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COMPARATIVE ASSESSMENT OF PERFOMANCE OF URBAN WATER SUPPLY SYSTEMS IN SMALL TOWNS OF ZIMBABWE

CASE OF ZINWA AND LOCAL COUNCIL WATER SUPPLY SYSTEMS

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COMPARATIVE ASSESSMENT OF PERFOMANCE OF URBAN WATER SUPPLY SYSTEMS IN SMALL TOWNS OF ZIMBABWE

by

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DECLARATION

I, Sharon Murinda, declare that this research report is based on my own work. It is being submitted for the degree of Master of Science in Integrated Water Resources Management (IWRM) at the University of Zimbabwe. It has not been submitted before for any Degree for examination at any other University.

Date: _____

Signature: _____

The findings, interpretations and conclusions expressed in this study do neither reflect the views of the University of Zimbabwe, Department of Civil Engineering nor of the individual members of the MSc Examination Committee, nor of their respective employers.

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ACRONYMS

AIDS: Acquired Immuno-Deficiency Virus

BH: Borehole

CSO: Central Statistics Office

GWP: Global Water Partnership

HIV: Human Immune Virus

SIWI: International Water Association

IWRM: Integrated Water Resources Management

IWSD: Institute of Water and Sanitation Development

MDGs: Millennium Development Goals

NAC: National Action Committee

NWSC: Nairobi Water and Sewerage Company

UN: United Nations

UNFPA: United Nations Population Fund

UNICEF: United Nations Children's Education Fund

WASH: Water Sanitation and Hygiene

WB: World Bank

WCW: World Commission on Water

WHO : World Health Organization

WSS: Water Supply and Sanitation

WWV: World Water Vision

ZINWA: Zimbabwe National Water Authority

DEDICATION

This thesis is dedicated to my husband, mum and dad. Thank you for the support that enabled me to be where I am today.

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Firstly I would like to thank my heavenly Father for granting me this opportunity to be able to be who I am today.

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ABSTRACT

One of the major challenges faced by residents of small urban towns globally is that of poor Water and Sanitation Service delivery. The management of urban water services has become very important in the wake of the cholera outbreak of 2008-09 which claimed more than 4000 lives in Zimbabwe. The outbreak was linked to poor WS systems delivery. The poor quality of service was attributed to the economic collapse of the country which to some extent affected the capacity of local councils to manage water supply services. The economic collapse also affected the capacity of residents to pay for water services. In the aftermath of the near collapse of the water supply systems in urban areas, the government directed the Zimbabwe National Water Authority (ZINWA) to take-over the water supply systems in most of the urban areas, resulting in towns such as Gokwe and Karoi having their water supply systems managed by ZINWA. However, in some urban areas local councils retained the management of water supply systems. This study compares the water supply systems of selected small urban towns in Zimbabwe which are Chipinge, Gokwe, Karoi and Rusape. Financial and governance aspects of water resources management are major contributors to the collapse or sustainability of water supply systems and these were investigated. Data collection for the study was done through key informant interviews covering governance issues, revenue collection, water tariff setting processes, technical issues and stakeholder involvement in urban water management. A total of 765 household questionnaires investigating customer perceptions on service delivery, willingness and ability to pay, impact of water tariffs on household water use and stakeholder involvement in the management of urban water supply services were administered in the four towns. Both the ZINWA and council water supply management systems in the four towns were found to have active institutional and legal structures but service delivery was generally poor. Consistence of water supply in the areas was found to be largely affected by recurrent power cuts while the breakdown of equipment affected water treatment and supply capacity. Although there was high meter coverage (ranging from 82-94%) functionality of meters was low mostly for the council managed water supply systems. Revenue collection was found to be very low accounting for less than 30% of the billed amount for both water supply systems. This was due to customers' low willingness to pay for reasons which included poor service delivery, poor customer care service, inaccuracy of bills and poor water quality. Unaccounted for water was found to be above 30% for council managed systems and less than 15% for ZINWA managed water supply systems. Findings also show that there is little involvement of stakeholders in the setting of water tariffs. In conclusion, power cuts, poor customer care services, increased unaccounted for water, low stakeholder participation among other things have contributed to poor service delivery and low revenue collection in the four towns. Stakeholder participation is critical for the sustainability of urban water management and water supply systems. There was no significant difference in performance between Local council and ZINWA managed water supply systems because the performance indicators varied between the systems.

CHAPTER 1

1.0 INTRODUCTION

1.1 Global overview of Urban Water Management

In many parts of the globe, population growth and urbanization are increasingly becoming challenges to governments. Although this is the case, provision of safe drinking water and basic sanitation is among the most critical challenges for achieving sustainable development over the next decade (UNICEF, 2006). World urban populations, which make upto 50% of the total population on the globe, are growing approximately 5% each year (Fruhling, 1996). This has the potential to further strain many overburdened water systems leading to extreme water shortages worldwide. According to UNFPA (2007), the world's urban population reached 2.9 billion in 2000 and is expected rise to 9 billion by 2030. The Southern Africa regional population was 46.7 million in 1990 and it is expected to reach 291 million by the year 2025 (*ibid).* Almost all of the population increase expected during 2000-2030 will be absorbed by the urban areas in the less developed regions thereby contributing to the straining of the limited water resource. In the same period the urban population of the less developed regions is expected to increase by 2.0 billion persons, nearly as much as will be added to the world population of 2.2 billion (UNFPA, 2007). These urban population dynamics have to be understood in the context of the need to improve human welfare. The Millennium Development Goals (MDGs), which are numerical time-bound goals for reducing human suffering, have one of their goals being to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015 s (Laia *et al.*, 2008). The provision of safe drinking water and basic sanitation also contributes to sustainable improvements in people's lives regarding their health, education and economic situation, eradication of extreme hunger and the empowerment of women (UNICEF, 2010).

Urban water supply presents challenges that are unique in water resource management (Ruiz-

Villaverde, 2010). These primarily relate to the need for very high reliability and security of supply. Furthermore, in the provision of water and sanitation services, there is need to balance social and economic needs for water (UNICEF, 2006). This makes managing urban water a challenge, especially given that the demands for water are increasing yet the availability of the resource is decreasing due to deteriorating quality of the resource and climate change related factors (Hellmuth, 2006). It is thus crucial for water service providers to ensure a balance of social and economic needs for water.

Traditionally local authorities have been responsible for the management of water supply in urban areas (Hardoy, 2001). However, over the years changes in approaches to governance have resulted in a number of sectors, including the private sector, the public sector or a combination of both sectors, acting as water service providers to urban residents. According to Shen *et al.*, (2008), choice of an appropriate public or private service to manage urban water is a recurring debate. As a result of opposing arguments and the absence of conclusive empirical evidence in favour of one kind of management or the other, this has prompted several studies since the mid-1980s to investigate what factors influence the choice of management for local public utilities (Shen *et al*., 2008)

1.2 Background to Urban Water Management in Zimbabwe

Water supply and sanitation services in Zimbabwe are delivered under two main management models, which are either public or private. Within the public management model the main providers are the Zimbabwe National Water Authority (ZINWA) and the local authorities which are mostly municipalities. Private service providers include private companies. However, in some cases private companies work together with local municipalities to provide water and sewerage services in urban towns of Zimbabwe. It is important to note that different service providers operate under different pieces of legislation, and this can have an effect on the management approaches used to provide water services to residents.

However, recent reports from the civil society conducting rapid assessment for urban towns in Zimbabwe (UNICEF, 2010) and the media have shown the challenge of providing adequate and

reliable water across the country. Urban water management has also been a great challenge as a result of government intervention through subsidy programmes. This has also led to many local water utilities failing to deliver good service to its residents because of shortage of funds. Realizing the poor cost recovery for most urban towns, some international organizations such as UNICEF, have greatly and positively intervened in most urban towns providing chemicals for the treatment of water and materials and equipment required at the water treatment plants.

1.3 IWRM in Urban Water Management

Attempts to improve water management have included the implementation of Integrated Water Resources Management (IWRM) in the management of urban water services. IWRM is a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP, 2000). Within the IWRM context and approach, economic efficiency and stakeholder participation are considered to be critical in the sustainable management of water resources and this has consequently a bearing ion how water utilities approach service provision.

Given the above critical elements required for the successful and sustainable management of water resources, there was need to assess the performance of local water utilities responsible for urban water management in Zimbabwe to see if they are in line with what will make the utilization and management of the vital, finite and fugitive natural resource sustainable. It is also critical to assess the effectiveness of governing legislations and the existing institutional framework for the water sector as these determine how the allocation and management of water is supposed to be handled in the country.

1.4 Problem Statement

According to USAID (2003), public works systems in the Third World have long been recognized as complicated and disorganized. It further states that most urban utilities in Third World cities are not strong organizations and do not provide good services in general. This has

prompted many studies to be conducted in relation to effectiveness, performance and efficiency of water utilities in the provision of water for urban areas. Results from these studies indicate that there is generally poor provision of water services in small towns and the institutional arrangements are weak. . In Zimbabwe most investments towards rehabilitation of infrastructure in Zimbabwe have been focusing on large cities such as Harare, Bulawayo and Mutare, but according to UNICEF (2010) populations in the country's small towns have been growing rapidly. Consequently this has placed a huge burden on the water supply systems infrastructure in these small towns. Nhapi (2009) suggests that there is limited human capacity and financial capacity in urban towns to provide efficient water services. This study aims compare the performance of the two water supply management systems and to contribute towards bridging the information gap that is existing for small towns so as to influence policy makers to redirect more funds to the upgrading and resuscitation of small towns water supply systems.

1.5 Objectives

1.5.1 General Objective

To compare the management of urban water supply systems under different management models in small towns.

1.5.2 Specific objectives

1. To assess the quality of water services in urban areas under ZINWA and local authorities management.
2. To investigate factors affecting revenue collection for the water supply systems in small urban towns.
3. To review the legislation governing urban water supply in Zimbabwe.
4. To evaluate stakeholder involvement in urban water management.

1.6 Justification

Provision of safe drinking water and basic sanitation is among the most critical challenges for achieving sustainable development (Shen *et al.,* 2008). There is need therefore of functional and

efficient water supply systems to ensure provision of water so as to attain the MDGs. This study will assist in contributing towards the attainment of the MDGs through the provision of safe water to the populations in small towns.

Various studies on performance of water utilities which provide water to the majority globally indicate that assessment of performance of small towns urban water supply systems have not been dealt with. This study therefore aims at reducing the information gap that is there for performance of small towns in the country.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing body of literature on urban water management. The first part will give some highlights of the global status with regards to management of water in urban areas and some of the key considerations in the provision of water. Beyond key considerations in the provision of water, challenges faced during provision will also be reviewed and issues of water pricing and its impact on household practises and general welfare of people will be examined. A review of the importance of stakeholder involvement and participation in urban water management will also be done. A review on why some towns opt for privatization of urban water management will mark the end of the literature review.

2.2 An Overview of the global population and need for government intervention

One-third of Africa's and Asia's population live in towns of between 2,000 and 200,000 people (World Bank, 2010). Urban population is expected to double within 15 years, and to double again within 30 years. This rapid pace of urbanization, together with challenges and opportunities for local governments resulting from decentralization, make town water supply and sanitation (WSS) fundamental to economic growth and achievement of the Millennium Development Goals. When taken as human right, the right to water places certain responsibilities upon governments to ensure that people can enjoy sufficient, safe, accessible and affordable water, without discrimination citizens (Derman, 2007). Most especially, governments are expected to take reasonable steps to avoid a contaminated water supply and to ensure there are no water access distinctions amongst.

According to a report on the International Year of Freshwater (2003), by the year 2020, some 60% of the global population will be living in urban areas. Currently, more than 80 countries, with 40% of the global population suffer from severe water shortages. Urban water demand is escalating as the world population is increasing and more and more urbanization is taking place worldwide. There is also limited water resources available, increasing competition over different water uses and interests and decreasing access to good-quality water as most of the nearby and good-quality sources have already been overexploited or exhausted. Furthermore, the capital and and operation and maintenance costs of water treatment, transport and distribution are increasing. Therefore, providing good-quality drinking water regularly to an increasing world population is an increasing challenge for water supply utilities globally (Ammons, 2001).

2.3 Key issues and considerations in the provision of water

In most third world countries, urban authorities are currently responsible for the provision of a wide range of services in their municipalities, ranging from duties such refuse collection, provision of water and basic sanitation, traffic control as well as activities with social purposes, such as care of the elderly or the development of leisure activities (Ruiz-Villaverde, 2010). Various approaches have been used for urban water management around the world. These have ranged from the private operation of publicly owned and funded systems via service contracts (common in France) to joint public-private operation and ownership via joint ventures (used in Colombia) and full privatization such as in Great Britain (David, 2005).

Availability of Water

Various issues have been documented as important in the sustainable provision of water in small towns. Schutte, (1996) identified availability of water as one of the critical challenges of urban water management. He further states that water supply for each person must be sufficient and continuous for personal and domestic uses. These uses ordinarily include drinking, personal sanitation, washing of clothes, food preparation, personal and household hygiene. According to a UNDP report (2006) human right to water is limited to personal and domestic uses and foresees a

supply for each person that must be sufficient for these purposes.

Water Quality

David (2005) identifies the issue of water quality as important in the provision of water. He elaborates that the quality of water required for either personal or domestic use must be safe, that is, free from micro organisms and chemical substances that constitute a threat to a person's health. Mostert (2003) emphasizes the need for water and sanitation facilities and services to be accessible to everyone without discrimination. According to Nair (2010) accessibility has three overlapping dimensions which are physical accessibility, economic accessibility and information accessibility.

Physical accessibility

Physical accessibility implies that the water, and adequate water facilities and services must be within safe physical reach for all sections of the population. Sufficient, safe and acceptable water must be accessible within, or in the immediate vicinity, of each household, educational institution and workplace (UN, 2008). Physical security should not be threatened during access to water facilities and services. Water and water facilities and services must be accessible to all, including the most vulnerable or marginalized sections of the population, in law and in fact, without discrimination on any of the prohibited grounds. Inappropriate resource allocation can lead to discrimination that may not be overt. States must also make sure that women are not excluded from decision making processes concerning water resources and entitlements (UN, 2008). The disproportionate burden women bear in the collection of water should be alleviated. Provision of adequate water to educational institutions currently without adequate drinking water should be addressed as a matter of urgency (Hellmuth *et al.*, 2002).

Economic accessibility

Economic accessibility implies that the water and water facilities and services, must be affordable for all. The direct and indirect costs and charges associated with securing water must be affordable, and must not compromise or threaten the realization of other human rights (Ndaw,

2005). To ensure that water is affordable, States parties must adopt the necessary measures that may include, inter alia: use of a range of appropriate low cost techniques and technologies, appropriate pricing policies such as free or low cost water and income supplements. The direct and indirect costs and charges associated with securing water must be affordable, and must not compromise or threaten the realization of other Covenant rights (McIntosh, 2003). In general, the water service is affordable when not more than 2% of the average family income needs be spent on water (Misiunas, 2005).

While the social and public health requirements of access to public water supply have largely been fulfilled in Organization for Economic Co-operation and Development (OECD) countries, some still have as many as a quarter of their population without individual household connection to piped supply. As for wastewater collection and treatment, several OECD countries have a backlog of investment requirements, with the result that they still do not meet their own water quality standards (Hellmuth et al., 2002).

Information accessibility

Information accessibility is also noted as one of the key considerations in the provision of water. Information accessibility includes the right to seek, receive and impart information concerning water issues. According to a UN report (2002), all states are obliged to make information about water freely accessible.

