User Perceptions and Levels of Satisfaction of Water Management Devices in Cape Town and eThekwini

Report to the
WATER RESEARCH COMMISSION

by

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WRC Report No. 2089/1/13
ISBN 978-1-4312-0472-4

October 2013

Obtainable from

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Executive Summary

Since the onset of democracy in 1994, South Africa has experimented with different ways of promoting sustainable water service delivery in urban areas. In the 1990s, there was concern with the need to expand water service delivery to unserviced areas in an environment characterised by non-payment or resistance to payment for water services by users in low income areas as well as decreasing central government grants. Pursuant to these concerns, numerous efforts were made to collect outstanding debts from water users. These included water cut offs as well as seeking judicial redress. However these measures met with limited success. Water cut offs resulted in advocates of human rights arguing that this was a violation of citizens fundamental human rights and the right to basic municipal service such as water and sanitation. Assisted by civil society organisations, ordinary citizens also took municipalities such as eThekwini and Johannesburg to court, compelling them to abandon water cut offs as a punitive response to non-payment by users. As a result, municipalities began to develop novel ways of enforcing payment for services. This resulted among other alternatives, in the introduction of Water Management Devices (WMDs).

There are a variety of types of water management devices. They either limit the flow of water from full pressure to various levels of trickle or cap the quantity available to users per day. WMDs have since gained significant appeal as a regulated mode of water service delivery in South African municipal authorities and are becoming a prominent instrument for water management in urban low income areas. Cape Town and eThekwini are two such municipalities that have rolled out these devices with the broad aim of charging viable user fees; enabling users to conserve water; managing consumer debt; providing free basic water and detection of leaks. While these devices have been praised as efficient and effective mechanisms in regulating water service delivery, limited studies have been conducted to find out perceptions of the recipients of these devices. This study provided an understanding of user perceptions of the efficacy of WMDs. Thus it is a marked departure from previous research studies that have tended to focus on the supply side of water services by analysing the effectiveness of WMDs in promoting cost recovery measures without seeking to understand how the recipients of the devices perceive them. In this study, an understanding of perceptions of WMDs users was derived from an examination of the available literature and selected case studies in two urban areas. Key objectives of the study were to:

- Assess the objectives of the installation of WMDs in Cape Town and eThekwini municipalities;

- Describe the available mechanisms for public participation in water services in Cape Town and eThekwini municipalities;
- Evaluate the process followed by the Cape Town and eThekwini municipalities to obtain consent to install WMDs;
- Describe the perceptions held by the communities on the flow limiters as well as the acceptability of such devices in the targeted communities.

The research reaffirms that following numerous institutional challenges that impeded the provision of adequate water, local authorities in South Africa have adopted the cost recovery approach to promote efficient and equitable use, in conjunction with rights-based policies such as free basic Water (FBW). The adoption of both approaches blurs the lines between water services as a public versus a private good. Cost recovery measures occur in the context of the dominance of liberal thought in economic development. In South Africa, it is rooted in the formulation and adoption of the liberal economic policy, GEAR that was adopted in 1996. As mentioned, the introduction of WMDs has faced severe criticism from social commentators in South Africa. Such criticism is based on the social justice or human rights approach, namely that water is an inalienable right to which everyone should have unfettered access regardless of their material conditions. The report shows that there are many unresolved tensions between the two approaches as they feature in policy formulation and implementation on WMDs in the cases under scrutiny here.

This research was conducted to gauge the perceptions of residents in 2 poor urban areas of Cape Town (Saxonsea and Samora Machel communities) and eThekwini (Umlazi and Umbumbulu communities) of WMD policy rollout processes, especially in terms of the social justice dimension, following the implementation of cost recovery measures that included the utilisation of water management devices.

Social structure of affected users

The study established that WMDs have predominantly been installed in formal low income properties valued below R300 000. Unemployment in these communities averages 40%. In addition to unemployment, there is a huge pool of pensioners in these communities. The largest number of pensioners was found in Umbumbulu (49% of respondents were pensioners). In areas where backyard dwellings can be installed, such as in Samora Machel, property owners were also mainly pensioners and the shack dwellers were gainfully employed in most instances. These features (unemployment and pension) account for the high levels of poverty in these communities.

This study primarily sought to determine perceptions of recipients of WMDs regarding their water supply situation. Analytically this has been done at three levels. The first level entails understanding user's perceptions on the adoption of utilisation of the WMDs themselves as instruments of water supply. The Technology Adoption Model (TAM) was used to determine the attitudes of water users towards the WMD technology. The second level of analysis of the users' perceptions is done to determine their satisfaction or dissatisfaction with water supplies following the installation of WMDs. The confirmation /disconfirmation model borrowed from marketing literature is used to understand the users' water consumption experience. This is then linked to the 'citizen as user' perspective to evaluate the degree to which the citizen as consumer affects rights based framings of water supply to poor households.

