on the funds available through water bills. Anything that comes up pertaining to the scheme, we inform the community – issues to do with contributions and tariff hikes, we inform the community through community meetings – AGM. Through the meetings, we explain to people that the funds we collect are not enough to sustain operations and we collectively agree on new tariffs. (FGDMCM5, 2016).*

Clearly, community members were not passive participants in service provision as they were involved in decision making. This qualitative finding signals increasing levels of community participation, an aspect which for over twenty years has been advocated for in the water sector in Zambia (MEWD, 1994).

b. Meetings and elections: According to Harvey and Reed (2007: 369), "Community management usually relies on the formation of a water committee which is responsible for all management issues related to water supply in the community". The literature shows that management committees of community-based organisations are elected by community members and the leaders are accountable to the General Assemblies (Dinbabo, 2014). The management committee of the Mulundu Community Managed Water Scheme was democratically ushered in by the community representatives from all the villages, and it drew its mandate from community members and it was answerable to them. The management committee called for Annual General Meetings (AGMs) every year and ordinary meetings every 3 to 4 months. Essentially, community leaders are accountable to the General Assembly. Meetings provided a means through which community members directly participated in the management of the water scheme as they had the tools through which to sanction erring management committee or committee members (by not re-electing them) or rewarding performing committee or committee members by re-electing them. At such meetings, community members took part in electing the management committee and deciding on tariff adjustments based on prevailing economic conditions. Elections were held every 3 years. The current management committee had been re-elected twice, although their re-election undermined dynamism and revived enthusiasm. One Focus Group Discussant explained as follows:

> *We do have a democratically elected committee and is mandated by the community to take office and run the affairs of the water scheme. We were given a three year mandate in 2010. We had another election and we were re-elected after we worked very well. We are yet to have another election and if the community so wishes, they may re-elect us again – it is up to the community. As management committee, we work on voluntary basis and we are not on a salary…Our committee runs the daily affairs of the water scheme.* (FGDMCM2, 2016)

All members of the management committee attributed their re-election to the trust and unity which existed between them and the communities. Dinbabo (2014) and Opare (2011) similarly established that trust played a role in relationships between leaders of community-based organisations (CBOs) and community members in Ethiopia and Ghana respectively.

c. ***Responsibilities:*** The committee worked on a voluntary basis. The committee ensured smooth operations of the scheme in the sense of planning, administration, water provision, maintenance works and community engagements. The committee was taking care of all financial planning, including distribution of bills and revenue collection. The committee made sure water bills were paid, and kept accounts records. Money from water bills was deposited in the bank regularly and petty cash was kept for emergencies and the smooth running of the water scheme. Workers were paid once enough revenue was collected from the water bills. The committee ensured that water was treated with chlorine and protected facilities from vandalism and theft. Tariff setting was not entirely the work of the committee. They came up with new tariffs under a consultative meeting with the community. The committee worked as a community and if the chairperson was absent the other members took the responsibility. For example, when the chairperson was not available for his duties due to other reasons the vice chairperson would take over.

The core function of the management committee was to ensure water supply. Water supply was done through both individual household connections and communal stand taps. Water was supplied to the villages through four pipe lines that are laid in the 20 villages. The management committee voluntarily coordinated day-to-day activities of the scheme and the general community membership took part in operations and maintenance of the water scheme. Community members were also being sensitised by the management committee on how to safeguard service facilities from theft and vandalism.

There was strict adherence to the schedule of water supply. The committee made sure that it provided water to twenty villages and in particular, fourteen villages on a daily basis. Although they provided water from morning to noon, in the afternoons concentration was on filling up the empty tank so that water was stored and ready to be used the following day by other communities that did not receive water the previous day.

The management committee was responsible for hiring human resources when the need arises. It had employed three staff (2 plumbers and a pump operator) who were available to sustain the operations of the scheme through servicing of the pump, maintaining the pipes and the tank.

d. Achievements of the Scheme: The scheme, through the management committee had, since 2010 when it was handed to the community, been able to expand, with increased number of communal water facilities and household connections.

> *To say the truth, as a management committee, we have tried to achieve so much. For instance, in many places where there were no water taps, we have been able to extend the services there. The time we were elected in 2010, there were only 72 taps, but now, we have over 300 taps. Out of the 32 villages in our area, we do supply water to 20 villages. We have done some individual connections and communal connections. (FGDMCM1, 2016).*

This clearly showed that the scheme had been steadily growing over the years, contrary to evidence from other studies showing low operational rates of rural water supply systems (e.g., Baumann, 2005; Rural Water Supply Network (RWSN), 2010; Taylor, 2009). The scheme's activities had also been sustained because there were no cases of major breakdowns reported. This was a success story for the scheme. Despite the limited resources, the scheme had been in existence for many years and was managed by the locals with dependence on local revenue sources. The community owned and was responsible for the scheme.