Staff productivity

According to Rodriguez *et al.,* (2004), staff productivity is not easy to assess given the fact that Water Branch in every utility operates as a part of a wider administration. A common basis for estimating efficiency is the number of connections per staff member. The World Bank classifies productivity of more than 100 connections per staff member as 'good' (Shen *et al*, 1994). Other research done in other parts of the world found rates of 171:198(Brazil), 226 to 248 (Mexico), 83 (Malaysia (Stenekes, 1996). It is important to consider staff productivity in the provision of water in urban centers as this will determine efficiency of a water utility.

Technical efficiency

Another issue that is crucial in the provision of water urban centers is the technical efficiency of a utility. Technical efficiency measures the ability of an organization to use its resources productively to generate outputs (Thompson *et al*., 2009). From available information, assessments of efficiency in the use of staff and water resources and in the financial management of the water account can be done. In the provision of water, a water utility is expected to be technically efficient.

Unaccounted for water

Unaccounted for water should also be considered in the provision of water. This should be considered so that when water budgets are being prepared, under estimates are avoided which can lead to water shortages in the urban centers. Unaccounted for water is the proportion of water that it is not extracted from the supply system but not charged to customers whether due to leakages, illegal connections, poor measurement or uncharged connections (Binnie *et al*, 2003).

Return on water describes the real cost of production and the revenue which should be earned from its sale. This should be considered in the provision of water. In the City of Bulawayo in Zimbabwe, reclaimed water is always sold at a below cost price but accounts for a very small proportion (between2-4%) of the whole.

Collection efficiency

Collection efficiency is crucial in the provision of water. This will determine the sustainability of water institutions and the level of service satisfaction by residents. In Zimbabwe, meter reading, billing and collection are undertaken by treasury staff. Generally in developing countries, citizens have a habit of paying their bills and arrears have been no higher than 10-15% (Rosegrant, 2003). According to IPS (1997), in a study done in Bulawayo in 1996, some of the reasons for growth of arrears were: rise in tariff levels, application of stiff penalties for consumption above ration, a mass campaign against payment, a computer breakdown which delays billing and separation of utility bills from rentals. It has been noted that revenue collection efficiency is also generally low in low pressure and urban poor areas as people are not willing to

pay for an unreliable, inadequate and low level of service (UN. 2002).

2.4 Key Challenges in supply of water in Small Urban Towns

2.4.1 Rapid population growth

Towns with population between 2,000 and 50,000 face special challenges in WSS. The demand for various technologies; piped water supply in the core, alternative technologies in the fringe areas and the often rapid and unpredictable water demand growth and spatial expansion require planning, design, and management skills that go beyond those needed for community-based management approaches in rural areas (World Bank, 2001). But, unlike larger towns or cities, these smaller towns often lack the financial and human resources to independently plan, finance, manage and operate their WSS (Yan, 2010).

2.4.2 Limited government resources

Another key challenge for small town WSS is to allocate limited government resources among a large number of dispersed towns. According to a World Bank report (2010), for every large town (50,000 to 200,000 people) there are ten smaller ones (2,000 to 50,000 people). The goal should therefore be to establish town utilities with the minimum viable investment, and to ensure that reforms are put in place so that the utilities can meet carefully defined cost-recovery objectives (World Bank, 2001).

In addressing the small town WSS challenge, governments may need to identify appropriate management arrangements that can cut across more than one town, ensure that design and financing requirements are suited to these towns, and make arrangements to secure effective professional support, for example by contracting with local partners (Martin, *et al,*. 2009). A business planning approach that integrates these aspects of service provision and factors in the role of both utility managers (service provision) and town administrators (regulatory oversight) is a fundamental part of town WSS (World Bank, 2001).

Water resource scarcity, poor quality, complex and aged infrastructure, high rate of growth of population and water demand, high water losses in the distribution system, low cost recovery and high subsidy, poor management and institutional framework are some of the common characteristics of urban water supply systems in developing countries (Schutte 1996).Various challenges are faced by urban water institutions which consequently result in poor service delivery. The main water issues facing Alexandria in the United States include; deterioration of water quality at end users, lack of proper maintenance of networks supplying water to users, ensuring water supply and sanitation services to all areas in Alexandria and these problems are compounded by the fact that Alexandria has not been able to mobilize sufficient government funds to address these issues (Carter, 1992).

However on the other hand despite non availability of funds from the government, implementation of leakage reduction and control programme is also difficult in many cities of developing countries where the water supply is intermittent (only a few hours per day) and the pressure is low (McIntosh 2003). In cities with a low pressure water supply of short duration, water-saving devices for toilets, bathrooms and kitchens may not be effective. Additionally, retrofitting with water-saving devices may not be feasible in these cities at least for a few more years to come, where the majority of the population do not have access to flushing toilets, washing machines or dishwashers and they may not be attractive to people who are struggling to get water for basic needs (Nair, 2010).

2.4.3 Poor cost recovery

Poor cost recovery is often regarded as a major contributory factor to the poor sustainability of urban water management in developing countries. It reduces the capacity of responsible institutions to increase service coverage and on the other hand, an urban supply system cannot survive without a sound financial base and proven methods of cost recovery. Water losses in poorly managed systems can be considerable and when such losses occur they make economic viability even more difficult. Major development agencies such as the World Bank supports the economic concept of willingness to pay for water (Becker, 2009). People's demand for services

is shown in prices, as demand increases people's WTP also increase and this consequently improves the service delivery of a water utility.

2.5 Water pricing

While local authorities and service providers may see the need to charge cost effective prices, central government may intervene and block such moves as a result of resident protests and failing to understand the economic value of water and this normally results in water being underpriced and poor urban water management.

The World Commission on Water (WCW) has estimated that to meet all water supply and sanitation, irrigation, industrial and environmental water demands, investments in water infrastructure needs to increase from the current level of $75 billion to $180billion a year (World Water Vision, 2000:51). This enormous investment gap will demand innovative thinking and that integrate approaches be met, while well-targeted subsidized public investments will still be needed. The development and long-term sustainability of the necessary infrastructure will certainly require the systematic adoption of integrated water resources management and introduction of appropriate water pricing mechanisms. Without adequate pricing mechanisms, consumers have no incentive to use water more efficiently as they receive no signal indicating its relative value (ADB, 1997).

According to Interconsult (1985), water rates have three major functions; economic, financial and social. Economic function is to ensure that scarce resources are allocated efficiently, the financial function is to see that costs are covered by revenue and social function requires that consumers are provided with their basic needs at a price which they can afford. Unfortunately no policy can satisfy both economic and financial criteria. This is because economic criteria would require different prices at every supply but the disadvantages of a uniform pricing policy are considered to be outweighed by the advantages. Secondly, there is spare capacity, the low rate demanded by the economic criterion would fail to meet the least ambitious financial criterion. Hence either one criterion must be ignored or a compromise must be achieved.

Many experts seem to agree that poor access to water supply is often a result of poor policies and management practices (Yan, 2003). However, there is significant disagreement over the approach to addressing the problem. In direct opposition to lobbies demanding that water be treated as a human right, experts at agencies such as the United Nations and the World Bank argue that a first or crucial step toward improving the water situation and its management is to treat water as an economic good (World Bank 2001). *The Economist* is even more emphatic and specific, it concurs that water has been ill-governed, but argues that the problem above all, is that it has been colossally underpriced." It concludes that in meeting the ambitious water target of halving the proportion of people without access to clean water, money will play a part. But greater reliance on pricing and markets are even more crucial. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources. Economic factors play an increasing role in water management. However, full appreciation of the value of water and more systematic water pricing could substantially improve water management. Prices for water have increased considerably in real terms over the past decade. This has been partially attributed to rising of quality standards for water supply. On the other hand the supply of clean freshwater is becoming more and more due to the increasing pollution and overexploitation of the water resources. Water is now being transferred from further and further away because of scarcity.

According to Pearce (1990), water tariffs and charges convey a signal to water users on the value of water. Incentives for water conservation are given by metering, volumetric charges, increasing block-tariffs and a move towards Full Cost Recovery as these instruments lead to a better reflection of marginal costs in water prices. Pearce and Turner further explain that water is usually under-priced as it best covers the direct use value or the production costs which is far below the marginal opportunity costs which include the production costs, the external costs and foregone future benefits due to resource depletion. As water scarcity grows, prices tend to accelerate due to higher production costs, rising external effects and if care is not taken rising foregone benefits due to water mining. It is therefore important to estimate the optimal price of water.

Determination of the optimal price is difficult (Howe, 1967) because of the absence of

competitive markets in water supply (Alarerts1998). Monopolies do not necessarily equate the marginal cost of supply to the consumer's willingness to pay and thus to ensure efficient water use and affordable water, step or block tariffs are commonly used. Step tariffs encourage water efficiency use, as the marginal price of water increases from the first to subsequent blocks (Alarerts, 1999).

Affordability is the social aspect of water service provision that is most clearly and closely linked to pricing policies. Affordability of water services may not be distributed equally across income groups or neighborhoods as seen in the case of Dhaka in Bangladesh, a lower income household will inevitably pay a higher proportion of their income for water services than a higher income household does (Haq, 2006) and thus it is important to consider the social and economic value of water.

2.6 Effects of water pricing on household water use practices

Ability and willingness of a household to pay for water depends of many factors among them being the household income and quality of service delivered by the service provider. However in Zimbabwe due to the poor service delivery by most water utilities across the country, water shortages were prevalent and this led to many residents to reside to unsafe water source. This consequently resulted in the cholera outbreaks which have taken place on an annual basis in Zimbabwe since 1998. The situation worsened from August 2008 and as of May 2009, over 97,000 cases had been reported which had lead to the death of more than 4,200 people country-wide (UNICEF. 2009). The outbreaks are clearly linked to the lack of safe drinking water and the inadequacy of sanitation due to lack of chemicals for everyday operation of water and wastewater treatment plants and maintenance of facilities.

South Africa has made incredible progress in providing water supplies to its people, though managing fee structures has been a challenge. A cholera outbreak occurred in August 2000, in the province of KwaZulu Natal and infected nearly 14,000 people and claiming more than 250 lives (Laia *et al*., 2008). This outbreak began after local authorities cut water supplies to people living in an informal settlement who were unable to afford new user fees (DWAF, 2004). The

government admitted that the policy of cost recovery exacerbated the cholera epidemic, forcing households to seek alternative water sources. In the build-up to privatizing water services, South Africa reversed its policy of keeping tariffs low and overlooking non-payment. But this reversal occurred overnight and without concurrent measures to ease the financial burden on the poor people (Laia *et al*., 2008). Another case is that of Cochabamba, Bolivia, in the early 2000 when protests occurred largely in response to the tripling and quadrupling of household water costs. This price hike was there when a London based private company Aguas del Tunari, took over the city's water system (World Bank, 2001). The protests effectively shut down the city for four days. And as protests spread throughout Bolivia, 50 people were detained, dozens injured and 6 died from the violence. However, South Africa due to the above mentioned programmes has a policy which entitle each household access to a certain amount of litres of water for free per month.

The above mentioned negative effects imply that if residents are not happy with the water price and they fail to pay, chances are high that they resort to unsafe water sources resulting in an increased burden of water related diseases and on the other hand some residents may protest and this may result in other worse effects such as loss of lives.

2.7 Stakeholder involvement in urban water management

Most countries in southern Africa, such as Zimbabwe, South Africa, Malawi, Tanzania, Zambia and Namibia, have embraced the philosophy of stakeholder participation in water resources management (Manzungu, 2004). In order to show their commitment to stakeholder participation in water management, South Africa, Malawi, Tanzania and Zimbabwe have already introduced laws, which provide frameworks for the establishment of stakeholder water institutions (Manzungu, 2004).

Stakeholder involvement is recognized as an important factor in the successful implementation of water management plans, particularly when efforts are made to resolve competing and conflicting demands in areas facing water scarcity (Gerasidi *et al*., 2009). Involving stakeholders enables, first, a better understanding of different parties that have an interest in water

management problems; second, the process can articulate more clearly the context of agreements and disagreements; and finally it can also significantly contribute to conflict management or conflict resolution (Becker, 2009). In this regard, stakeholder involvement in water management processes has been applied as a means of resolving water allocation conflicts for example in the island of Paros, Greece. This Island faced a challenge of identifying solutions to the water management issues in the island and ensuring urban water demand coverage taking into account the high seasonal tourist influx, while at the same time securing an equitable water allocation for all water users in order to avoid, manage or resolve existing and emerging conflicts. To achieve this dual goal, the close collaboration among stakeholders and institutions active in the management of water in the island was crucial towards promoting improved water governance, valuing and equitable sharing of water resources (UNDP 2006). More important, however, the process also revealed and identified common perceptions and points of convergence in support of demand management options, socio-economic measures and institutional adaptations. Through the different steps of the process, all stakeholders bridged differences and came to a consensus as a diverse group, advocating soft-path measures and reforms, encouraging public participation in decision-making and contributing to integrated urban water management planning (UN-HABITAT, 2006).

Of late Integrated Water Resources Management (IWRM) has become the dominant paradigm in the management of water resources (GWP, 2009). The third Dublin principle of IWRM is on participation by all stakeholders (SIWI, 2005) in the management of water resources. What is the rational for managing water with the involvement of stakeholders? IWRM combines interests, priorities and disciplines as a multi-stakeholder planning and management process for natural resources within the catchment ecosystem, centered on water. In southern Africa it has been observed that participation has mainly been an issue in the farming sector because of the interest which commercial farmers had in the sector (SIWI, 2005). Many studies on stakeholder participation particularly in Zimbabwe have been done by authors such as Chikozho, Swatuk, Kujinga, Mabiza and Manzungu in the 90's and the 20th century. However, in urban areas there is still scope for analyzing how participation is taking place, and one such area which needs inquiry is that of tariff setting.

2.8 Privatization of Urban Water Management

Only about 5% of the world's people (about 300million) receive their water from private companies. Private companies are unlikely to be interested in providing water services in rural areas in low-income countries because rural areas are generally considered unprofitable (UN, 2003). Privatization of water services has often led to increased tariffs largely unaffordable to poor households. In the year 1995 the Philippines was declared a water crisis because the public water utility had left 3.6million people unconnected to a water supply and in 1997 two private water companies won concessions to take over Manila's water system. After five years the companies had connected roughly 2 million more people to the network and service had improved significantly but within these years, the private companies had operated below their targets and thus by January 2003 water tariffs had risen by two to five times 1997 rates. By 2000, residents survey in 100 districts revealed a mixed perception of privatization, with 33% of respondents noticing better service, 55% noticing no change and 12% noticing deterioration (Thompson, 2000).

2.9 Summary

This chapter has reviewed literature around key issues that affect the performance of water utilities in small towns and cities in general. There are various considerations which include water availability, water quality, information accessibility, economic accessibility, technical efficient, staff productivity which affect the performance of a water utility. Some of the key challenges highlighted in the literature review include limited government resources, poor cost recovery and rapid population growth in the urban areas. Concerning stakeholder participation, it can be noted that most countries in southern Africa embraced the philosophy of stakeholder participation in water resources management promulgated at the Rio-Dublin conferences (Kujinga, 2002). The view taken at the international level is that stakeholder participation in natural resources management, leads to improved decision-making by making the process transparent, inclusive and fair.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Introduction

This chapter gives a brief outline of the study areas. The chapter discusses the research design and sampling techniques used. Research instruments used to gather data analytical framework used will also be discussed.

3.2 Description of Study Areas

This study was conducted in four small towns in Zimbabwe which were purposively sampled. As mentioned in Chapter 1, the study sought to compare the management of water supply services management in towns under different management models, focusing specifically at towns whose water services are managed by the national water authority and those which are managed by the local authorities. For this reason Karoi and Gokwe, which have their water supply managed by ZINWA, and Rusape and Chipinge, which are managed by the council were selected for the study.