In line with the central question this research sought to examine, namely users perceptions of and satisfaction with WMD policies and rollout, a central assumption is that the ideal water supply mechanism to consumers would balance the users and provider's expectations, in terms of the expectations, policy pronouncements and promises on debt relief, as well as ease of household water management, and rights, by way of participation that is seen as effective and inclusive. ***In other words, the study aimed to evaluate the balance between rights and cost recovery as exercised through WMD rollout.***

Users' perceptions of the utilisation of water management devices are ordinarily derived from the human rights framework which puts increasing emphasis on citizen participation in municipal governance as a prerequisite for project success. It is assumed therefore that the balance between the users' and providers' expectations will be easily reached where citizen participation is integral part of municipal water governance.

Frameworks used for evaluating User Perceptions of WDMs

The Technology Adoption Model posits that the attitude toward a technology and intention to use a technology are largely explained by perceived usefulness of the technology and the perceived ease of its use. Perceived usefulness is defined as the extent to which a person believes in using a system that would enhance their performance while perceived ease refers to relative lack of mental and physical effort (Lu *et al*., 2003). The attitudes towards WMDs would thus in part derive from their perceived usefulness and perceived ease of use.

The disconfirmation model postulates that consumers 'bring expectations into an exchange encounter and then to compare these expectations with perceived performance' (Alford and Sherrell, 1996:71). In its simplest form this model postulates that satisfaction results from actual performance is greater than expectations and dissatisfaction occurs when expectations are higher than performance.

The TAM and confirmation/disconfirmation frameworks as a form of evaluation of satisfaction are contextualised in relation to the third level of analysis, namely the 'citizen as user' which examines the balance between rights and cost recovery, particularly in South Africa's historical context. In terms of water services in poor and largely black communities in South Africa, the expectations of citizens as consumers can be assumed to be a product of the aspirations and anticipated dividend of their participation in the anti-apartheid struggle codified in the documents such as the RDP (ANC, 1994) and the Constitution (RSA, 1996). During apartheid, black people were not accorded full citizenship, with many living under difficult conditions without access to clean water. Unsurprisingly, many of the urban poor hold the expectation of an improved status of their objective living conditions in addition to the 'freedom' that was ushered in 1994. During this period, the white population enjoyed levels of service comparable to those of the developed world. Coming to power on the back of an ambitious programme of social transformation entitled the Reconstruction and Development Programme (RDP) the ANC-led government promised 'to provide all households with clean, safe water supply of 20-30 litres per capita per day (lcd) within 200 metres' and in the medium term 'to provide an on-site supply of 50-60 litres per capita per day (lcd) of clean water' (ANC, 1994:29).

The study theorised that the location of WMDs within broader expectations and performance framings are related to consumer satisfaction attributes:

Expectations

(a) the *articulation of water access rights provided for in the constitution*
(b) the service attributes related to the previous conventional meters
(c) the continuation of the form of relationship between the consumers and the water services provider

Performance

(a) the form and level of participation afforded to the consumers in the project/programme to roll out the water management devices
(b) the form and content of communication regarding the water management devices
(c) the effects of water management devices
(d) prior knowledge of effects of similar devices in other areas
(e) socio-economic status of the consumers
(f) incentives for using water management devices

The research posited that the ideal water supply mechanism to consumers would balance the users and provider's expectations.

Evaluating users perceptions of WMDs using the TAM and confirmation/disconfirmation model

The research findings make clear that despite lack of participation in the decision processes that led to the adoption of WMDs, a majority of users in both case study areas were satisfied with the devices in terms of the technology provided in terms of managing their consumption as linked the FBW policy. In terms of the confirmation/disconfirmation model, the research also shows that the devices satisfied expectations by taking the burden of payments from their shoulders and the majority have adjusted to working with less water. Numerous coping strategies have been devised by users attempting to use only the FBW portion of their allocation. Unfortunately some of these mechanisms pose health dangers to water users, for example limiting bathing and washing in order to save water.