e. Management challenges: The challenges in managing the scheme were both technical and financial in nature. The scheme only had one tank which had limited volume capacity to provide water to all the villages in a day – hence water supply was rationed. The tank was corroded and at high risk of breaking down. The pump which pumped water into the reservoir from the river also had limited capacity as it could only run half a day every day. The management committee was in dire need to secure another pump, but that was constrained by limited revenue collected from customers. Appeals had in the past been made to Government through an area member of parliament, but nothing had been yielded. Hence, despite the fact that the scheme had skilled workers to operate and maintain the service lines, pump and the tank, there were technical glitches emanating from the fact that service facilities were limited and nearly rundown. This challenge emanated from limited financial capacity to replace old and dilapidated facilities. One participant had this to say:

> *We do not have sufficient funds to run our scheme efficiently, its operations and costs. This is because we do not collect enough revenue from our customers.* (FGDMCM3, 2016).

Revenue collections were minimal and not on time, such that the three workers' (two plumbers and one pump operator) salaries were usually delayed and depended on the amount of money collected in a particular month. Interestingly, the people who mostly failed to pay their bills on time were those in formal employment, such as teachers. Limited capacity to finance operations is not unique to Mulundu Community Managed Water Scheme. For instance RWSN (2010) and Heikkila, et al. (2012) established that one of the stumbling blocks to sustainable community management of rural water systems was limited financial capacity.

5.6.2 FGDs Analysis - Community members

During FGDs with community members, the extent of community involvement was explored in relation to cost sharing, participation, control and ownership. Analysis of data from community FGDs primarily proceeded using the start list method with a preliminary organising framework, having an already preconceived code structure drawn from existing evidence and theory.

a. Cost sharing: Cost sharing in community-managed projects comes in the form of community contributions in cash or kind (labour and materials) (Harvey and Reed, 2007; Doe and Khan, 2004). The results of the FGDs showed that community members paid K50 (US$5) for water per month per household. This was the amount which the scheme charged its customers. Community members were aware that they needed to pay their water bills for sustainability in the provision of the water supply service by the scheme. Customers were aware that to pay wages, electricity bills, and to procure chlorine and pipe repairs and pump servicing, the scheme depended on them paying the water bills. Participants showed willingness to sustain the operations of the scheme. One participant said this:

> *"To avoid such (closure) to happen we have to just pay the water bills in order for them (the Scheme's management committee) to continue with their services, we wouldn't want the scheme to close so as a community we just have to sit down together with them and try to solve these issues,*

because these people sometimes use their money to fix things that we don't know about, and our interest is just getting water, so we just have to work together so that such should not happen because we will really suffer". (FGDCP8, 2016).

However, the basic issues that affected the community were poverty and lack of employment. Farming was the main source of livelihood. Poverty levels were high; some households failed to pay the K50 monthly bill and at the end resorted to using unsafe drinking water. The fee for household connection was K200, which some participants claimed was too high for poor people. Some people were very old; they could not manage to fetch water from distant places like Luapula River, hence they were exempted from paying for the water supply from the Scheme.

Despite high levels of unemployment and poverty, participants expressed their willingness to pay for water provision. However, this was on condition that the Scheme improves on its service delivery, by for instance extending supply hours beyond three hours every day. Contribution in cash hinged on satisfactory service provision, confirming similar findings by other researchers (e.g., Mugumya, 2013). Another participant had this to say:

"[…]we are not satisfied with the services. If we are satisfied we can be paying; we can't even complain, we can just pay but their services do not motivate us to pay". (FGDCP12, 2016).

b. Sense of ownership and responsibility: Community management highly depends on community members' sense of ownership and responsibility of the development interventions (Opare, 2011; Blay et al., 2008). Community members exhibited high levels of ownership of the scheme, except a few who did not know that the scheme belonged to the community. The sense of ownership was evidenced from their zeal to safeguard the pump, water network, and the tank from vandalism, theft and leakages. Community members also exhibited courage and resoluteness to take anyone found vandalising service facilities to the police, suffice to mention that cases of vandalism were uncommon. Clearly, the community owned and had a responsibility towards the scheme. No cases of vandalism had been recorded in recent times because community

members kept watch of the service facilities. The community reported to the scheme any observed leakages.

c. ***Participation and delegation:*** In times of need, community members attended meetings called by the management committee. Over 60 percent of participants indicated that they participated in the meetings. Many of them also said they took part in electing the management committee during the Annual General Meetings (AGMs). They felt that participating in elections was the best way to have the right people to steer the running of the scheme in the right direction. The general assembly and trust are important in as far as accountability is concerned and maintaining the relationship between community members and leaders of community-based schemes (Dinbabo, 2014). Interviewed participants in the current study exhibited high levels of trust in the management committee by electing them and delegating to them the responsibility of running the affairs of the scheme.

d. ***Control:*** Mere participation in community management is not enough, as community members need to be involved in decision-making (Rakodi, 2000). Doe and Khan (2004: 362-363) note that in community management, the "community assumes control – managerial, operational and maintenance responsibility – for the development scheme in question through their elected representatives for community development through empowerment". In other words, community members need to get involved in making decisions regarding management, operations and maintenance. Some levels of control over the Mulundu Community Managed Water Scheme were exhibited by the participants as they indicated that they were taking part in the maintenance of the pipes. They also stated that they take part in making decisions regarding tariff adjustments. However, not all participants were involved as the management committee only invited two people from each village to participate in the meetings at which decisions on tariff setting and maintenance were taken.