3.2.1 Chipinge

Chipinge Town, which falls within the Save Catchment, and administratively in the Chipinge District, Manicaland Province, has a population of 30,000 (CSO, 2004). The town is located on a hilly area where rainfall is relatively high (700-900mm/annum) for Zimbabwe and land is fertile. The town's main water supply comes from the Bangazaan Dam. Water supply is also augmented by four boreholes, three of which serve Gaza high-density area and one the town’s low density suburb. Chipinge has one operating water treatment plant, which is at Bangazaan. The Council

has only been established for about 5 years being formed out of the Chipinge District Council which still administers rural areas around Chipinge town. The water supply section is headed by a Town Engineer.

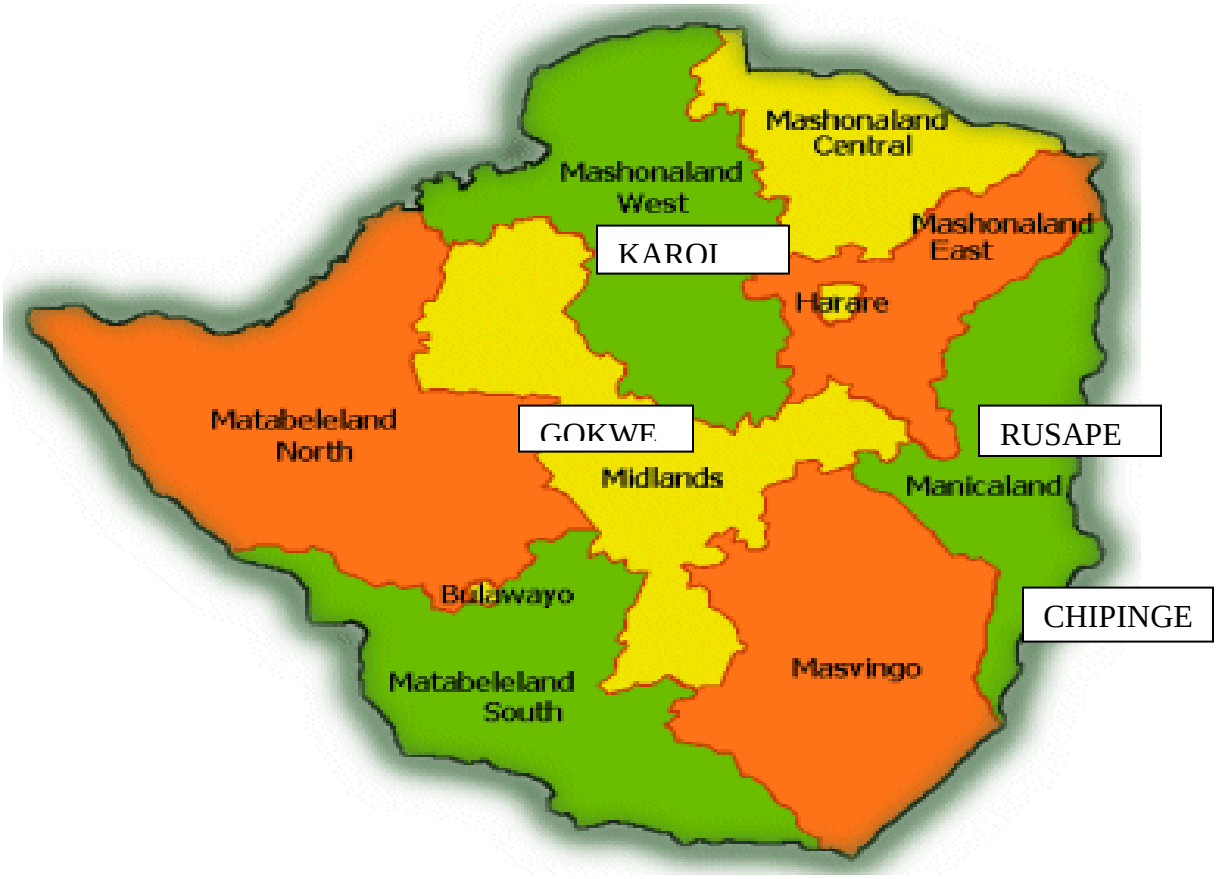

Figure 3.1: Zimbabwe Map showing the study areas

3.2.2 Gokwe

Gokwe falls under Sanyati Catchment and is located approximately 340km south-west of Harare which is the capital city of Zimbabwe. Gokwe attained town status in 2007. The estimated population of the town is 25,064. This is distributed across the residential areas of Nyaradza,

Mafungautsi, Njelele, Sesame 1, Sesame 2, Cheziya, Green Valley, Police Camp, Tsetse Camp.

The town is one of the six urban centres in the Midlands Province. Gokwe Town Water Supply falls under the administration arm of Sanyati Catchment. Currently five out nine boreholes present in the town are supply water to the urban areas.

3.2.3 Karoi

Karoi is a town in Mashonaland West province of Zimbabwe. The town is located approximately 200 km north west of Harare. It is situated in a farming area. In 1945 Karoi was designated for World War 2 white war veterans who obtained government assistance to embark on farming tobacco in the area. The population of Karoi Town in the 2002 census was 24,763 but Karoi Town Council estimate the current population to be 27,000 in three urban residential areas known as Town and high density areas of Chikangwe and Chiedza. Another 11,000 people also reside within the administrative rural area of Karoi. Karoi is located in the Manyame Catchment. Water services in the town are managed by ZINWA

3.2.4 Rusape

Rusape is a town in the province of Manicaland. The town is situated approximately 170 km south east of Harare and 93 km North West of Mutare. Rusape is a sprawling town. The name Rusape was derived from the word 'rusapwe' which means 'never dries out', with reference to the perennial Rusape River close to which the town was built. The town is in the Save catchment. The main high density area in the town is Vengere Township. According to the 1992 (this is too old, why not use the 2002 figures?) Population Census, the town had a population of 13,920 and this rose to21 000 in 2002. Currently it is estimated to be 30,000 (Rusape Town Council report, 2006). The settlement began in 1894 with the establishment of a British South Africa Company on the Rusape River. Residential areas include, Castle base, Jacaranda, Silver Bow, Crocodile, Magamba, Mabvazuva, Vhengere and Tsanzaguru. Water supply services in the town are managed by the Rusape Town Council.

3.3 Data Collection

3.3.1 Research Design

According to Luck and Rubin (2002), research design refers to the general research approach or strategy adopted for a particular project. It is how the research is planned, specifically the heart of planning. Research design ensures that research objectives are achieved. This study employed both qualitative and quantitative research methods. The main idea behind quantitative research is to be able to separate issues easily so that they can be counted and modeled statistically, to remove factors that may distract from the intent of the research (Hopkins, 2002). Quantitative methods are important because they state the research problem in very specific and set terms clearly and precisely (Frankfort-Nachmias and Nachmias, 1992). Quantitative data were collected using a household questionnaire survey.

Qualitative research is a method of inquiry employed in many different academic disciplines, traditionally in the social sciences, but also in market research and other contexts (Denzin *et al.*, 2005). Qualitative methods are used to collect data on facts from an individual point of view. Attitudes, perceptions and knowledge of stakeholders with regards to service delivery and water pricing policy for the different models were assessed. Qualitative methods are conducted in a natural setting, without intentionally manipulating the environment. It involved highly detailed rich descriptions of human behaviors and opinions. In this study, key informant interviews were conducted as a way of gathering qualitative data.

3.3.2 Sampling

Purposive sampling was used to identify the four towns under study. Systematic convenience sampling was used to select the households which were interviewed as suggested by Depoy and Gitlin(2005). Households willing to participate in the research were interviewed. Purposive sampling was also used to identify key informants who were interviewed and snowball sampling so as to gather sources of other relevant and insightful information.

3.3.3 Data collection techniques

Desk Study

Usually there is a large amount of data that has already been collected by others, although it may not necessarily have been analyzed or published. Locating these sources and retrieving the information was the starting point. This method involved analysis of the information routinely collected by water managing institutions in the four areas was useful for identifying problems or challenges in certain interventions. Desk study was used to review existing legislation (Water Act, Urban Councils Act and ZINWA Act) in Zimbabwe.

Key Informant Interviews

Key informant interviews are qualitative in depth interviews with people who know what is going on in the community. The purpose of using key informant interviews was to collect information from a wide range of people who had the first hand knowledge about the community (Carter and Beaulieu,1992). Key informant semi-structured interviews ensures valuable data is gathered in a relatively easy and inexpensive way, allows interviewer to establish rapport with respondent and clarify questions, provides an opportunity to build a relationship with important key stakeholders in the community, raise awareness and enthusiasm around a certain issue and also the interviewer can easily contact informants for further clarification. Inorder to investigate the factors contributing to poor service delivery and low revenue collection, and the role of stakeholders in urban water management, key informant interviews were conducted. Four key informant guides which captured; administrative issues (Appendix 2), revenue collection efficiency (Appendix 3), water tariff setting approaches (Appendix 4), technical issues affecting revenue collection (Appendix 5) were developed and used. These key informant interviews were conducted with relevant senior personnel within the water utilities of the different towns. In general, these interviews sought to assess: institutional capacity, customer care operations, information on service delivery, revenue collection efficiency, challenges faced during revenue collection, water utility expenses against income, illegal connections and how they are handled, water rates and procedures for setting tariffs, stakeholder involvement in the setting of tariffs and technical issues affecting revenue collection.

Key informants from the councils were the Town Council Administrator, Town Council treasurer, Town Engineer and from the ZINWA managed towns, key informants were: the station managers, the water supplies manager for the catchment and the Catchment manager. Documented data such the Acts were used to validate the information given. Observation of phenomena was also used to validate the responses given by the key informants.

Another key informant interview guide was developed and used for the Ministry of Water Resources Management and Development (Appendix 6). This interview sought to assess the institutional framework in the water sector, the link between the Ministry and ZINWA and Urban Councils as well as the role of the Ministry of Water Resources Management and Development in urban water management.

Household Questionnaire

A household structured questionnaire was designed and this was the main quantitative data collection instrument used for this study. This involved administering a set of formal questions to a selected group of people and recording their responses. The questionnaire was first piloted to 20 households so as to remove all sources of weakness, error, bias and to erase ambiguities.

After the pilot test, a standard questionnaire was finalized and administered to all the household in the low, medium and high-density suburbs of the respective towns (See Appendix 7 for the household questionnaire). The household questionnaire sought to assess perceptions of the residents with regards with to the service delivery, water sources and alternate sources, ability and willingness to pay of residents, knowledge of residents with regards to how their tariffs are set, assess the level and kind of participation of residents with regards to setting of tariffs, impact of set tariffs on service delivered to them, assess the contributory factors to high or low revenue collection, impact of water price on willingness and ability to pay and the total revenue collected. Table 1 below shows the sampled areas and number of households sampled for each town.

Table1: Sampled Households distribution

	Chipinge	Sampled Size	Gokwe	Sampled Size	Karoi	Sampled Size	Rusape	Sampled Size	Total
Low Density Surburbs	Low Density	43	Green Valley	22	Town	37	Castle BASE	22	140
							Jacaranda	16	
Medium Density Surburbs	Medium Density	64	Sasame	23	Jubilee	43	Mabvazuva	29	185
			Nyaradza	26					
High Density Surburbs	Gaza	78	Cheziya	25	Chikangwe	53	Vhengere	85	395
			Mafungautsi	55	Chiedza	57	Tsanzaguru	42	
Government Residents				45					45
Total Sample Size		**185**		**196**		**190**		**194**	**765**

3.4 Data Analysis

A database was created using Statistical Package for Social Scientist (SPSS) files where the questions were entered and responses coded. Data from the questionnaires was entered in SPSS. Prior analysis, data was cleaned and later analyzed using the software. Data was explored for frequency of responses, distribution trends, statistical relationships and significant differences of responses between the four towns.

Responses from the key informant interviews were used to validate the responses of the households. Data from these interviews was analyzed using the thematic approach whereby key issues from the various responses were grouped together under a common theme and examined. Feedback meetings with some of the key informants were held so as to eliminate errors of bias or misinterpretation of respondent's views and also to validate the themes developed.

3.5 Ethical Considerations

Ethical considerations are critical so as to observe the rights of people for privacy, safety, confidentiality and protection from deceit with the pursuit of scientific endeavor (Polit and

Hungler, 1998). Consent was sought first for each household before the questionnaire was administered and the purpose of the research was clearly explained to all the respondents. ZINWA and Council as water service providers in the four towns were engaged from inception right up to end of the research.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the research. The chapter begins with a review of the legislation on water governance in Zimbabwe, which also applies to urban water management. Performance indicators were analyzed in detail using information collected from the Key informant interviews and household questionnaires on the perceptions of residents on service delivery, their willingness and ability to pay and also water utilities views with regards to their service delivery. This will be followed by an analysis of the impact of water tariffs and service delivery on revenue collection. Lastly the chapter discusses stakeholder involvement in urban water management and in particular, in the setting of water tariffs.

4.2 Water supply systems service delivery

In order to assess the quality of service delivery of the water supply systems in small towns, it was important to first trace the background of the urban water supply systems and some of the institutional structures which may affect its operation.

4.2.1 Institutional Framework in the Water Sector

A key informant interview was held with the Ministry of Water Resources Development and Management (MWRD) so as to identify the key players affecting the operations of water supply systems in Zimbabwe. The Ministry of Water Resources Development and Management is the lead Ministry in water management in Zimbabwe. Various structures have since been formed in 2010 after a Ministerial Committee convened to discuss the roles and responsibilities for the key players in the water sector. All the reporting channels in the water sector end at the Presidium

level which is headed by the Deputy Minister of Infrustructure Cluster. In Appendix 1, there is a clear elaboration of the structures which were formed after the Ministerial Committee and the reporting structures and the various Chairs for the different Committees at the different levels. These institutional arrangements are almost similar to those in Senegal where the water sector is currently organized around four government institutions; The Ministry of Prevention, Public Health,Sanitation and Urban Water Services, Ministry of Agriculture, Rural Water Services and Food Security, Ministry of Economics and Finance, the Supreme Water Board and the Water Technical Committee (Ndaw, 2005). The only difference with Zimbabwe water structure is the naming of the specific ministries but generally all stakeholders involved in water issues are part of the structure in both countries. All these external stakeholders involved in the management of water fulfil a number of important functions in the planning and operation of a water supply institution (Baieti, 2006) which include; policy making, ownership, regulation, demand for service or entitlement to receive services; and financing or authority to secure financing in both debt and equity. Thus it is important to have these structures in place as they promote accountability within the institutions running the water supply systems in small towns.In Zimbabwe the structure is now strong though handling of water issues may not be a core issues for a chairing ministries which is not MWRDM and thus this may result in less commitment and enforcement of the Water legislations which may consequently affect service delivery. However this can be addressed by making water a priority for those lead ministries so that they handle water issues more importantly.

4.2.2 Legal and Regulatory Framework

To assess performance versus set targets for water supply institutions, a review of legislation governing the water supply systems of the ZINWA and Council institutions was done. The two types of water supply systems under study have different legislations which they operate under. Council managed water utilities in Rusape and Chipinge operate under the Urban Council's Act complimenting it with the Water Act of 1998. ZINWA managed water supply systems in Gokwe and Karoi operate under the ZINWA Act of 1998 which was extracted from the Water Act of 1998.

The Urban Councils Act Chapter 29: 15 governs the management of urban areas in Zimbabwe. Part XIII: 183 of the above named Act applies to water supply services in urban areas. The clause specifies the responsibilities of the council concerning the provision and maintenance of supply of water within or outside the council area. However, a weakness of the Urban Councils Act is that it does not give sufficient guidance for the management of urban water supply services. The Urban Councils Act is that a large document but has a very thin clause on water yet water issues are pertinent to the every sector. The thin clause does not give details of how the urban water management should be done. Issues such as water tariff setting procedures are not addressed in the Act. There is no clear designation of who should regulate water management in urban areas. Notably other Southern African countries such as South Africa and Zambia, have Urban Water and Sanitation Acts which are specific to the water supply and sanitation in urban areas. These clearly stipulate the institutional arrangements that should be in existence in urban areas and their roles in the management of water services. Also worth noting is that Zimbabwe does not policy on urban water services. The urban water policy was drafted in 2004 and amended in 2007 but never finalized and thus the country does not have a water policy document.