WMDs and 'Citizen as User's' Perspective

The study noted that the citizen as user's perspective of WMDs is framed around the human right to water. In this framing, water service provision is seen as an inalienable right that all citizens should be entitled to. This contrasts with the cost recovery measures being pursued by municipalities. However government has put in place legislative and policy provisions that seek to strike a balance between the human right to water and cost recovery. The Water Services Act, White Paper on Water and Sanitation (1994); Guidelines for Compulsory National Standards Regulations; Municipal Systems Act (2000); and Norms and Standards for Water Services Tariffs Regulations are some of the instruments that the government has put in place to bring effect to the utilisation of standard WMDs and differentiated water tariffs.

The above instruments, as well as the Constitution, Strategic Framework for Water Services (SFWS) (2003) and the Free Basic Water Policy attempt to bridge the gap between liberal cost recovery measures and the need for the provision of water as a human right. They note that water is a basic right that should be provided regardless of ability to pay. The two-pronged focus of these instruments have enabled South Africa to be one of the countries that have a hybrid water service provision system that incorporates both human right to water and cost recovery.

Citizen as User Participation Framework

In terms of policy implementation, and balancing rights with cost recovery through the installation of WMDs, both case study municipalities argued that they have an elaborate water user participation process in the installation of water management devices. Cape Town municipality engaged private service providers to seek buy-in and installation of WMDs. On the other hand, eThekwini municipality used its Water Services Unit to roll out its devices. An analysis of both cases highlighted that the conceptualisation of the WMDs project was not done through the participation of citizens. While in Cape Town, users were compelled to have them installed on their property, it is set as a voluntary exercise in eThekwini. In all cases the 'Citizen as User' in relation to actual policy input and influence is weakly grounded in WMD policy implementation processes. Furthermore for both Cape Town municipality and eThekwini we observe the complex and the multiple forms of participation taking place but none of them exceeds or go beyond consultation.

The above conclusion is enforced when we review Arnstein's (1969) categorisation of the 'ladder' of participation:

i. *Manipulation and Therapy* – Both are non-participative. Public participation becomes nothing more than manipulation when participatory rhetoric is used, but the process is imposed on citizens to achieve an outcome that they have no influence over and which is not likely to serve their interests. Public participation is merely a form of therapy when citizens are involved in a "feel-good" exercise, which might allow them to reflect on their condition, but they have no influence over related decision-making processes that affect their lives. In the context of service delivery both manipulation and therapy amount to nothing more than public relations exercises by municipalities to drum up citizens' support.
ii. *Informing* – A most important first step to legitimate participation if practiced in water service delivery. But too frequently the emphasis is on a one way flow of information and there is no provision for channel for feedback.

iii. *Consultation* – Again a legitimate step – attitude surveys, neighbourhood meetings and public enquiries. For many analysts of participation, including Arnstein, consultation is the weakest form of participation and is often simply a window dressing ritual.

iv. *Placation* – For example, co-option of hand-picked 'worthies' onto committees. It allows citizens to advise or plan ad-infinitum but retains for power holders the right to judge the legitimacy or feasibility of the advice.

v. *Partnership* – Power is in fact redistributed through negotiation between citizens and power holders. Planning and decision-making responsibilities are shared, e.g. through joint committees.

vi. *Delegated power* – Citizens holding a clear majority of seats on committees with delegated powers to make decisions. Public now has the power to assure accountability of the programme to them.

vii. *Citizen Control* – Have-nots handle the entire job of planning, policy making and managing a programme, e.g. neighbourhood corporation with no intermediaries between it and the source of funds.

Summary of Report Findings

There is generally a high level of satisfaction with water service provision in both Cape Town and eThekwini municipal areas affected by WMDs. For example, in eThekwini Municipality, 63% of the respondents said they were satisfied with water services and 29% very satisfied (which adds to a total of 92% satisfied or very satisfied). The level of unsatisfied is only 2% and another 2% for very unsatisfied with the remaining 4% neither unsatisfied nor satisfied. In Cape Town, 63% of Samora Machel respondents in the main dwelling households were satisfied with water services compared to 59% of backyard dwellers who were satisfied with their water services. In Saxonsea 50% of residents were satisfied by the installation of WMDs, 39% were ambivalent, while 11% were unsatisfied. The unsatisfied households were mostly those who live on plots with a large number of people living on a plot. The general strand of the reasoning against WMDs in these households is that in the past they never ran out of water and with the devices they are struggling to use water below the set limit.

The common thread for high levels of satisfaction was the direct result of water regulation that translated into zero payment of arrears, and the promise that these would be written off or parked on acceptance of the WMD. In general satisfaction issues also related to the reliability of water supplies and the quality of water supplies. These in both cases have always been highly rated.

Those respondents that were ambivalent and unsatisfied by the installation of the WMDs cited inadequate information on how the devices functioned, coercion, lack of consultation and the feeling of unfair treatment because of their economic and educational status.