5.7 Chapter summary

The analysis of data collected through both qualitative and quantitative methods has produced evidence that there is a significant relationship between social capital and involvement in community management of the Mulundu Community Managed Water Scheme, at p-value of .000. Hence the null hypothesis was rejected for the alternative hypothesis. The findings also

revealed that other than social capital, satisfaction with service provision also affected involvement in community management, at p-value of 0.001. Income levels as well as education levels of community members did not sufficiently affect involvement in management. The findings are consistent with other studies that have linked social capital to development outcomes.

Additionally, willingness to get involved in the management of the Scheme was high, evidenced from the high levels of willingness to safeguard water service facilities, willingness to prevent non-revenue water losses by reporting water leakages, blockages and damages, willingness to pay more for service provision, willingness to contribute labour or materials to the scheme, attending meetings and taking part in electing the Scheme's leaders, as well as involvement in participating in decision-making on tariff setting and O&M.

The next chapter is the final chapter of this research report which seeks to make conclusions and recommendations based on the research findings presented in this chapter.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The main objective of this study was to assess the contribution of social capital to community-led management of water schemes – using the Mulundu Community Managed Water Scheme in Luapula Province of Zambia – with the view to provide appropriate conclusions and recommendations on how water schemes can be managed more viably. This chapter first discusses the results presented in the previous section, based on the objectives and questions of the study and within the ambit of existing literature and theoretical models. Thereafter, recommendations pertaining to the utilisation of social capital are outlined, within the thicket of the achievements and challenges of the scheme, as well as the results of the regression model developed in this paper. Finally, a conclusion of the report is presented.

6.2 Discussion

Objective 1: Achievements of the Mulundu Community Managed Water Scheme: Some of the indicators of success of water projects are service levels and functionality of service facilities. This study showed that the Mulundu Community Managed Scheme has been successful. Since 2010 when it was handed over to the community by WaterAid Zambia, the scheme had expanded its network of stand taps from 72 to 300 in 2016. This clearly shows that the scheme had been steadily growing over the years. Furthermore, all the stand taps were functional, representing a 100% operational rate. This is contrary to other studies which cited non-functionality of rural water supply systems to be between 30% and 40% (Lockwood and Smits, 2011). The scheme's service provision activities had also been sustained as there were no cases of major breakdowns, illegal connections, and theft of service facilities or vandalism reported. This finding resonates with previous studies which had confirmed the success of community-led water supply systems (e.g. Macharia et al, 2015; Whittington et al, 2009).

Crucially, the achievements of the scheme can be attributed to the high sense of ownership and responsibility among community members, emanating from the relationship with the management committee of the scheme. The findings clearly point to participation of community members in the management of the scheme as a precursor for its success. This interpretation is theoretically linked to the community development paradigm which theorises

community involvement as a precursor for success of community projects (Swanepoel and de Beer, 2011).

Community management of rural water schemes also depend on institutional set-ups, and those with technical expertise are more likely to be successful (Harvey and Reed, 2007). Mulundu Community Managed Scheme had three skilled employees responsible for maintaining and operating services facilities. The staff were always available to attend to leakages, breakdown of the pump and all other technical problems which might arise. The management committee also has basic skills to handle minor operational and maintenance works such as fixing leakages. Hence, despite the fact that staffing levels of skilled personnel were very low, the availability of three skilled personnel and the management committee represent institutional arrangements that are supportive to the success of the scheme.

Objective 2: Management challenges: There are challenges the scheme is facing, particularly a dearth of resources – both technical and financial. While the scheme had technical personnel to manage all technical glitches that might arise, and while the management committee exhibited reasonable management competencies, the scheme had a limited resource base to support long term sustainability and scale-up of the project. The scheme only had one tank which had limited volume capacity to provide water to all the villages in a day. The tank was also dilapidated and needed replacement. There was only one pump, without a standby. Hence, in the event that the pump broke down and the operator was unable to fix it in time, the supply of water would be disrupted. The management committee was in dire need to secure another pump, but that was constrained by limited revenue collected from customers.