The ZINWA Act of 1998, is an organizational based legislation. It mostly refers to catchment management rather than to urban water management of towns. The ZINWA Act also does not clearly stipulate the role of ZINWA as far as the management of urban water supply systems is concerned. Specific issues of how domestic water tariffs should be set and the processes involved are not specified in the Act. Another weakness of the Act is that, in cases were ZINWA is managing urban water services, there is no other body to regulate its operations which suggests that ZINWA can regulate itself.

4.2.3 Availability of water service in the four towns

Water Sources in the towns

Among the many factors which influence the quality of service delivery, water availability is one of them. In order to assess the regularity of supply of water for the two water supply systems

(ZINWA and Urban Councils) in the small towns under study, it was important to first identify the common water sources used. A household questionnaire was used to identify the main supplier of water in the town. It was found that the majority of the residents in all the four towns are supplied with water by the respective authorities in charge of water supplies which for Rusape and Chipinge is the local council and for Karoi and Gokwe is ZINWA. However, some residents stated that they were not connected to the main supply system run by the authorities and were therefore getting water from alternative sources. Figure 4.1 shows the percentages of residents using the alternative sources. However due to erratic supplies of water which were attributed by the key informants to power cuts resulted in some residents resorting to use of unsafe sources such as unprotected wells (70% of respondents from Rusape town) See Figure 4.2. In some areas under study, there has been donor intervention which provided public boreholes for the respective towns and thus residents were making use of the public boreholes (Rusape-100%, Chipinge-9.5% and Karoi-81%).

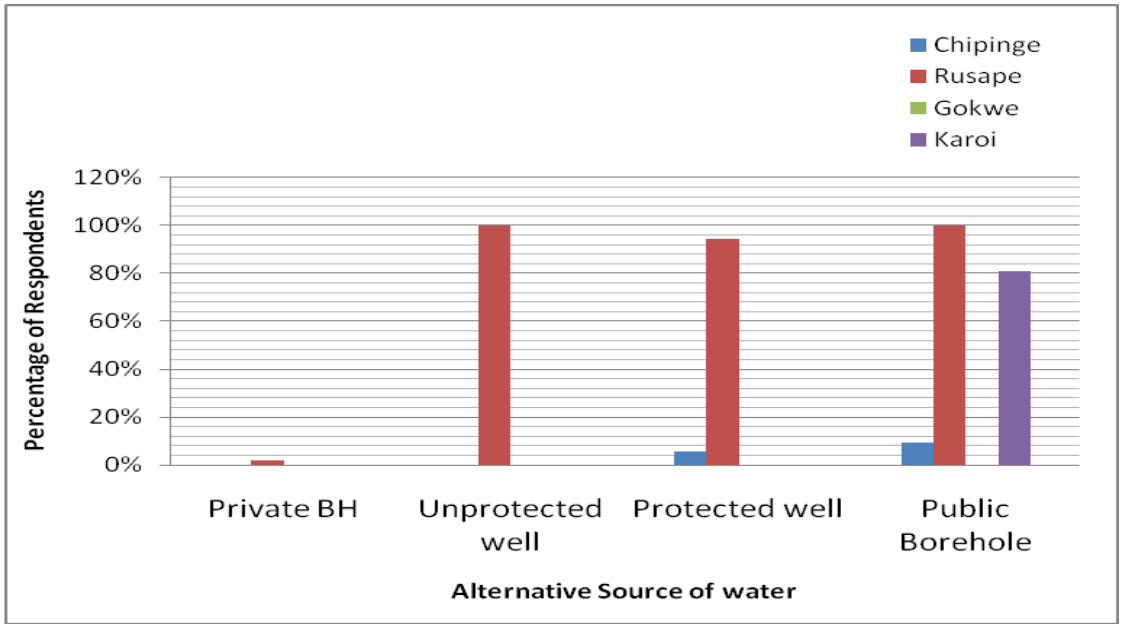

Figure 4.1: Alternative water sources for residents

Use of unsafe water poses potential health risk. According to David (2005), water quality is an important consideration in rating the performance of a water supply system. He states that the quality of water required for either personal or domestic use must be safe, that is, free from

micro-organisms and chemical substances that constitute a threat to a person's health. Resorting to alternative sources of water reflects the incapability of water supply systems.

Figure 4.2: Open water source in Gokwe Town

Residents were asked for their perceptions pertaining the water quality delivered to them. This was rated either as satisfactory or not satisfactory. In towns were water is supplied by ZINWA and those supplied by the local authority were not satisified with the quality of water delivered to them. Council managed water utilities also were featuring with a significant number indicating dissatisfaction (Rusape) compared to ZINWA managed. Figure 4.3 shows the households satisfaction with water quality. Some of the reasons which contributed to the dissatisfaction include, poor taste of water, presence of impurities in the water and turbidity. However the researcher also obeserved presence of impurities in water in all the towns which also indicated the stautus of water quality.

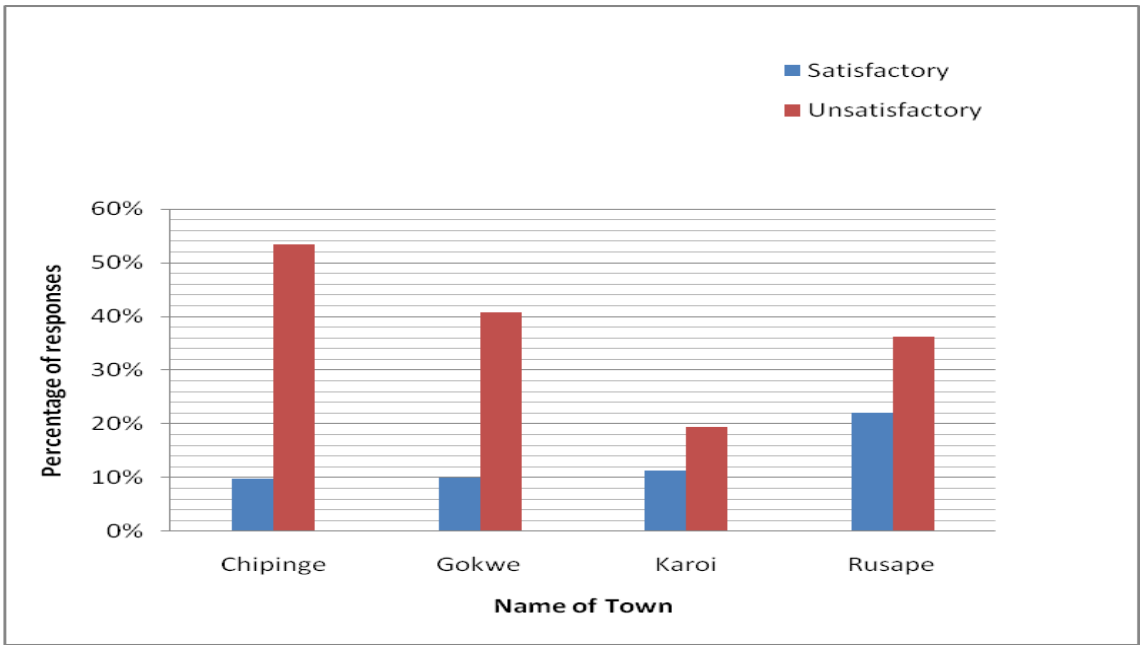

Figure 4.3: Household Satisfaction with quality of water

Key informants in both ZINWA and Local council however, pointed out that there were great efforts being made to ensure that water quality is of the recommended standards. International organisations such as UNICEF have intervened and are providing chemicals for the treatment of water to the expected standards. Thompson *et al.*, (2001) emphasizes the need for water quality to be of World Health Organization (WHO) standards so as prevent gastro-intestinal diseases which arise due to poor water quality.

4.2.3 Availability of water

To assess the consistence of water supply by the water supply systems, a household questionnaire was used. It was found that availability of running water varied from 0 hours/day-7days/week . In places such as Rusape's Tsanzaguru Suburb, it was reported that water had been supplied only once in the last decade. Gokwe had on average the most hours per day without water followed by Rusape then Karoi and lastly Chipinge (See Figure 4.4 and Figure 4.5). Rusape had the most number of days without water. This was as a result of one of the sampled high density suburb that had been facing consistent water shortages due to technical challenges faced by the Town Council.

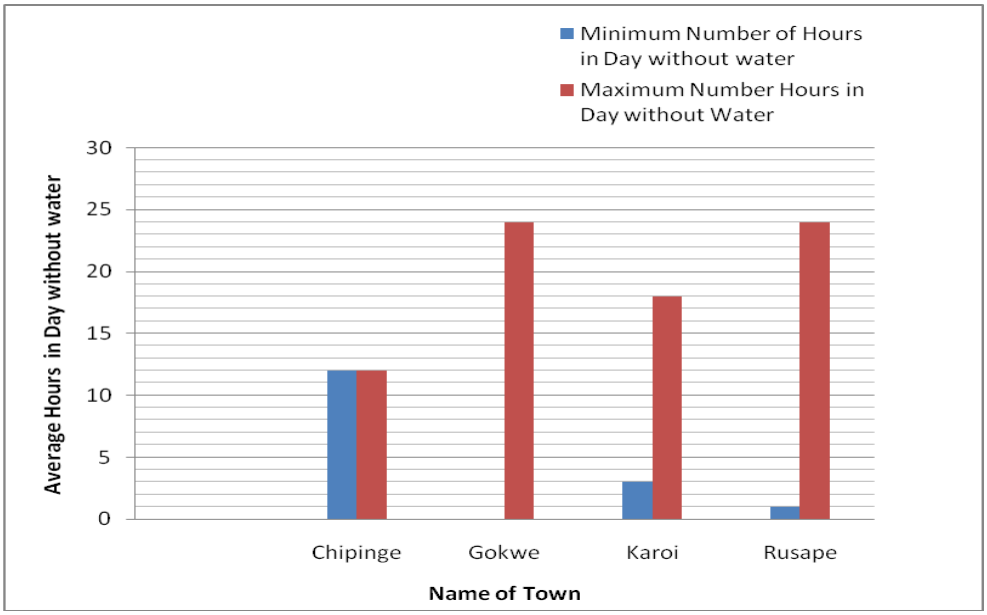

Figure 4.4: Hours/Day without water

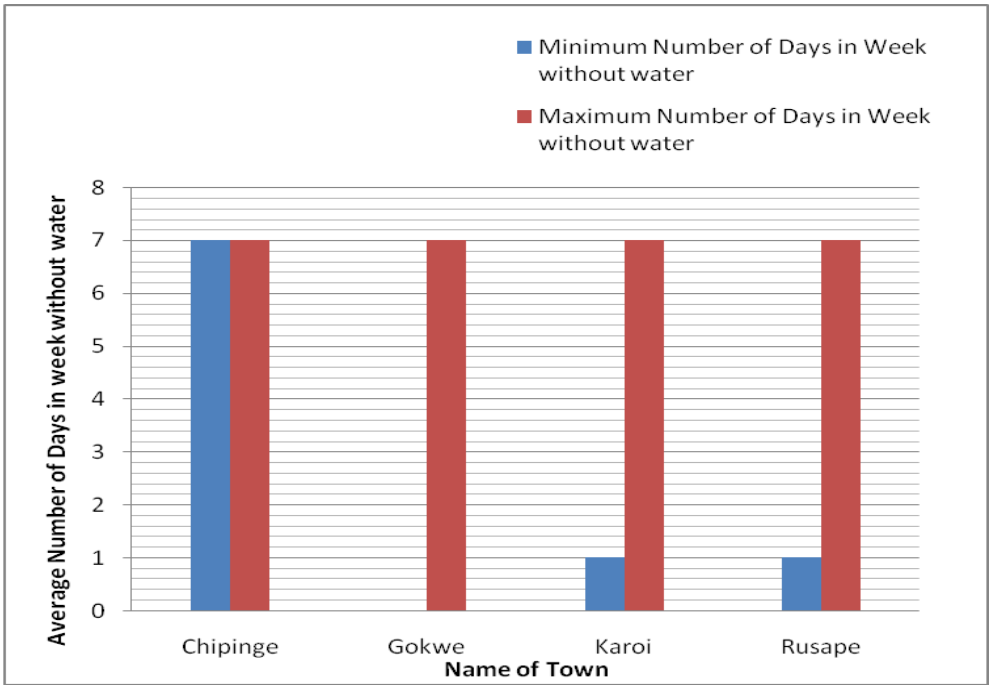

Figure 4.5: Days/week without water

Average daily services among all the towns surveyed totaled 8 hours per day. However the difference between the number of hours during which the different towns receive water is to a larger extent determined by the availability of electricity and is therefore not directly related to

the authority managing the water services. According to the key informants conducted with the service providers, lack of funds was cited as the main reason why water supply management systems do not have generators to provide back-up power in times of electricity cuts. However there is to a larger extent the intervention of the private sector in ensuring availability of water in some towns. For example, in Chipinge in March 2011, the town went through nine consecutive days without water supply as a result of a major pump break down which resulted in no distribution of water to the town Fortunately, according to the Chipinge Town Council Engineer, a private company located next to the town (Tanganda Tea Company) intervened and provided funds for the purchase of new pumps and the problem was rectified.

According to Nair (2010) availability of water is a key consideration in the provision of water supply for each person must be sufficient and continuous for personal and domestic uses but this is not the case in the four town thus the human right to water is being deprived. In general, the design of water distribution systems has been based on the assumption of continuous supply. However, in most of the developing countries, the water supply is not continuous but intermittent. The situation in Zimbabwe small towns is similar to other regions of the world, for example in some African countries, only 11 per cent of the consumers with a piped supply in Nigeria, received water once in two days, in 1995. Furthermore, Hardoy *et al*., (2001) reported that in Mombasa the average duration of the service is 2.9 hours a day.

Erratic water supply leads to many problems including, severe supply pressure losses and great inequities in the distribution of water (WUP,2001). Another serious problem arising from erratic water supplies, which is generally ignored, is the associated high levels of contamination. This occurs in networks where there are prolonged periods of interruption of supply due to negligible or zero pressures in the system (Vaahala, 2004).

4.2.4 Meter Coverage

Meter coverage is the presence of meter at a household which is connected to the main service provider. For those households, connected to ZINWA and Council distribution network, meter

coverage from the sampled households for ZINWA was 96% for Karoi and 81% for Gokwe. For the Council managed towns, meter coverage in Chipinge was at 98% and 97% for Rusape. Figure 4.6 below shows the variation in meter coverage for the sampled households in the four towns. Those indicated as Yes are the ones who had meters, those with No are the ones who did not have the meters at the time of the research but was once had it (in most cases it was stolen). The response 'Not Applicable' referred to those cases whereby the household never had a meter.