The study affirms that consultation is the chief form of participatory strategy, and that what Arnstein refers to as manipulation, therapy and placation also occur. This is a key area in need of attention in terms of balancing cost recovery with rights, and ensuring that current legislation is adhered to. Although the study shows that the majority of WMD devices recipients welcomed the cost recovery aspects of the WMDs, the lack of participation and 'buy-in' could lead to problems down the line. As discussed earlier, the benefits of effective participation are:

- Public acceptance, commitment and support with regard to decisions and plans;
- Increasing public awareness of environmental issues;
- Increased quality of decisions by drawing on lay local knowledge;
- Social learning and developing a shared understanding of the problem dimensions;
- Less litigation, fewer misunderstandings, fewer delays and more effective implementation;
- Stronger democratic legitimacy of decisions by allowing the public to have a say in and/or an influence on the decisions at stake;
- Social goals such as the building of trust in institutions.

Litigation on the part of civil society organisations campaigning for the rights of the poor is a very real potential problem should WMD rollout policies be deeply flawed. The case studies here showed that in the Cape Town WMD policy rollouts, forms of community inclusion have been particularly weak, with the potential for rights based protest based on promises made during consultation that have not been followed through, for example, the lack of debt write-offs in certain areas such as Saxonsea. The case studies in eThekwini show better communication, although of a weak, rather than robust form or 'rung' of participation. The following types and structures of participation are used, but from our interviews it seems that most of these forms of participation were bypassed in the Umlazi and Umbululu case studies. However, it is a framework that could be built on and expanded to better balance rights and cost recovery in the future:

- *Focus group discussions*

According to eThekwini municipality, the focus group mechanism ensures that the public influences the service delivery standards and levels when it came to strategic decision- making processes in water and sanitation;

- *The Raising Citizens Voice – Rights and Responsibilities Programme*

The Raising Citizens Voice programme (RCV) is intended to support a bottom up approach to water services regulation by actively involving the citizens in the local monitoring of water and sanitation services. The training targets councillors, ward Committees, Civil Society Organisations, or individuals.

- *Customer Service Charter*

The Customer Service Charter is a piece developed with an intention to guide both the city authorities and the public to promote efficient and effective service delivery. It spells out what the unit does and the unit's commitment to the public. In particular, the charter spells out that EWS seeks to provide all citizens within the eThekwini Municipality access to appropriate, acceptable, safe and affordable basic water supply and sanitation services.

- *Service Level Standards*

eThekwini also has an elaborate framework of service level standards. These standards are meant to improve relations and understanding between the Municipality who provides the services and the customers who make use of the services.

- *Internal and External Communication.*

The eThekwini Water and Sanitation Unit also uses various media, ensuring the flow of information to enable easy access to water and sanitation services, i.e. Suggestion Boxes; Electronic Media Programs; Road show; Education Awareness Centre; Internet website and Call Centre.

- *Citizen Report Cards*

According to the municipality, the eThekwini Citizen Report Cards are a new initiative which the municipality has taken on board. It is aimed at identifying gaps in service delivery and also creating consciousness on the side of the members of the public so that the municipality can improve measures of trust, overall satisfaction, transparency, accountability, efficiency and effectiveness.

In conclusion, the report findings underline the importance of better integrating rights based approaches into the rollout of WDMS. The report shows that while satisfaction with the technology of WDMs is high, the statistics on perceptions of inclusion and meaningful consultation, especially in Cape Town, illustrate that there is considerable room for improvement in balancing rights with cost recovery.

Acknowledgements

We would like to acknowledge the Water Research Commission for funding the research project and would like to thank the following Steering Committee Members for their contributions and guidance:

Mr J N Bhagwan	Water Research Commission (Chairperson)
Prof Kobus van Zyl	University of Cape Town (UCT) – Civil Engineering
Mr Teddy Gounden	eThekwini Municipality – Water and Sanitation
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Dr Jackie Dugard	Socio-Economic Rights Institute of South Africa (SERI)
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Ms S Harigobin	City of Cape Town – Water and Sanitation
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Ms Barbara Tapela	PLAAS, University of the Western Cape

The authors would like to thank the personnel of Cape Town and eThekwini municipalities and WMDs users who took the time to respond to questionnaires and interviews as well as personnel from various organisations and government departments who provided valuable information during the course of the study.