Regarding finances, the scheme had constraints in collecting revenue from its customers. With minimal and untimely revenue collections, the management committee was unable to pay its staff on time and to have fixed wages for them. Furthermore, the management committee was unable to secure enough funds to procure a standby pump and to replace the old tank. The proposal to cover funding gaps through cost recovery mechanisms, as the UNDP (2006: 67) notes "would put water […] services beyond the reach of precisely the people who need to be served". This is also the case with the Mulundu Community Managed Scheme where it has to balance between social interest and commercial goals, cognisant of income levels among community members and high levels of unemployment. The findings in the current study echo observations and findings of other scholars where increased self-financing and diversified sources of financial support were key to sustainability and scale-up of community-managed

project interventions (e.g., Lockwood, 2004; Uvin and Miller, 1994). Given the challenges above, social capital alone clearly does not guarantee sustainability.

Objective 3: The extent and level of community involvement in the management of the water scheme: Water supply services of the scheme were entirely provided and managed by the communities through the management committee. This is contrary to a similar study in Zambia by Shaw (2012) where over 30% of water management committees were non-functional. The communities took overall responsibility for the water supply scheme including water abstraction, distribution, operations, maintenance, asset management, billing as well as revenue collection. The communities practically had a formal oversight function through the management committee which was comprised of members of the same communities. The communities had symbolic ownership of the assets, which was the reason they would report cases of vandalism, theft and illegal connections to the management committee or police. Furthermore, community members participated in decision-making process, a cornerstone of community management.

The findings from both the qualitative and quantitative analysis revealed that community members were either involved or were willing to get involved in the management of the scheme. This is evidenced from the high levels of willingness to safeguard water service facilities, willingness to prevent non-revenue water losses by reporting water leakages, blockages and damages, willingness to pay more for service provision, willingness to contribute labour or materials to the scheme, attending meetings and taking part in electing the scheme's leaders, as well as involvement in participating in decision-making on tariff setting and O&M. This essentially means high levels of community involvement in the management of the scheme, consistent with similar studies in the SSA region (e.g. Opare, 2011; Doe and Khan, 2004).

Objective 4: Levels of social capital among community members: Similar to other social capital studies conducted by other scholars (e.g. Isham and Kahkonen, 2002), social capital in the 22 villages was established to be high, with 75% of households expressing willingness to act in a united manner and support each other to respond to a natural disaster; 73% of households willing to leave their child(ren) when they left the village for a distant town for a day or two; 62% of households either strongly disagreeing or disagreeing with the sentiment that people look out mainly for the welfare of their own families, and they are not much concerned with the welfare of this community; 74% of households conceiving of a

civic/traditional leader who puts aside his own welfare and that of his family to concern himself mainly with the welfare of this community – an act of solidarity; 62% of households suggesting that villagers would still protect and preserve fish stocks even when the government ban on fishing during the breeding season was lifted; 71% of households having concern for future generations and supporting the proposition of preserving fish stocks for the future.

Objective 5: Relationship between social capital and community management of the water scheme: Social capital has variously been linked to development outcomes, be it at micro- or macro-level (e.g. Putnam, 1993; Fafchamps and Minten, 2002; Knack, 2002; Krishna and Uphoff, 2002). The logit regression model in the current study revealed that there was a significant relationship between social capital and involvement in community management at p-value of .000. This implies that households with high levels of social capital were more inclined to get involved in the management of the scheme. This finding corroborates other studies that have linked social capital to development outcomes. For instance, though methodologically different from the current study, Isham and Kahkonen (2002) established that among households in Indonesia with high levels of social capital, participation in design was likely and that monitoring mechanisms were likely to be in place. The finding in the current study confirms the role of social capital in the management of community-managed water schemes. This evidence is also consistent with Krishna and Uphoff's (2002) findings of a substantial relationship between social capital and collective action for development. Education levels and household incomes are important but not sufficient enough to influence involvement in community management.

6.3 Recommendations

Based on the findings, Mulundu Community Water Scheme has made some considerable achievements from the time that it was handed over to the community by WaterAid Zambia. It is also clear that community involvement in the management of the Scheme is prevalent. Further, it has been established that there is a high level of social capital among community members which has also been linked to community involvement in the management of the scheme. However, the scheme is facing challenges due to old facilities and lack of resources, compounded by poor revenue collection. Hence social capital alone does not guarantee sustainability of the scheme. Without capital investment support, sustainability of community water schemes is not possible. Given these factors, the recommendations are that:

- The government through National Rural Water Supply and Sanitation Programme and Non-Governmental Organisations interested in the water and sanitation sector need to support periodical capital investments if the water scheme is to remain operational and sustainable. An assessment of all community-led schemes need to be done in the country to ascertain resource needs and to build capacity in the management committees for sustainable management of the rural water supply systems.
- Social cohesion should be nurtured within and across the villages in order to leverage involvement in the management of the water scheme.
- Community engagement initiatives need to be consistent in order for community members to understand and appreciate their roles and responsibilities as regards management of the scheme. Community members need to be sensitised on the need to pay bills on time to support operational costs of the scheme.
- Improving service provision should be among the key priorities of the management committee in order to satisfy community members and to thereby create willingness among them to get involved in the management of the water scheme.