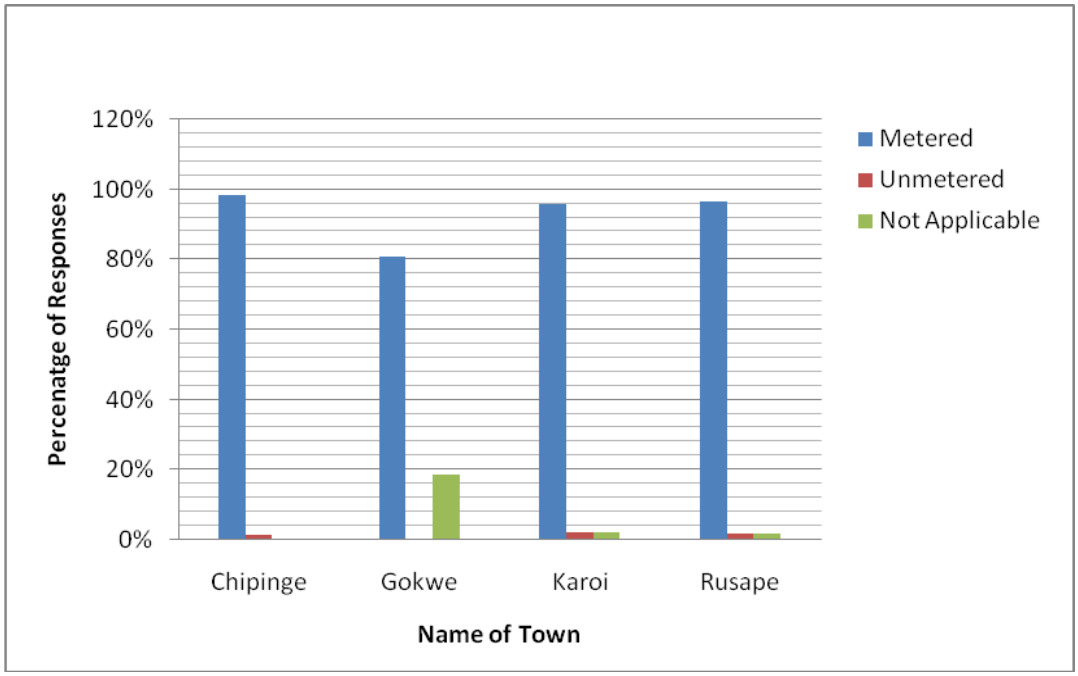

Figure 4.6: Meter Coverage for the sampled households

Meter coverage in Chipinge 98%, Rusape 97 %, Karoi 94%, Gokwe 92%. This shows that for both water supply systems managed by ZINWA and local councils, meter coverage is not significantly different. This could be a result of the fact that in the last ten years there has been very limited infrustructure development in the country because of the economic challenges as a result, very few residential housing units have been put up in the same period thus meter covergae indicates a situation inherited prior to the changes in the water supply management systems in towns which are now managed by ZINWA. However, where new residential housing units have been constructed, authorities have not been able to install meters due to lack of funds. Accordning to the outcomes of the interview conducted with the Gokwe Town Council, it was

pointed out that when ZINWA was handed over urban water , some records were not given and as a result ZINWA is still tracking for those residential units without water meters. It is important to note that sampled households and responses given during the interviews with the key informants are almost similar.

However, although some households reported that they had water meters on their properties, in some cases the meters were not working and therefore of little use for purposes such as billing for water use. Figure 4.7 below shows the percentages of the meters working in each of the towns.

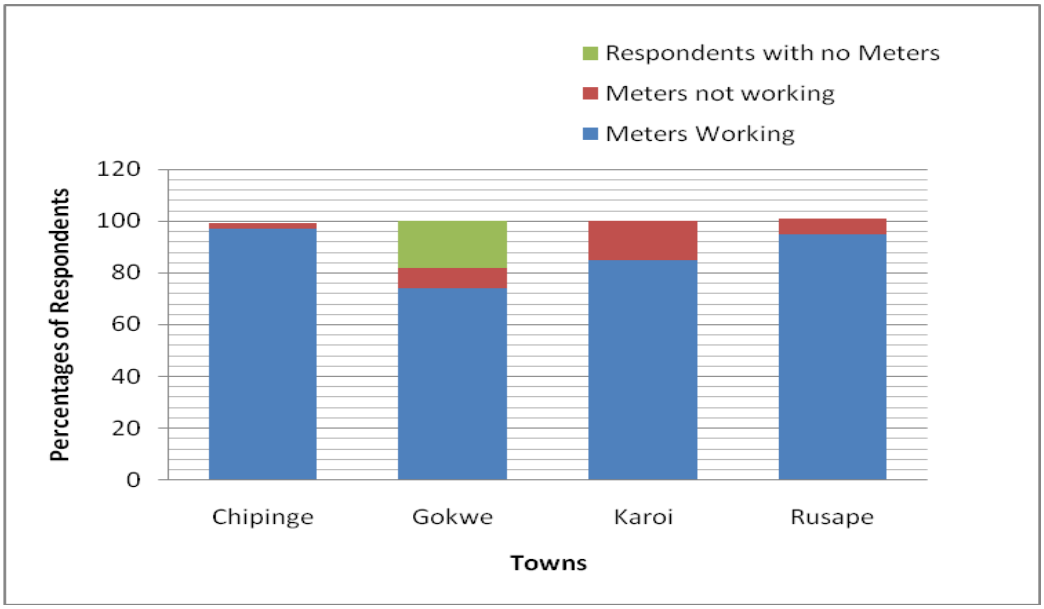

Figure 4.7: Functionality of Meters in the four towns

There was a notable difference between available meters and those functioning for ZINWA managed water supply systems than those managed by local councils. This shows that in terms of meter coverage and functionality, council driven water utlities are perfoming better. Water meters are also an important tool for a utility system to monitor the amount of water produced and that which is billed. However the higher number of those not functioning indicates that there is high potential of inaccurate billing and poor estimation of amount of water sold out. Meters help to conserve water, assist in pinpointing leaks and pressure problems in the water distribution process, to conduct a system audit (Dajun *et al,*. 2009). In Tunisia coverage was at 99% and

functionality of meters was at 100% (Sonede, 2005). This shows that Tunisia prioritizes functionality and coverage of meters and this is crucial for reducing Unaccounted for water. It is thus important to ensure meters are working so that water is conserved.

For those meters not functioning, duration of non-functioning varied from one month to several years (See Figure 4.8). About 99% of households with mulfunctioning meters claimed that the service provider was aware while 1.3% indicated that the service provider was not aware since they had not reported the breakdown. Non-functioning of meters show the prompteness of the water utility to respond to problems which affect perfomance. From these results, it can seen that Gokwe took more time to respond to non-functional meters, this was followed by Karoi then Rusape and Chipinge. Non-functionality of meters also indicate perfomance of a water supply system. This shows that the council water supply systems perfomed better than the ZINWA managed water supply sytems in terms of responding to non-working meters. Quick response in responding to non-functional meters shows that a water supply systems has the resources to rectify the problems and on the other hand the water supply systems values the conservation of water.

From the interviews conducted with the key informants, in Gokwe there is an estimated connection of 3000 meters and 20% of the meters are not working. In Rusape there are more than 5000 meters in the town and an estimated 70% of old meters are not working. This information matches with the data obtained from the household survey. It was also observed by the researcher during the study that most households in Gokwe had mal-functioning meters. However from these findings, it can be seen that both water utilities are still lagging behind interms of assuring 100% coverage and functionality of meters.

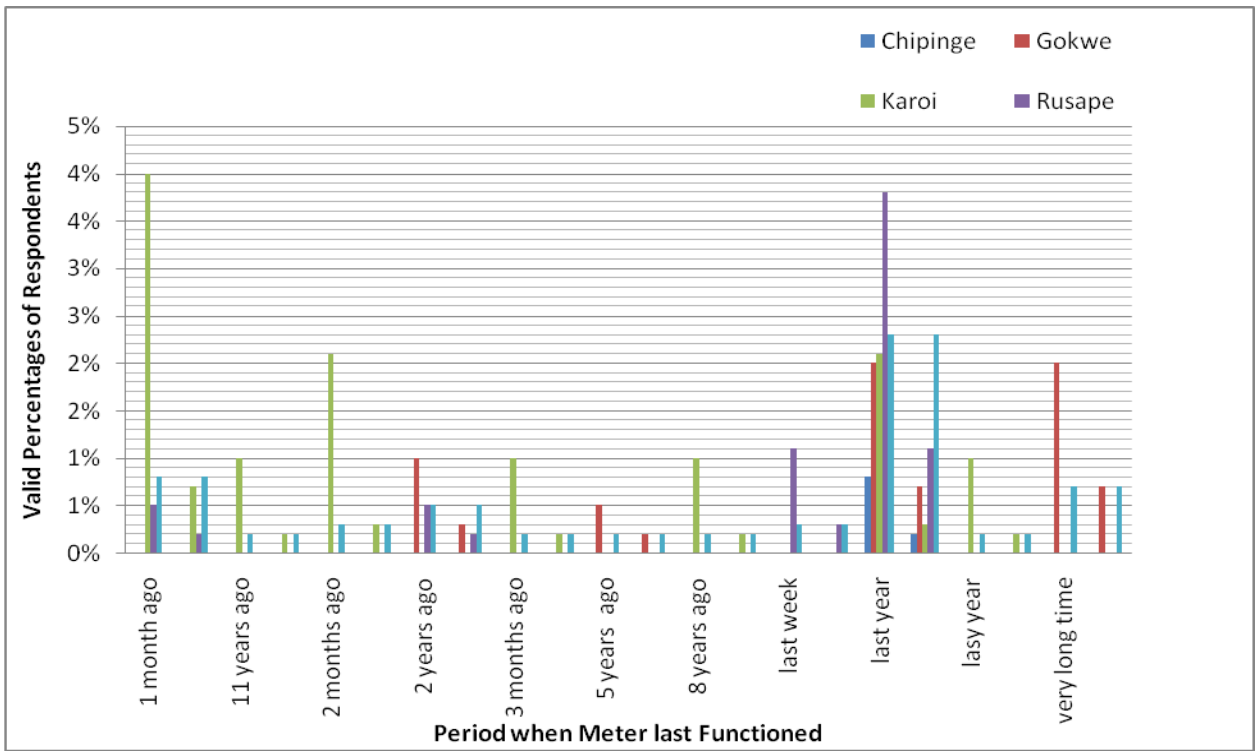

Figure 4.8: Last functional period for water meters

Frequency of meter reading by the service provider also influences the perfomance of a water utility. Frequency also has some impact on the billing accuracy and this affected residents perceptions on the bill and consequently on willingness to pay. From the household survey, there is an indication that all the water supply systmes in the respective towns were making an effort to take monthly readings (98% of responses) though in some case there were taken irregularly.

From the interviews conducted with the key informants, there was an indication that meter readings are carried out on a monthly basis in all the towns and there are staff specifically employed to do that though for ZINWA they have additional tasks to the meter reading. However since perceptions of customers can be used to assess perfomance, it can be seen that in Chipinge there was a worthnoting number of residents indicating that their meters are rarely read but generally in all towns majority of respondents mentioned that meter readings are done monthly. Frequency of meter readings enhences accuracy in billing actual household consumptions are used (NSWC, 2003).

4.2.5 Customer care services and customer perceptions on service delivery

Important measures of customer orientation which were investigated in this study included reporting channels and availability of options for service delivery. A household questionnaire was used to assess how respondents view the customer care services of the water supply systems in the respective towns. Respondents were first asked where they report complaints. It can be noted that generally most respondents made use of the service provider's offices in their town (See Figure 4.9. There was also a small number of respondents who did not know where to report complaints from the ZINWA managed supply systems (Karoi 6.8 %, Gokwe 7%). Some of the residents made use of meters reading staff and some went to Zimpost (Zimbabwe Post Office) to report. Zimpost is a parastal which assist many companies and organizations in the collection of levies, fees, credits and other forms of payment. It can also be noted that all respondents were not aware of the presence of customer care services within their water institution offices. However from the interviews conducted with ZINWA officials, customer care chatter is not yet being implemented but it is there on paper within their vision and mission and this is still to be actioned. ZINWA key informants also mentioned that they make use of Water User Boards which are at grassroots level and these meet regularly to discuss issues and problems being faced by the residents concerning the ZINWA utility and then forward their queries to the Sub-Catchment Council which then forwards to the Catchment Council and lastly to the Chief Executive Officer if all the levels have not been able to handle the complaints. For the Council managed supply systems, key informants mentioned that they make use of residents associations and also the councilors in the Wards where the residents stay and these report to the utility on behalf of the Ward.

Notifications prior to service interruptions is an important customer care factor which affects residents perceptions on service of a water supply system. The household questionnaire was used to assess whether these residents were notified prior service interruptions by the water supply institution. Only 2% of the respondents from all the sampled households in all the towns mentioned that they received notification of interruption of service prior the interruption. The other 98% of the respondents complained that no notification of interruption is done. Some of the means noted to be made use by residents as a result of water service interruptions included

Media(20%), posters in public places (50%) and during ward meetings(70%).

For other countries, inorder to handle customer complaints as well as general enquires and service requests and passing of information, the eThekwini Water Department in Durban created a customer call center that receives text messages, e-mails, and phone calls. The center is open 24 hours a day, 365 days a year. Customer service is also provided on a walk-in basis, at headquarters and four regional offices throughout the municipality (DWAF, 2004). In Kenya, the Nairobi Water and Sewerage Company developed a comprehensive Web site that provides options for users to report corruption, water leaks, billing problems, and general customer complaints (NWSC, 2003). Overall, the utility has focused on streamlining and improving the bill collection process, in part by allowing customers greater flexibility in making payments. Bills can be paid at company headquarters; at any branch of the Coop Bank (a cooperative bank that operates throughout Kenya); at select branches of K-Rep Bank (a microfinance bank); at the post office, and some other government offices (Davis, *et a*l., 2004). But for the small towns under study, all the respondents complained that they had to pay the bills at the ZINWA or Council office which was not convenient for them due to the walking distance and transport costs incurred. This level of customer care demonstrated in Durban and Nairobi shows that the water supply institutions prioritize the customer more compared to what is done in Zimbabwe small towns. The UN report of 2002 clearly states that these water supply systems are obliged to make information about water freely accessible and aware to all residents, and this include information on how they can submit their complaints and the process involved as well (UN, 2002), and this proves not be the case in all the water supply systems under study.

Considering satisfaction or fulfillment with how the complaints are handled by the different institutions, majority of respondents in Council managed water supply systems were not satisfied at all with the way their complaints were being handled. They stated that the council took time to respond, ignored the complaints and did not inform residents of any progress concerning their complaints. About 30-48% of respondents from the ZINWA managed water supply systems were satisfied with the way their complaints are handled.

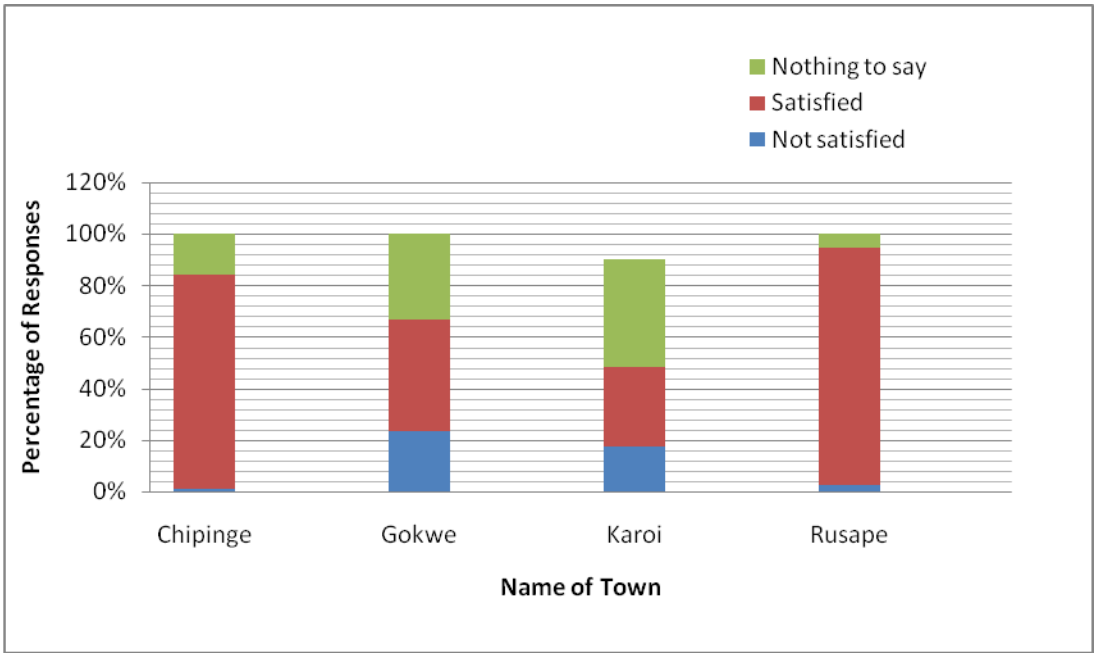

Figure 4.9: Respondents satisfaction with handling of complaints

The above levels of satisfaction show that the different institutions have different attitudes towards certain issues but this has consequences on the quality of service delivered. On the other hand, when ZINWA was formed in 1999, the idea was to make Catchment Councils self sustaining but due to low revenue collection this has not been possible and thus there has been intervention with grants from the Public Sector Investment Programme to keep it going. But for Councils, there has not been much monetary assistance. However the Ministry of Water Resources Development and Management mentioned that there is no budget for the Urban Councils but they are currently sourcing funds for Urban Councils from international donors such as UNICEF under the Urban Rehabilitation programme so as to improve service and infrastructure in the urban council supply systems. Ministry of Water also mentioned that for Catchment Councils under ZINWA, there is a budget allocation for them that comes straight to the Ministry of Water Resources Development and Management from the Ministry of Finance so as to keep them going. Thus ZINWA as a technical arm of the Ministry of Water has more support from the Ministry compared to the urban councils thus their promptness in responding to complaints and problems in their supply systems.

In Burkina Faso, within the Onea Water Utility company, the customer service unit manages customer relations. The Unit frequently carries out studies on customer satisfaction, and has found the results to be largely positive, with a complaints rate at 0.6% of the total customer base (Onea, 2005). Complaints are addressed quickly and monitored regularly, although complaints are not yet integrated into the Management Information System. Major customers are given preferential treatment and their concerns are addressed by a correspondence unit. From this, it can be seen that the Burkina Faso utilities performed better than the water supply systems under study in small towns of Zimbabwe because of the promptness to respond to water service complaints. This has been as a result of the country's legal requirements for good customer care services in each sector which is lacking in Zimbabwe.

4.3 Revenue Collection

4.3.1 Water Tariffs and Billing

To investigate the water tariffs for the four towns, a key informant interview was conducted with the Finance manager of each water supply institutions. On average, there has been no major tariff differences among the surveyed water supply systems though for ZINWA there are significantly higher compared to those of Council managed supply systems. The issue of fixed charges when billing hinders cost recovery (Nair, 2007). From the surveyed towns, in Gokwe, residential suburbs are paying US$0.3/Cubic metre and in Chipinge there is the use of block system (See Table 4.1 below) but there are some parts of the high residential areas of Gaza that have not been paying anything for the past four months because the council is still fixing the distribution networks and thus the water is still being considered as unaccounted for water.

Some tariffs do not provide full cost recovery or funds for business development. Tariffs for water services differ depending on utility location and production costs (Kaercher, *et al*., 2004). In most African small towns, water charges are determined by the government, taking into account several factors such as different users (farmers vs. domestic users), and also the socio-economic status of different ratepayers

Table 4.1: Block Tariff system for Chipinge

Block Tariff	Low density domestic consumers
1.-10	$ 0.80
11.-20	$ 0.96
21-30	$ 1.04
31-40	$ 1.12
41-50	$ 1.21
>50	$ 1.29
Block Tariff	**High Density industry and commercial users**
1.-25	$ 1.04
26-50	$ 1.12
51-100	$ 1.21
>100	$ 1.29

Senegal's water tariffs are the highest in West Africa, largely because water resources are located at a distance from water consumption centers, especially in Dakar. The tariff in Senegal also includes a cross-subsidy for poor consumers and it covers three categories of local subscribers based on consumption (0-20 m^3, 20-40 m^3, and over 100 m^3 per two-month period), and favor conservation: a 'social rate applies to the lowest level of consumption, whereas between 20-100 m^3 results in a full rate, and a "dissuasive" rate applies to consumption greater than 100m^3 (Ndaw, 2005). For Tunisia, the potable water tariffs (excluding fixed costs) were found to be: Average -US$ 0.45/m^3, minimum US$ 0.12 /m^3, maximum US$ 0.74/m^3, which is higher compared to those of the water supply systems under study. In cities such as Windhoek, Namibia, which are located in water stressed regions, water management is a task and a Water demand management (WDM) strategy to meet the objective of using limited water resources as efficiently as possible and, when combined with block tariffs, it is being used to ensure equitable access to water (Makin, 2004).

Bills are sent to households generally on a monthly basis in all the towns under study. However, despite the Council sendingthe bills, according to key informant interviews conducted, there have no powers to disconnect those customers who fail to pay for the bill. This is different for

ZINWA because the disconnection potential of ZINWA water supply systems was found to be more than 90%. This had an impact on the revenue collected. Considering also that the Urban Councils report directly to the Ministry of Local Government, there is direct influence of the government compared to ZINWA which is more of an independent institution though under the MWRDM. In Burkina Faso, residents receive bills every two months and these are based on meter readings (Onea, 2005). As part of its contract, SDE water utility in Burkina Faso has power to cut off water supply for non-payment, and the company has a very high billing recovery rate thus in 2005 the company actually reported a billing recovery rate of 98.2%, and has had a recovery rate higher than 97% since 2001. This is different for Urban Council managed water supply systems in Zimbabwe mainly because of the institutional and legal structures and thus revenue collection is low compared to the ZINWA managed water supply institutions.

Currently, the overall payment rates are below 50% for both the ZINWA and council water supply institutions (Mr Katsande- Manyame water supplies manager and Mlauzi Chipinge town engineer, 2011). Average bill payment rate for individuals exceeds 60days. Comparing with the study conducted in Burkina Faso for the small urban water utility(SDE), payment rate was 95% and the average bill payment rate for private individuals was found not to exceed 40 days, and this was considered acceptable by the utility (World Bank, 2004). Thus comparing with this study, the ZINWA and Council managed water supply systems, can be considered unacceptable because of the great impact that these payment rates have on revenue collection.

Respondents were asked their perceptions with regards to the accuracy of the bills. Figure 4.10 below shows the perceptions of the respondents concerning accuracy of their bills. From this, it can be noted that most respondents from Chipinge rated their billing accuracy as poor to very poor. This could be as a result that meters are in place but some residents are forced to pay fixed rates and for some no meter readings are taking place but the bill is sent without supporting explanations.

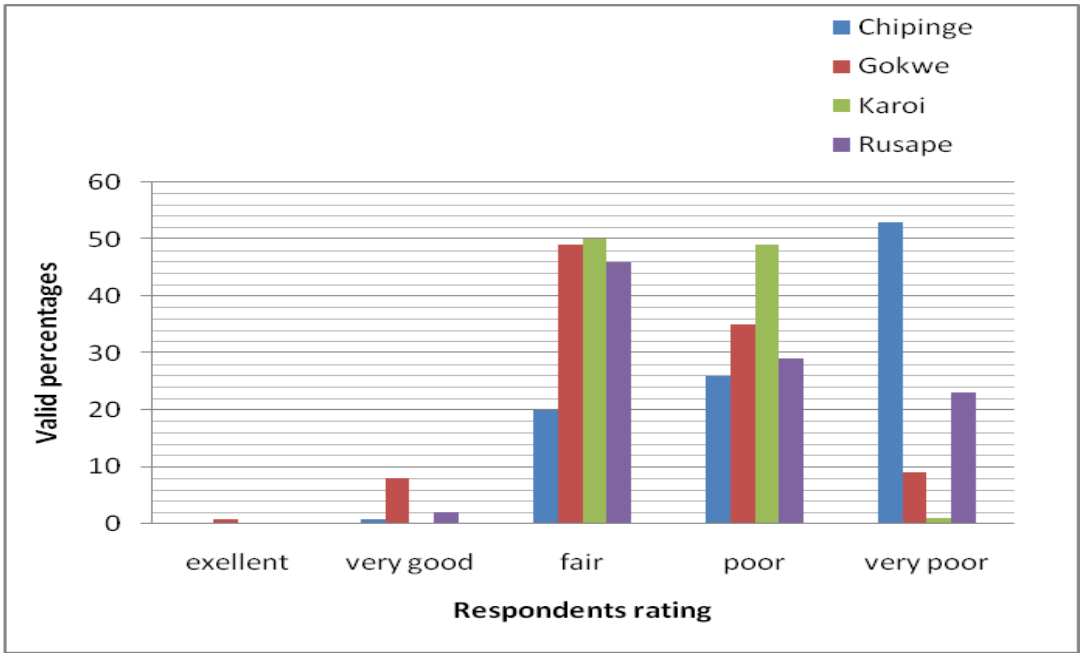

Figure 4.10: Rating of billing accuracy

However the actual bills received by the sampled households varied from US$1 to US $32 and the average bills for each town is presented in Table 4.2 below. ZINWA managed water supply systems had the highest average bills compared to the Council managed water supply systems. However it is important to note that though ZINWA town managed respondents had the highest bills, about 45% in Gokwe and 48% in Karoi rated their billing as poor to very poor and also as very expensive for them (see Figure 4.11).

Table 4.2: Average monthly bills for residents

	Chipinge	Gokwe	Karoi	Rusape
MeanUS $	5.70	6.59	7.50	6.39
Standard Deviation US$	9.16	9.06	10.91	10.72
Max US$	30.00	30.00	32.00	32.00
Min	$ 1	$ 2	$ 2	$ 1

ZINWA and council water supply systems were generally not happy with the revenue they would collect from their billing. Revenue collection compared to the billing ranged from 20-40% for all the water supply systems. This indicated that most residents were not paying their bills

and this was triggered to a larger extent by the erratic water supplies and general poor service by the water supply systems.

The SONES/SDE financial status in Senegal is premised on the principles of financial equilibrium, i.e., that costs are recovered through operating income (World Bank, 2004). The utility's billing is often incomprehensible and inaccurate, even as inadequate revenue collection is one of the biggest cDavisenges faced by the utility which is also similar to the urban water supply systems under study in Zimbabwe. However to rectify this, the council or ZINWA have not done anything but in some parts of Africa, in 2005, the Nairobi Water and Sewarage Company conducted a far-reaching seven-week multimedia marketing and branding campaign to impress the utility's new corporate entity into consumers' minds, as well as resolve billing issues and increase collection efficiency (NWSC, 2006). This shows an initiative to improve revenue collection rather than just waiting for things to changes on their own.

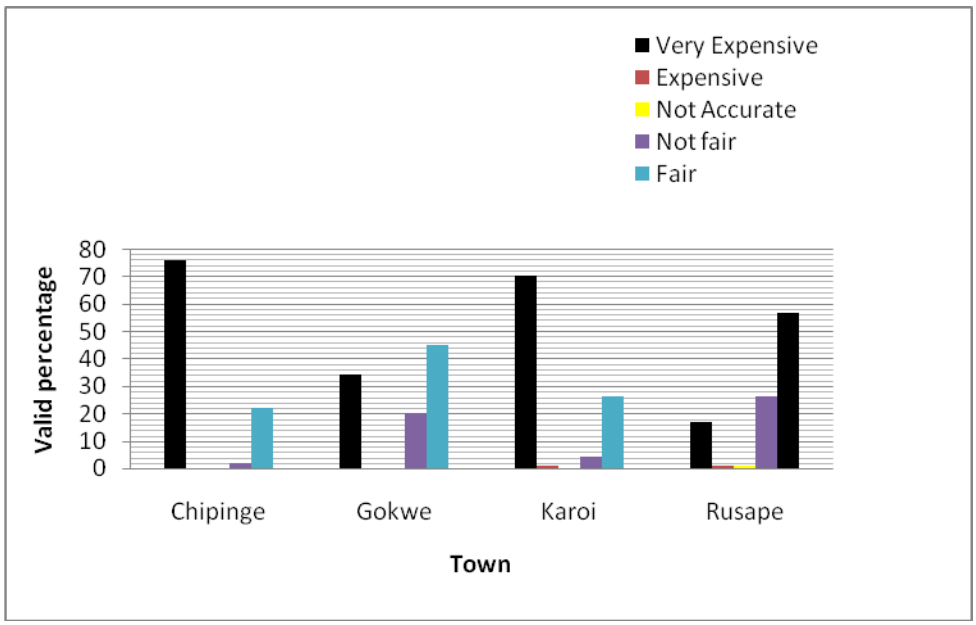

Figure 4.11: Residents perceptions on bills for each town

4.3.2 Willingness to pay

To determine willingness to pay, a household questionnaire was used to gather the information. Resident's willingness to pay is determined by many factors. From this study, service delivery is one of the major factor that can increase or lower willingness to pay for improved service. With the prevailing situation of erratic water supplies, inconsistence of meter readings and malfunctioning of meters, inaccuracy of bills, respondents willingness to pay was affected greatly. A question which indicated the level of willingness to pay was paused and responses recorded accordingly. Figure 4.12 below presents the willingness to pay of respondents for improved service delivery. For Rusape the maximum willingness to pay was significantly high because there is a new low density residential suburbs of Silver Bow were the rich are constructing expensive houses with swimming pools and big gardens which was one of the sampled areas under Rusape (See Appendix 8 for demographic profile). However because these few compared to the low income residents interviewed thus the mean for all the towns indicate that willingness to pay ranged fromUS$11-US$14.

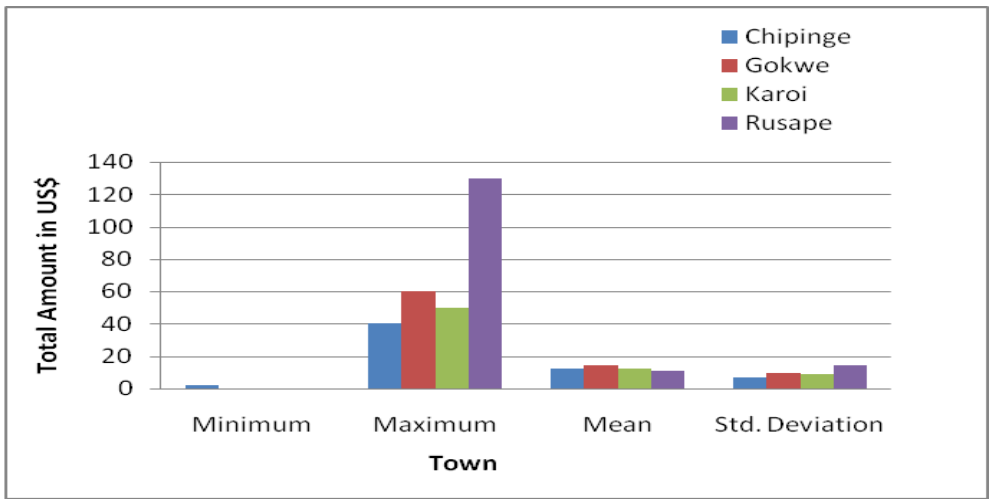

Figure 4.12: Willingness to pay for improved service delivery (US$)

The level of willingness to pay as indicated in Figure 4.12 above indicate that reliability of the water service is of value to residential customers as this determines their willingness to pay. Some of the factors as highlighted earlier which influence the households willingness to pay include frequency and the length of disruptions. With respect to the timing of an interruption,

residential customers expressed a strong preference to have water service interruptions during weekdays rather than on weekends, and the later in the day on weekdays, the better.