6.4 Conclusion

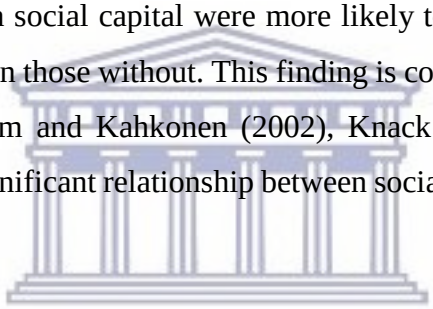
This paper responded to mixed evidence regarding the success of community-led management of water schemes in rural areas. Whereas other studies have shown that community led-management of rural water supply systems have been successful (e.g., Macharia et al, 2015; Whittington et al, 2009), other studies have found contrary evidence (e.g. Shaw, 2012; Lockwood et al 2010; WAZ, 2010; Harvey and Reed, 2007).

Given the record of the Mulundu Community Managed Water Scheme as a relatively successful scheme and given the fact that there is limited application of social capital theory to studies in the water and sanitation sector, this study sought to investigate the contribution of social capital to the management of this community-led water scheme. By unravelling social capital dynamics and how they impinge on community management of the scheme, the study was set apart of other studies that have been done in the past. A single-case mixed approach was adopted in the study to investigate the interplay between social capital and community involvement in the management of the scheme.

Factor analysis was used to generate a social capital index from a set of six indicators of social capital (networks, trust, reciprocity, solidarity, expectations about future cooperation, and

concern for future generations) proposed by Krishna and Uphoff (2002). Furthermore, a composite variable was generated from the six indicators of involvement in community management (preventing NRW losses; safeguarding service facilities; willingness to pay more for water supply; willingness to contribute labour or materials to the scheme; attending meetings and electing leaders; and decision making on tariff setting and O&M) originating from the four common principles of community management (Lockwood, 2004). The two new variables were then regressed against each other using the logistic regression model.

It was established that social capital was high among community members in the 22 villages in Mambilima Ward of Mwense District. Furthermore, the study produced evidence that community members were willing to get involved in the management of the water scheme. Most importantly, evidence from the regression model showed a significant relationship between social capital and involvement of community members in the management of the scheme. Households with high social capital were more likely to get involved in community management of the scheme than those without. This finding is consistent with previous studies done by Putnam (1993), Isham and Kahkonen (2002), Knack (2002) Krishna and Uphoff (2002) which have shown a significant relationship between social capital and collective action for development.



However, satisfaction also impinged on involvement in the management of the scheme, consistent with evidence from a study by Mugumya (2013). This entails that social capital alone does not guarantee sustainability of the scheme which currently requires capital investments which cannot be financed by meagre revenues collected from water bills. The scheme has limited infrastructure to provide water all day and every day to the 22 villages.

This researcher recommends prioritising service improvement in order to satisfy community members. Improved service delivery triggers satisfaction which in turn influences involvement in community management. Community engagement and promotion of social cohesion among community members should be enhanced in order to build robust social capital. Furthermore, considering that the scheme is unable to collect adequate revenue for major capital investments such as procuring tanks and a standby pump, government and NGOs with interest in the water sector should from time to time step in to provide capital investments if community schemes are to remain operational.

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Appendices

Appendix A: Research Questionnaire

Household Survey Questionnaire
Research Topic: Social capital and community-led management of rural water schemes: Evidence from Mulundu Community Managed Water Scheme in Luapula Province, Zambia.

A. IDENTIFIERS

My name is Christopher Katete, a student at the University of the Western Cape (South Africa) pursuing a Masters programme in Development Studies at the Institute for Social Development. I am conducting a study to investigate the play out between social capital and community-led management of water schemes. I am inviting you to participate in this interview. This study is solely for academic purposes. However, its findings may be useful to policy-makers to understand the interplay between social relationships and the management of rural water supply systems, thereby availing to them options on water governance in rural areas of Zambia. Your personal details shall remain strictly confidential and anonymous, and the study does not intend to harm you in any way. The interview will take approximately 45 minutes to one hour. I thank you in advance for your participation.

Participation in this survey is voluntary. We hope that you will take part in this survey since your participation is very important.

May I begin the interview now?