4.3.3 Unaccounted for Water

Inorder to assess the efficiency of revenue collection for the ZINWA and Council water supply systems, a key informant interview with the water engineers of the water supply systems were done. From the interview, council managed water supply systems had a higher percentage of unaccounted for water which ranged between 20-30%. For ZINWA managed water supply systems it was below 10% in both towns. This shows that in reducing unaccounted for water especially through repairing of burst pipes which releases high volumes of water, ZINWA managed water supply systems are performing better. However for the Council managed water supply systems, it was mentioned that there are plans to source funds so as to purchase leak detectors which will greatly assist the issue of unaccounted for water. Plans are also underway in both systems to ensure that all residents are connected to to the distribution network and have a meter installed. All illegal connections are paying heavy penalties with the aim of reducing the unaccounted for water. Currently, illegal connections for council managed water supply systems are US$1000 and for ZINWA they are US$200 though enforcement is still questionable due to corruptive behaviour within the institutions.

The prevailing water stress in many developing countries is not only due to source limitation but other factors such as poor distribution efficiency through city networks and inequalities in service provision between the rich and the poor (UN-HABITAT, 1999). One of the main reasons for increased unaccounted for water is the high rate of water losses form the distribution systems. Many studies revealed that water losses in cities of developing countries are at levels of between 40-60% of water supplied (Alarerts, 1999). The mean Unaccounted For Water (UFW) in the developing world show high rate of water losses (ADB, 1997; WHO, 2000). The unaccounted for water reported in all the towns were due to water losses (as it excludes unbilled and unauthorized consumption). In many cases the water loss reflect inefficiency of the management of the water supply system. Any reduction in water losses, requires coherent action to address

not only technical and operational issues but also institutional, planning, financial and administrative issues (WHO, 2000)

4.4 Stakeholder Participation in Urban Water Management

Stakeholder participation is critical for the sustainability of water resources management. It was important to study the participation of stakeholders in water management for small towns as this had been realized to have a great impact on the willingness of residents to pay and consequently on the performance of the water utilities.

4.4.1 Stakeholder Involvement in setting of water tariffs

According to Stenekes (2006), setting of water tariffs should be a participatory exercise whereby all stakeholders involved are actively involved. This is to have a buy-in from all customers so that willingness to pay and revenue collection are not affected. A household questionnaire was used to assess the involvement of stakeholders. From the sampled population, only about 2% of the residents were aware of how water tariffs are set and from the demographic information, these respondents work for the water supply systems. The remaining 98% did not know how these tariffs are set. From those who said they knew the process, answers given to the how part are:

- The water utility calculates the total expenses and divides with number of residents
- Consultative meetings are held to ask for opinions of different stakeholders on the council's finances
- At the beginning of the year, we hold meetings at Ward level and Council finalizes what we would have discussed concerning our proposed tariffs and justification for the rates.
- They Use cubic metres.

These responses indicate that some of the respondents had an idea of how the tariffs are set and some responded with their assumptions.

It was also important to find out if the respondents had ever been called to meeting were the

water supply managing institution proposes to set tariffs. From the all responses, about 10% of the respondents had heard or had been called to a meeting were it was proposed to set new tariffs and the other 90% have never heard about such meetings (Chipinge-64%, Gokwe-100%, Karoi-97%, Rusape-91%). For those who attended meetings, reasons for attending varied. Some attended because;

- They wanted a change (17%),
- They wanted to be connected to a meter rather than getting bills where they do not know where it coming from (11%)
- Bills were high and they wanted them to be lowered (13%)
- They wanted to know how the water supply systems estimate bills when they do not come to read the meter (10%)
- They wanted to understand the process of setting water tariffs (55.6%)

Reasons for not attending were as follows:

- Water supply systems management always lie (45%), they do not implement what we would have discussed
- Occupied with work and household chores (55%)

However in terms of representation, effectiveness and transparency, very few respondents managed to comment on that since they were not aware of the process and not involved at all. It was indicated that after the meetings there is no feedback communication to inform the residents of the outcome. It was mentioned that the meetings are not well represented by all stakeholders especially women who use the water more and at times they are mixed with political agendas thus they drive away some people. Some pointed out that these meetings take too long to be completed and also they are not well advertised. Contrary to the knowledge of residents of how water tariff are set, the process for Council managed water supply systems is as follows (See Figure 4.13):

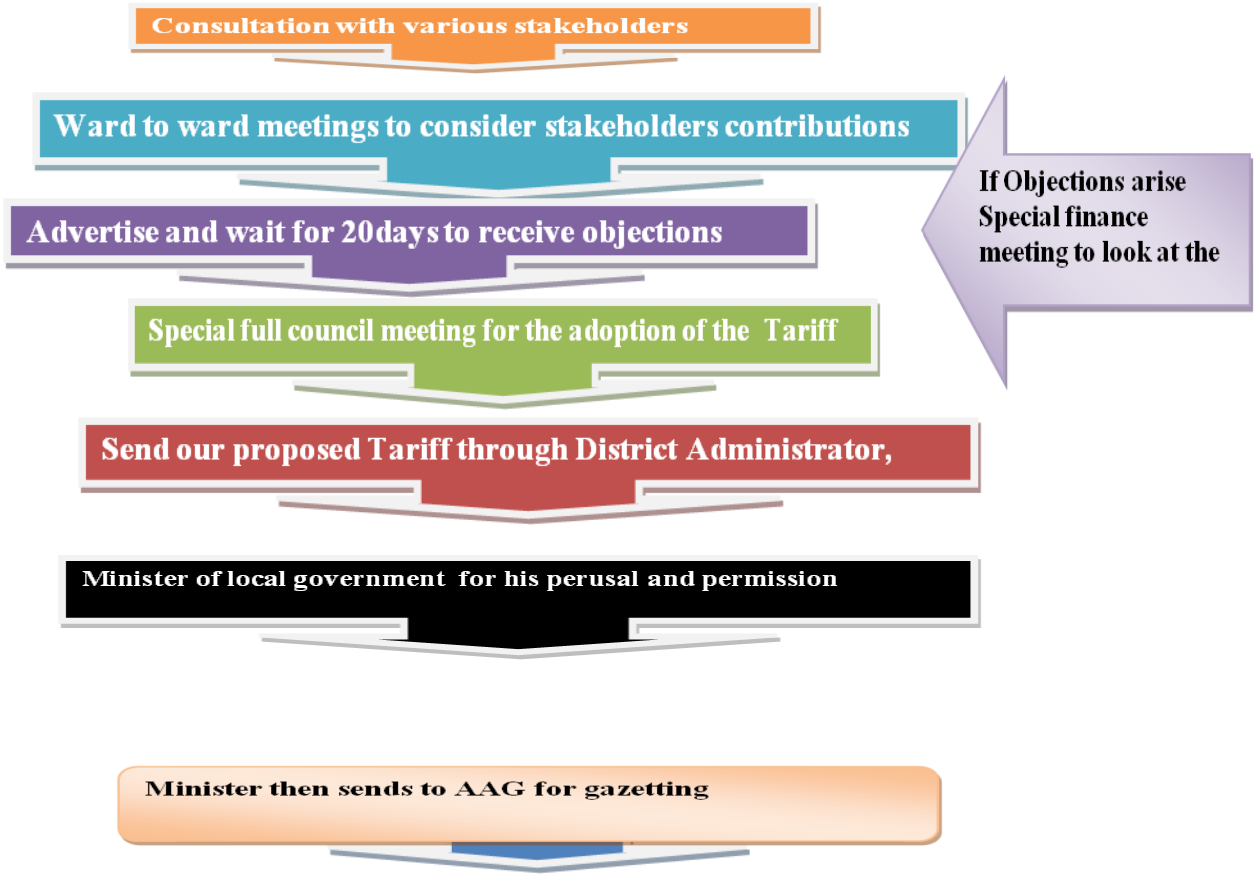

Figure 4.13: Council Process of setting water tariffs

For ZINWA managed water supply systems, the process is simple and straight forwards. See Figure 4.14 for the processes involved.

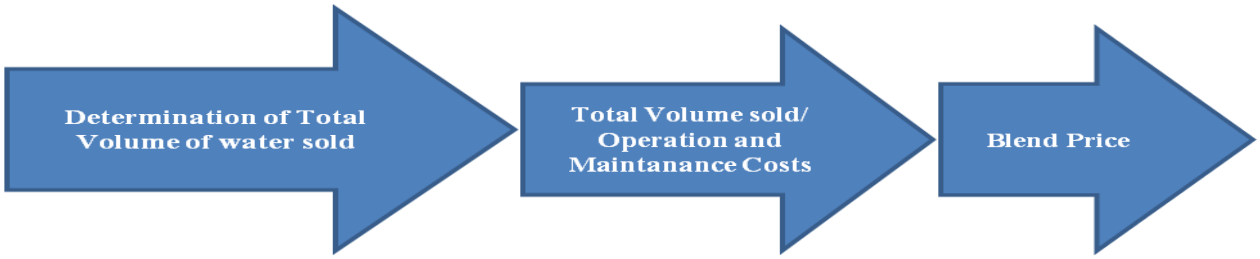

Figure 4.14: ZINWA Process of setting water tariffs

From the two processes mentioned above, it can be seen that the Council process in more

involving though the residents are not aware of the process. The one for ZINWA is determined at top level and there is potential of more resistance to pay from customers because there is nowhere were they are involved compared to the Council managed processes. ZINWA tariff system is country wide and not catchment or system specific as is the case for local councils. This has a negative bearing on the sustainability of the system because rates which may be fair for residents of one town may not be fair to another town thus revenue collection is greatly affected by ability to pay. According to Gerasidi *et al.*, (2009), stakeholder participation is recognized as an important factor in the successful implementation of water management plans, particularly when efforts are made to resolve competing and conflicting demands in areas facing water scarcity. GWP (2009) also state that the involvement of stakeholders enables, better understanding of different parties that have an interest in water management problems and also significantly contribute to conflict management and resolution.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following conclusions are drawn from this study;

Service quality is generally poor for both water utilities. This has been contributed partially by the power cuts resulting in water supply systems failure to pump the water demanded by the residents on a regular basis. Increased rates of unaccounted for water especially within the Council run water supply systems due to old and worn out infrastructure in the towns has also contributed to the poor service delivery in the small towns. Poor customer care services from both water service management institutions have also contributed to the poor service delivery.

Revenue collection is greatly affected by poor water quality, low confidence of customer with their service provider, low willingness to pay, high rates of unaccounted for water, poor customer care services, low stakeholder participation

Current legislations for urban water supply in Zimbabwe are there but however; there is minimal enforcement, no regulator for urban water management, no detailed clauses which indicate how the utilities should be managed

Stakeholders participation is not there at all and this has consequently contributed to; low willingness to pay, high resistance to pay, vandalism of water infrastructure, poor sustainability of water resources

5.2 Recommendations

This study makes the following recommendations;

To improve service delivery, the Government of Zimbabwe has a great role that it has to play. There is need to ensure a budget for Urban Councils so that they can keep on operating despite the revenue collection being low. A water policy should be made available which is a guiding document for water management in the country. There should also be a an Urban Water and Sanitation Act alongside a regulatory body for urban water management so as to ensure there is efficient and effective management of water services in urban areas.

To increase revenue collection, water utilities should ensure:

- Reduction of unaccounted for water
- Prior notifications of service interruptions
- Good customer care should be practiced by utilities so that residents feel the need to pay water.

- To ensure improvement in service delivery, there should be specifc legislations for urban water management which clearly explain all the processes involved in the management of water

- To ensure stakeholder participation;
    - Awareness and sensitization programmes to residents
    - Water utilities should ensure residents are involved at all stages in management

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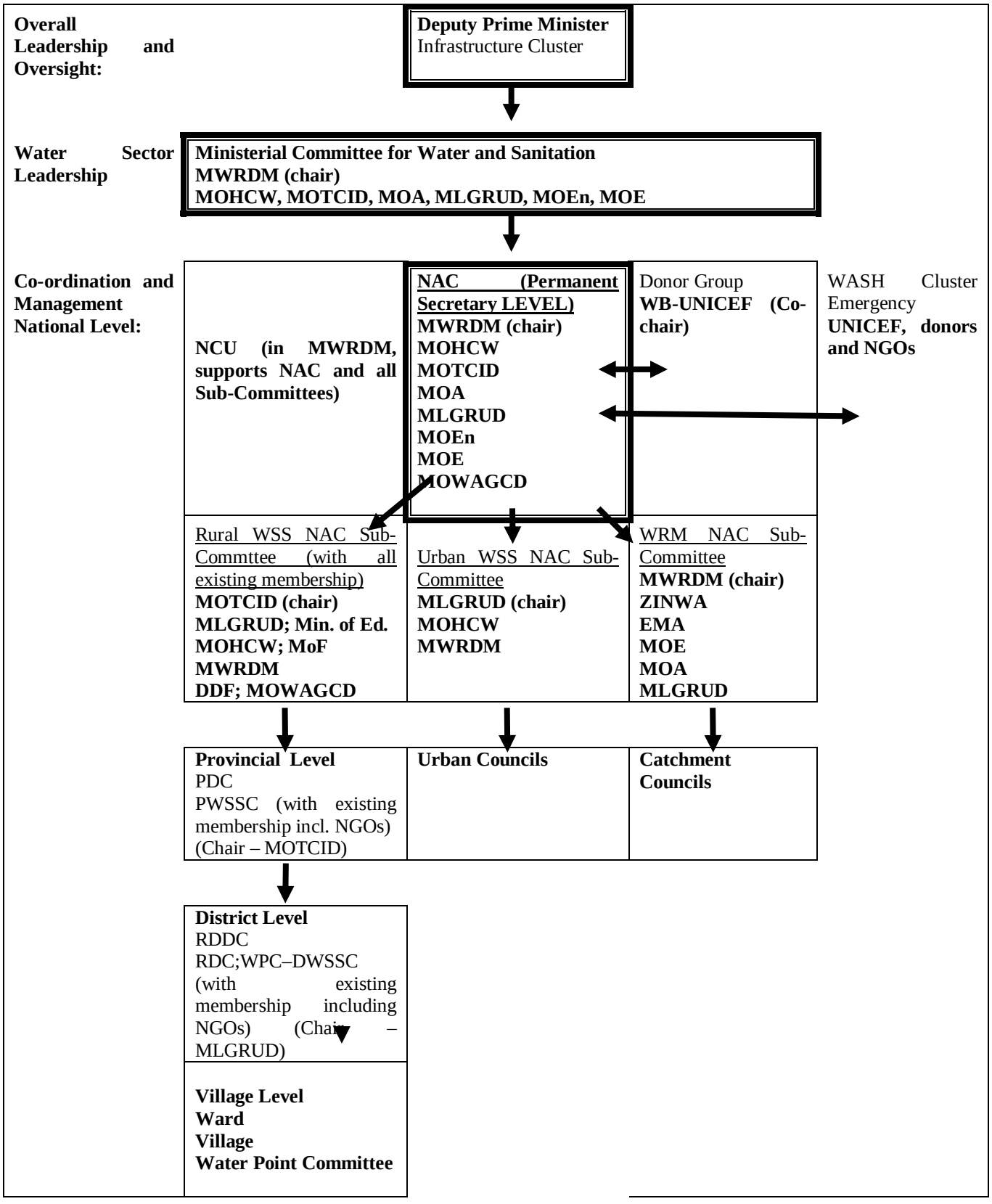
APPENDIX 1: ZIMBABWE WATER, SANITATION AND HYGIENE STRUCTURE



APPENDIX 2: KEY INFORMANT INTERVIEW GUIDE FOR THE WATER SUPPLY MANAGEMENT SYSTEMS

Administrative issues

1. Which legislation govern this institution?
2. What are the positive elements of this legislation
3. What are the negative elements of this legislation
4. What is the ratio of water connections to staff members?
5. Do you have a customer chatter section?
6. How does it operate?
7. Do you have a suggestion box?
8. Do residents make use of it?
9. What proof is there that residents make use of the suggestion box?
10. How often do you open it?
11. How else do you get queries from residents concerning your service?
12. How do you pass information concerning interruption of service to residents?
13. Who are you accountable to?
14. What is your main source of funds?
15. Do you have an allocation in the national budget?

APPENDIX 3 KEY INFORMANT INTERVIEW GUIDE FOR THE WATER SUPPLY MANAGEMENT SYSTEMS

Revenue Collection

1. What is the total water quantity distributed per month?
2. What is the expected revenue?
3. What is the actual revenue collected?
4. What are the factors that affect bill payments?
5. What is your disconnection potential?
6. What are your average operation and maintenance costs?
7. How much is spend on overheads?
8. How much is spend on salaries and wages?
9. What other expenses do you incur every month and what is the total bill for that?
10. Are there any illegal connections in this town?
11. Why are there are illegal connections, where are they are prevalent, and what measures are being taken to ensure that this does not remain the case.
12. How do you account for the illegal connections?
13. How many meter do you have in this town?
14. How many are working/not working?
15. How do you estimate the bill for those not working?
16. What challenges are you facings with regards to revenue collection

APPENDIX 4: KEY INFORMANT INTERVIEW GUIDE FOR THE WATER SUPPLY MANAGEMENT SYSTEMS

Water tariff approaches

1. What are the processes involved in setting tariffs
2. Who is involved and to what extent?
3. Who approves the tariff rates?
4. How long does it takes for tariffs to be set, discussed and final approved. (If there are minutes for such meetings ask to see them).
5. What factors affect the water tariff system currently in place?
6. Are tariffs different for high, medium and low density?

APPENDIX 5: KEY INFORMANT INTERVIEW GUIDE FOR THE WATER SUPPLY MANAGEMENT SYSTEMS

1. What is current state of domestic water infrastructure?
2. What percentage of water is unaccounted for?
3. What is your estimated cost for the unaccounted for water?
4. What is your plan to reduce unaccounted for water?
5. What are some of the cDavisenges that you face during abstraction, treatment, storage and distribution of water?

APPENDIX 6: KEY INFORMANT INTERVIEW GUIDE FOR THE MINISTRY OF WATER RESOURCES MANAGEMENT ANDDEVELOPMENT

Ministry of Water Resources Management and Development /Min of Local Government

1. What is your role in the Urban Water Management of small towns?
2. Who is responsible for gazetting and approving water tariffs for these small towns
3. How Is the key staff in water utilities employed(Contractual/fixed etc)
4. What are the other main players in the water sector which can influence the management of water in urban towns
5. What has been some cDavisenges that these small towns have been facing in terms of service delivery
6. What is being done to address the cDavisenges being faced
7. Do you have a budget allocation within your ministry for the running of water utilities?
8. What is the policy for management of water in small urban towns
9. Is it being followed?
10. What legislation governs the water utilities
11. How is it being enforced and by who?
12. Where do the water utilities report to?

APPENDIX 7: HOUSEHOLD QUESTIONNAIRE

HOUSEHOLD QUESTIONNAIRE FOR A RESEARCH ON AN ASSESSMENT OF THE PERFOMANCE OF LOCAL AUTHORITY AND ZINWA MANAGED WATER SUPPLY SYSTEMS IN SMALL URBAN TOWNS OF ZIMBABWE

INTRODUCTION

My name is Sharon Murinda. I am a student at the University of Zimbabwe currently studying Master's Degree in Integrated Water Resources Management. I am undertaking this research as part of my academic study. I would like to interview you for a few minutes. Your responses will be treated as confidential and I will not request your name. I am very much interested in hearing your opinions and views with regards to urban water services. Participation in this research is voluntary and if at anytime you feel you no longer want to carry on please be free to quit. The information you provide will be very valuable for policy design and water management in Zimbabwe.

QUESTIONS ABOUT THE HOUSEHOLD

Name and Address of residential area.....……..

Date of interview……

Name of interviewer ……..

PART 1 DEMOGRAPHIC INFORMATION

1.1 How many people live in this household

- ❑ >10
- ❑ 7-9
- ❑ 4-6
- ❑ <3

1.2 How many are adults?

Male …….

Female ……..

1.3 How many households live on these premises?

- ❑ >4
- ❑ 4
- ❑ 3
- ❑ 2
- ❑ 1

1.4 Relationship of respondent to Household head

- ❑ Parent
- ❑ Sibling
- ❑ Extended family member
- ❑ Housemaid/worker

1.5 Gender of Household head

- ❑ Male
- ❑ Female

1.6 What is the age of household head

- ❑ >65
- ❑ 50-64
- ❑ 40-49
- ❑ 30-39
- ❑ 18-29
- ❑ <18

1.7 Highest level of formal educational attained by head of household

- ❑ Tertiary
- ❑ Secondary
- ❑ Primary
- ❑ Never attended formal school

1.8 What is your monthly average household income?

- ❑ >US $1000
- ❑ US $700-1000
- ❑ US $400-699
- ❑ US $200-399usd
- ❑ US $100-199usd
- ❑ <US $100usd

1.9 Occupation of household head……

1.10 Apart from the above named, are there other sources of income for this household?

……
……
……

PART 2 WATER SOURCES AND WATER USES

2.1 Are you currently connected to the water distribution network?

- ❑ Yes
- ❑ No

2.2 What type of connection do you have?

- ❑ Individual
- ❑ Shared
- ❑ Communal
- ❑ Other ……..

2.3 Is the connection metered?

- ❑ Yes
- ❑ No

2.4 Is the meter working?

- ❑ Yes
- ❑ No

2.5 When last was it functional? …….

2.6 Is the water service provider aware of it?

- ❑ Yes
- ❑ No

2.7 What have they done about it?

……
……
……
……

2.8 What is the main source of your drinking water?

- ❑ Individual connection from ZINWA
- ❑ Individual connection from the Council
- ❑ Private borehole
- ❑ Unprotected well (without a lid)
- ❑ Protected well (with a lid
- ❑ Private supplier
- ❑ Rainwater
- ❑ Public borehole
- ❑ Community tap

2.9 How would you rate the quality of water for drinking and laundry delivered by the current service provider?

- ❑ Satisfactory
- ❑ Unsatisfactory

2.10 Give reasons for your answer

……
……
……
……

2.11 How many litres of water does this household consume (for drinking purposes) per day?

- ❑ >20
- ❑ 15-20
- ❑ 10-14
- ❑ 5-9
- ❑ 1-4
- ❑ <1
- ❑ Other ……..

2.12 What kind of toilet do you use?

- ❑ BVIP
- ❑ Flush system
- ❑ Bush system
- ❑ Other Specify …….

2.13 How many times do you flush the toilet in a day

- ❑ >10
- ❑ 7-9
- ❑ 4-6
- ❑ 2-3
- ❑ 1
- ❑ None

Check capacity of the tank……..

2.14 How many liters of water do you need each time you do your laundry?

- ❑ >100
- ❑ 80-100
- ❑ 60-79
- ❑ 40-59
- ❑ 30-39
- ❑ 20-30
- ❑ 15-19
- ❑ 10-14

- ❑ <9

2.15 How many times do you wash laundry in week?

- ❑ >10
- ❑ 7-9
- ❑ 4-6
- ❑ 2-3
- ❑ 1
- ❑ None

2.16 Which way do you use when bathing?

- ❑ Tub (how big is the tub……..)
- ❑ Shower
- ❑ Bucket (How big is the bucket……..)
- ❑ Other ……

2.17 How many times do bath in a day?

- ❑ 4
- ❑ 3
- ❑ 2
- ❑ 1
- ❑ Other Specify …….

2.18 Do you practice water conservation?

- ❑ Yes
- ❑ No

2.19 How do you conserve the water?

- ❑ Recycling used water
- ❑ Use of bucket when watering the garden
- ❑ Use of bucket to wash the car
- ❑ Bucket system for bathing
- ❑ Doing Laundry once a week
- ❑ Doing dishes once a day
- ❑ Other ……

PART 3 RESIDENTS' PERCEPTIONS ON SERVICE DELIVERY

3.1 How frequent does the service provider take meter readings? ……

3.2 When does your monthly water bill come? …….

3.3 Where do you pay your bills? ……..

3.4 Is it convenient for you?

- ❑ Yes
- ❑ No

3.5 If no give reasons why?

……
……
……
……

3.6 How would you rate the performance of water service in the categories below?

	Billing accuracy	**Value for money**	**Promptness in repairing burst pipes**
Excellent			
Very good			
Fair			
Poor			
Very Poor			

3.7 How often do you get water?

Hours/Day ……
Days/week ……

3.8 Do you sometimes experience water service interruptions?

- ❑ Yes
- ❑ No

3.9 If yes how many;

Hours/Day ……
Days/week ……

3.10 What time of the day is the water service normally interrupted? ……HOURS

3.11 Are you notified prior to these interruptions?

- ❑ Yes
- ❑ No

3.12 If yes, how are you informed?

- ❑ Media
- ❑ Public posters
- ❑ Leaflets at door posts
- ❑ Community Meetings
- ❑ Other ……..

3.13 What are your top 3 complaints with regards to service delivery

……
……
……
……

3.14 Where do you report your complaints? …….

3.15 Are you satisfied with the way your complaints are resolved?

……
……
……
……

PART 4 ABILITY AND WILLINGNESS TO PAY

4.1 What has been your average monthly bill in the last six months (Sept2010-Feb2011) ……

(Ask to see any bill available for the last six months)

4.2 Available bills

Month	***Bill***
September 2010	
October 2010	
November 2010	
December 2010	
January 2011	
February 2011	

4.3 What do you think about the bill? …….

4.4 How much would you be willing to pay if service is to improve interms of quality and hours of availability? ……$USD/Month

4.5 Have you ever been disconnected by your main water service provider?

- ❑ Yes
- ❑ No

4.6 If yes for how long?

- ❑ More than 3 months
- ❑ 2-3 months
- ❑ 1 month
- ❑ 2-3 weeks

- ❑ 1 week
- ❑ <1 week
- ❑ Other …….

4.7 What was the reason for the disconnection?

……
……
……
……

4.8 Where did you get water for domestic uses during that time?

……

4.9 Did you to pay to access water from that source?

- ❑ Yes
- ❑ No

PART 5 ALTERNATE WATER SOURCE- COMMUNITY TAP

5.1 How far is the collective tap from your home (consider round trip)?

Km_____ hrs _____

5.2 What means of transport do you use for fetching water?

- ❑ walking
- ❑ Car
- ❑ Domestic Animal
- ❑ Wheel barrow
- ❑ Other ……

5.3 How often do you collect water (no. of trips to the collective tap)

- ❑ One trip/day
- ❑ two trips/day
- ❑ three trips/day
- ❑ once/week
- ❑ twice /week
- ❑ three times /week
- ❑ four times/week
- ❑ other (specify)_____

5.4 Who is responsible for collecting water in this household?

- ❑ Mother
- ❑ Father
- ❑ Girl child
- ❑ Boy child
- ❑ Helpers within the household

- ❑ All of the above
- ❑ Other …….

5.5 What containers are used to carry water home from the collective tap?

- ❑ Bucket
- ❑ 25l water container
- ❑ 20l water container
- ❑ Other (specify) ……

5.6 Number of containers per trip: ……

5.7 Do you pay for the service (collective tap)?

- ❑ Yes
- ❑ No

5.8 If yes, how much are you paying per month for the water supply service?
……

5.9 How do you rate the quality of water from the community taps?
……
……

5.10 Would you be willing to pay more for a nearer and more regular access to water?

- ❑ Yes
- ❑ No

5.11 If yes, how much would you be willing to pay per month for a nearer and more regular access to water?
…….

5.12 If No, give reasons
……
……
……
……

PART 6 IMPACT OF WATER PRICING ON HOUSEHOLD WATER USE PRACTISES

6.1 Has the price of water affected your household water use practises?

- ❑ Yes
- ❑ No

6.2 If yes state how

……
……

6.3 What has been the impact of the price of water on household hygiene?

- ❑ Household members now bath once a day
- ❑ Household cleaned once a day
- ❑ Recycling has lowered the personal and kitchen hygiene of the household
- ❑ Washing of hands after toilet use is no longer done
- ❑ Dirty clothes are being recycled over and over again
- ❑ Other …..……

6.4 Has your household ever been affected by the cholera?

- ❑ Yes
- ❑ No

6.5 If yes how many members have been affected? ……

6.6 What do you think causes cholera?

……
……

PART 7 STAKEHOLDER INVOLEVEMENT IN FINANCIAL AND ADMINSTRATIVE ISSUES OF URBAN WATER MANAGEMENT

7.1 Do you know how water tariffs are set?

- ❑ Yes
- ❑ No

7.2 If yes, describe the process?

……
……
……
……

7.3 Have you ever been called to attend a meeting were they propose to set new tariffs?

- ❑ Yes
- ❑ No

7.4 Did you attend?

- ❑ Yes
- ❑ No

7.5 Give reasons for your answer

……
……

7.6 What has been your involvement in the setting of tariffs?

……
……
……
……

7.7 What do you think about the process? In terms of (representation; effectiveness; transparency etc).

……
……
……

7.8 What do you think can be done to improve the way service is delivered to residents?

……
……

7.9 How best can all stakeholders be involved in the issues of urban water management and specifically that of setting tariff

……
……
……
……
……

7.10 How can customer care services be improved by the service provider?

……
……
……
……

Remarks from the respondent

……..……
……..……

Remarks from the interviewer

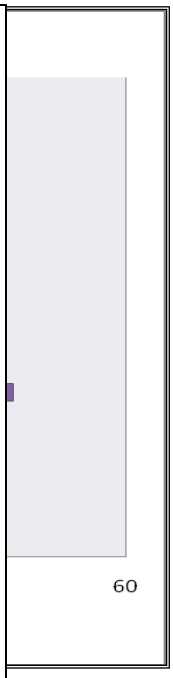
……..……
……..……
……

APPENDIX 8 DEMOGRAPHIC PROFILE

Sample Size Distribution

Table showing: Calculated Town Average Incomes

Chipinge	**Average Income**		
Income Range	**fi**	**xi**	**fixi**
1_99	2	50	100
100-199	5	149.5	747.5
200-399	21	299.5	6289.5
400-699	40	549.5	21980
700-999	15	849.5	12742.5
1000-1999	3	1499.5	4498.5
Sum	**86**		**46358**
Mean	1/n*fixi=	**539.0465**	
Gokwe	**Average Income**		
Income Range $US	**fi**	**xi**	**fixi**
1_99	29	50	1450
100-199	32	149.5	4784
200-399	51	299.5	15274.5
400-699	10	549.5	5495
700-999	3	849.5	2548.5
1000-1999	3	1499.5	4498.5
Sum	**128**		**34050.5**
Mean	1/n*fixi=	**266.0195**	
Karoi	**Average Income**		
Income Range $US	**fi**	**xi**	**fixi**
1_99	11	50	550
100-199	35	149.5	5232.5
200-399	37	299.5	11081.5
400-699	9	549.5	4945.5
700-999	1	849.5	849.5
1000-1999	0	1499.5	0
Sum	**93**		**22659**
Mean	1/n*fixi	**243.6452**	
Rusape	**Average Income**		
Income Range $US	**fi**	**xi**	**fixi**
1_99	36	50	1800
100-199	85	149.5	12707.5
200-399	50	299.5	14975
400-699	1	549.5	549.5
700-999	0	849.5	0
1000-1999	2	1499.5	2999
Sum	**174**		**33031**
Mean	1/n*fixi=	**189.8333**	



Distribution of Household sizes for the Four towns