Yes……1 **No……0** **Signature:……**

	PROJECT	REF:	Questionnaire June 2016
RESPONDENT'S NAME (OPTIONAL)			
RESIDENTIAL ADDRESS	House number:		
	Street Name:		
NAME OF VILLAGE			
TELEPHONE NUMBER	**Home** _____ **Work** _____ **Mobile** _____		
DATE OF INTERVIEW	D D M M Y Y: 1 6	**START TIME** Hours	**END TIME** Hours
INTERVIEWER NAME		**CODE**	__ __/__ __ __ __ __

B. DEMOGRAPHICS

1. Are you head of the household?
   YES…… 1 NO…..…….0

2. What is your age range?
   16-19……..…1
   20-24……..……2
   25-29……..……3
   30-34……..……4
   35-39……..…5
   40-44……..…6
   45+……..…7

3. House ownership:
   TENANT……1
   LANDLORD…….….2
   OWNER ONLY…….3

4. Gender (Observe):
   MALE…….……..…….1
   FEMALE……2

5. Occupation:
   FARMER…….…....1
   FISHERMAN/WOMAN…..2
   BUSNESSPERSON….....3
   STUDENT……...4
   HOUSEWIFE……..5
   FORMAL EMPLOYMENT..6
   UNEMPLOYED……7
   CAREGIVER…….……...8
   OTHER…….……9
   SPECIFY_____

6. Education level:
   NO EDUCATION…….1
   Primary..……...2
   Secondary.……...…….3
   College..……4
   University..……...……5

7. Marital status:
   SINGLE……. 1
   MARRIED…… 2
   WIDOW/ER…… 3
   SEPARATED/DIVORCED……4

8. Number of people in your household
   1-4……..……1
   5-10……..…...2
   11-15……..…….3
   16-20……..…….4
   21+……..…….5

C. DAILY EXPENSES

1. What is your expenditure in a day ON AVERAGE?
   LESS THAN K100...……..……..……..1
   K101 TO K200……..……...…….2
   K201 TO K300……..……...…….3
   K301 TO K400…….4
   K401 TO K500……..……5
   K550 & ABOVE……..……...6
   I DON'T KNOW…….999

2. What monthly expenses do you have? (circle all that apply)
   ELECTRICITY……..……...……1
   WATER……..……..……2
   RENTALS…….. ……..……..……..3
   CHARCOAL……...…….4
   SCHOOL FEES……...……..5
   OTHER……..……..…777 EXPLAIN……

3. What is your average monthly income?
   LESS THAN K500……..……....1
   K501 TO K1000……...……..…2
   K1001 TO K1,500……...……..…3
   K1501 TO K2,000……..…4
   K2,001 TO K2,500……..…5
   K2,501 & K3,000……..……...…..6
   K3,001 & K3,500 ……..……...…..7
   K3,501 & K4,000 ……..……...…..8
   ABOVE K4,000 ……..……...…….9
   DO NOT KNOW……999

D. HOUSEHOLD WATER USAGE

1. What does Mulundu Water Scheme do?

   a. Provides sanitation services in and around this villag ☐ 1
   b. Supplies water in and around this village ☐ 2
   c. It cleans up Luapula River and implements fish ban ☐ 3
   d. I don't know ☐ 4

2. What is your MAIN source of drinking water?

   a. Mulundu Water scheme ☐ 1
   b. Own borehole ☐ 2
   c. Luapula River ☐ 3
   d. Shallow well ☐ 4
   e. Other: ☐ 777. Specify_____

3. What are your source of water for other domestic uses, e.g., washing, bathing, irrigation, car washing?

   a. Mulundu Water scheme ☐ 1

b. Own borehole ☐ 2
c. Luapula River ☐ 3
d. Shallow well ☐ 4
e. Other: ☐ 777. Specify_____

4. How much do you spend on water?

a. DON'T PAY……..1
b. PER MONTH……2 K_____
c. PER BUCKET……...3 K_____

5. How many buckets of water do you use in a day on average?
1 BUCKET……..1
2 BUCKETS……..2
3 BUCKETS……..3
4 BUCKETS……..4
5 BUCKETS……..5
6 BUCKETS……..6
7 BUCKETS……..7
8 BUCKETS……..8
9 BUCKETS……..9
10 BUCKETS……..10
10+ BUCKETS……11
N/A……..777

6. What is the litre-size of the buckets you use? (circle all that apply)
10 LITRES……1
15 LITRES……2
20 LITRES……3
25 LITRES……4
30 LITRES……5
OTHER……6
SPECIFY _____

7. [If source is Mulundu Water Scheme]: Is the amount of water you get from the scheme adequate for drinking and other domestic use?

a. Yes ☐ 1
b. No ☐ 0

8. How satisfied are you with the amount and quality of water you receive from Mulundu Water Scheme?

a. NOT AT ALL……1
b. SOMEWHAT……..2
c. SATISFIED……3
d. VERY SATISFIED……4
e. EXTREMELY SATISFIED……5
f. DON'T KNOW……999
g. N/A……777

E. SOCIAL CAPITAL

1. **Informal networking and mutual support:** If there was a flood in your village/neighbourhood caused by rainstorm and overflow of the Luapula River, bringing down households and causing injury and damage to animals and people, what do you think the people of this community would do?

   1. Act as individuals and not as a community to respond to the natural disaster ☐ 0
   2. Act in a united manner and support each other to respond to the natural disaster ☐ 1

2. **Trust:** Suppose you left this village/neighbourhood for a day or two to visit your sick relative in Lusaka, in whose care would you leave your child/children?

   1. No one ☐ 1
   2. Only close relatives ☐ 2
   3. Relatives and neighbours ☐ 3
   4. Anyone from the village ☐ 4

3. **Reciprocity:** How strongly do you agree or disagree with this statement? "People here look out mainly for the welfare of their own families, and they are not much concerned with the welfare of this community."

   Strongly agree ☐ *1 Agree* ☐ *2 Disagree* ☐ *3 Strongly disagree* ☐ *4*

4. **Solidarity:** Is it possible to conceive of a civic/traditional leader who puts aside his own welfare and that of his family to concern himself mainly with the welfare of this community?

   1. Impossible ☐ 0
   2. Possible ☐ 1

5. **Expectations about future cooperation:** What do you feel is likely to happen once government stopped implementing the fish ban during the breeding season of fish? How likely is it that villagers will come forward to protect/preserve fish stocks in the River and allow them to breed and grow for fishing activities in future?

   1. Will not be able to protect by themselves ☐ 0
   2. Some protection is possible, but not as much as before ☐ 1
   3. Villagers will protect fish by themselves and ensure that the fish breed and grow ☐ 2

6. **Concern for future generations:** Which of the following statements would you agree with: "When people have urgent economic needs, they should be expected to continue fishing from Luapula River in order to meet their needs even during the fish ban period," or "Fish belong to future as well as present generations, so people should never exploit them so as to diminish them for the future".
   1. Should exploit for present need ☐ 0
   2. Should preserve for future ☐ 1

F. COMMUNITY MANAGEMENT

1. Cost sharing

a. How much money does your household spend on water per day and per month?

DON'T PAY……..0
PER DAY…..……1 K_____
PER MONTH.……...2 K_____

b. [*If you pay*] Do you think it is worthy paying that amount?

It is too much ☐ 0 It is too little ☐ 1 It is reasonably worthy it ☐ 2

c. Are you willing to accept to pay more in order for the scheme to improve the volume of water for your household?

Yes ☐ 1 No ☐ 0

d. [If yes above] how much more would you be willing to pay per month to support the operations and sustenance of Mulundu Water Scheme?

Not willing to pay……1
K100 -K200……..…2
K201 -K250……..…….……3
K251 -K300……..…….……4
K301 -K350……..…….……5
K351 -K400……..……6
K451 -K500……7
K501+……..……...8
Other amount…….777.Specify:……...

e. Have you ever contributed any materials or labour to the Water Scheme when you were called upon

Yes ☐ 1 No ☐ 0

f. In future, are you willing to contribute materials or labour to the Water Scheme?

Yes ☐ 1 No ☐ 0

2. Participation

4.1. Do you participate in electing management committee members for the Water Scheme during meetings called by the committee?

Yes ☐ 1 No ☐ 0

3. Control

4.1.1.1.1. [If answer is 0 or 1 in question **'2.a'** above], do you take part in making decisions on tariffs and O&M activities such as water rationing during meetings?

Yes ☐ 1 No ☐ 0

4. Ownership

a. Have you ever found someone vandalizing, stealing or encroaching water service facilities?

Yes ☐ 1 No ☐ 0

b. [If yes above] What did you do to that person?

Mind my own businesses ☐ 0

Report him/her to police or to the water committee ☐ 1

c. If you found someone vandalizing, stealing or encroaching on service lines, what would you do to that person?

Mind my own businesses ☐ 0

Report him/her to police or to the water committee ☐ 1

d. What do you do when you find a broken pipe/tap or leakages

Mind my own businesses ☐ 0 Report him or her to the water committee ☐ 1

5. Challenges

What challenges do you face in accessing drinking water?

……
……
……
……
……

6. Conclusion

Thank you for taking part in this interview.

Appendix B: FGD guide for community members

Focus Group Discussion guide- Community members

Date:_____

Village: _____

Section: _____

Duration: _____

Introduction

- Introduce yourself.
- Ask participants to introduce themselves.
- Explain purpose of session.
- Assure them that all responses are confidential.
- Assure them that there is no right or wrong answers, only their ideas and opinions, so please encourage them to share freely.
- Thank them in advance for participating.
- Request to enter each participant's demographic information.

Questions

Community management aspects

1. Tell me something about your daily lives in relation to water situation, in your neighborhood, in your family.
2. What would you say are the three top basic issues in your community or neighborhood? Why? Suggest what could be done in each issue or problem.
3. What do you know about Mulundu Water Scheme? Who owns the scheme?
4. Where do you get water for drinking and other domestic uses?
5. Does Mulundu Water Scheme provide you with adequate water supply?
6. As a community member, what do you think is your role/involvement in the Mulundu Water Scheme?
7. Who manages the water scheme and where do they come from?
8. How would you describe your relationship with the water committee management members?
9. Can you let me know what you think is the source of funds for operating and maintaining the scheme?
10. Imagine one day Mulundu Water Scheme stopped operating due to lack of funds for operations, as community members, how would you be affected? And what would you do as individuals and as a community to bring back the scheme to operation?
11. If you were called upon to participate in the maintenance of broken tap, pipes and other equipment/property owned by the water scheme, what would you do?
12. What water-related challenges do you face as a community? What do you think the Mulundu Water Scheme management committee can do about those challenges?

Social capital aspects

1. How would you describe your relationship with your neighbours? Do you trust them? Why?
2. How would you describe your relationship with your relatives? Do you trust them? Why?
3. Do you belong to any community groups? be it religious, CBOs, NGOs, sports groups, etc
4. What have you benefitted from being a member of such groups?
5. Are community members here willing to help each other in times? How? Why?
6. Do you trust your local leaders? Why?
7. Are leaders able to leave their tight schedules or other activities in order to attend to the needs of the community in times of need?
8. How important is it to conserve fish in Luapula River?

Appendix C: FGD guide for management committee members

Focus Group Discussion guide- Water scheme management committee members

Date:_____

Village: _____

Section: _____

Duration: _____

Introduction

- Introduce yourself.
- Ask participants to introduce themselves.
- Explain purpose of session.
- Assure them that all responses are confidential.
- Assure them that there is no right or wrong answers, only their ideas and opinions, so please encourage them to share freely.
- Thank them in advance for participating.
- Request to enter each participant's demographic information.

Introduction

My name is Christopher Katete, a student at the University of the Western Cape (South Africa) pursuing a Masters programme in Development Studies at the Institute for Social Development. I am conducting a study to investigate how social capital contributes to community-led management of water schemes. I am inviting you to participate in this interview. This study is solely for academic purposes. However, its findings may be useful to policy-makers to understand the interplay between social relationships and the management of rural water supply systems, thereby availing to them options on water governance in rural areas of Zambia. Your personal details shall remain strictly confidential and anonymous, and the study does not intend to harm you in any way. The interview will take approximately 45 minutes to one hour.

I would like to welcome you to this interview. I will be as flexible as possible in the way I will be asking you questions. You are also free to ask me back if you have any queries. I thank you in advance for your participation.

Questions

1. Tell me more about your role in the Mulundu Water Scheme. What are your functions as a _____ in the committee?
2. How do you raise funds for operations, maintenance and wages for employed staff? Do you raise enough funds?
3. How much water do you supply to community members every day?
4. How many hours of water supply do you provide to community members?

5. If there was a breakdown of the supply system, how would you bring it back to operation?
6. How long does it take you to respond to reports of vandalism, theft or encroachments?
7. How often do you call for community meetings and what do you discuss with community members?
8. When setting new tariffs, what is the process you follow in order to do that?
9. How are community members involved in tariff setting?
10. As a water committee, how can you describe your relationship with the community?
11. What are the achievements of the scheme since its inception in 2009?
12. What challenges do you face as a management committee in your day-to-day activities?

Appendix D: Answer sheet form for Focus Group Discussions

Name of Village:		
Date :		
Composition of group :	Males (№):	
	Females (№):	
Names of participants		
	Males	Females
Main topics discussed:		
Name of Interviewer:		

Introductions:
Comments/remarks

Details (Separate answers for each question and probe where necessary to get in-depth answers – write as much detail. Answers should be captured in direct speech, and not reported speech!)

	Coding space (Leave column empty)

Appendix E: Letter of consent for the study

Letter of consent

Title: Social capital and community-led management of rural water schemes: Evidence from Mulundu Community Managed Water Scheme in Luapula Province, Zambia.

Researcher: Christopher Dominic Katete

1. I confirm that I have read and understood the information sheet explaining the above research project and I have had the opportunity to ask any questions about the project. ☐
2. I understand that my participation in this study is voluntary. I am free not to participate and have the right to withdraw from the study at any time, without having to explain myself. I am aware that this interview might result in research which may be published, but my name may be/ not be used. ☐
3. I understand my response and personal data will kept strictly confidential. I gave permission for members of the research team to have access to my anonymised responses. I understand that the information derived from this research is confidential and treated as such. ☐
4. I agree that the data collected from me to be used in the future research. ☐
5. I agree to take part in the above research project. ☐

Name of the participant:……Signature…… Date ……

If you have any questions about the research study itself, please contact my supervisor Dr. Mulugeta F. Dinbabo at The Institute for Social Development (ISD), University of Western Cape on phone number +27219593855, his email address is: mdinbabo@uwc.ac.za