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ABBREVIATIONS

CCT	City of Cape Town
CFO	Chief Financial Officer
DWAF	Department of Water Affairs
FBW	Free Basic Water
GEAR	Growth, Employment and Redistribution
IDP	Integrated Development Plan
IT	Information Technology
RDP	Reconstruction and Development
SFWS	Strategic Framework for Water Services
TAM	Technology Adoption Model
WMD	Water Management Device
WSA	Water Services Act

SECTION 1

INTRODUCTION

1.1 Background

This report is an analysis of the utilisation of Water Management Devices (WMDs for the control and regulation of water supply to domestic water consumers) in eThekwini and Cape Town municipalities, examined from a user perspective. In water service delivery, studies have mainly focused on the utilisation of WMDs as alternative forms of water service delivery and the economic viability of cost recovery measures in the water sector. Limited research has been done from the perspective of the user, in particular with regards to their satisfaction with the service, but also in terms of the social justice component of WMD policy formulation and implementation. This research focuses on the citizen and highlights rights versus consumer challenges and contradictions as expressed by WMD recipients/users. It principally focused on Water Management Devices in terms of (a) their effectiveness from the water service authority/providers perspective (b) perceptions of users of meaningful inclusion in processes of participation around WMDs (c) acceptability of the WMDs to users and (d) process and sequencing of stages in the implementation of the WMDs. The study is premised on the view that in South Africa the provision of satisfactory water supply services necessarily entails meeting all constitutional and legislative provisions, at the very minimum, as well as giving space to citizens to participate in decision-making that underpins a social justice component relating to implementation of WMD policies. Perceptions of satisfaction therefore, entail an assessment of the degree to which users perceive WMDs do not infringe on their constitutional or legislative right to water. WMDs are electronic metering devices that have mainly been used to limit the volume of water used in low income communities to free water basic levels. WMD installation looks likely to become one of the principal cost recovery measures in South Africa municipalities. Cost recovery here is used to refer to the institution of mechanisms that enable local authorities to recover all (or nearly all) of the costs associated with a water system, programme or service to ensure long-term sustainability (Cardone and Fonsceca, 2003; McDonald and Pape, 2002:17-18).

The concept of cost recovery in local service delivery can be traced back to the 1980s' push to develop a new consensus on policies for developing nations. Later to be known as the Washington Consensus, it introduced a radically neo-liberal market driven approach to economic development based on the free market ideology of Margaret Thatcher and Ronald Reagan. Subsequently IMF and WB led economic reform measures of the 1980s in Africa premised on trade liberalisation, fiscal

austerity and marketisation of commodities, including water, where public utilities traditionally had monopoly (Gillis, 2004). According to the IMF, World Bank and other multilateral agencies, reform prescriptions were meant to transform African economies, reduce debt, and restore a sustainable balance of payments and creating conditions for sustainable growth. When South Africa implemented its own version of these reforms under GEAR in 1996, Africa had 40 countries implementing such economic reforms that year, the highest concentration of countries with IMF and WB inspired reforms in the world (Muuka, 1998).

Subsequently, current international trends in water service delivery have tended to support municipal cost-recovery through commercialisation, privatisation and long-term municipal water management contracts (Bond, 2011) pressing national governments to move away from the concept of free water for all (Hukka and Kakto, 2003: p.v). Governments' now encourage their municipalities to adopt a profitable user fee structure. The African Development Bank (n.d) notes that,

> *User fees have an important role in meeting social, economic and environmental policy objectives. User fees, and their structure, provide signals to users about the cost of the service, the scarcity of resources used to provide the service, and the priorities that governments place on provision of services to particular groups. At a minimum, user fees for cost recovery provide the basis for financial sustainability: failure to provide for adequate funding leads to the degradation of systems, deteriorating performance and services, and unwillingness to pay – a commonly observed vicious circle.*

The World Bank, International Monetary Fund (IMF) and other donor agencies have pushed for the use of economic and market tools to ensure the efficient provision of water. This is in contrast to the earlier crisis prone welfarist approaches where traditional public utilities in the water sector collapsed (Langford, 2005:273; Kessides, 2004:31). The International Financial Institutions (IFIs) argue that African governments are too poor and too indebted to subsidise the water services provision at municipal level. Therefore recovery of costs in water utilities is currently seen as a key element in sustainability of both the provider and of the water resource itself (Ntengwe, 2004:1301). Consequently, loans specific to water and sanitation routinely include conditions requiring increased cost recovery, full cost recovery or "economic pricing" for water services (Grusky, 2001).

The introduction of cost recovery in South African municipalities led to the adoption of an array of measures in the water services sector as they attempted to capture enough and sustainable revenue for their services. In democratic South Africa, cost recovery in water sector took shape following the

introduction of GEAR. In municipal service delivery GEAR urged privatisation of basic services and full cost recovery for all services. In the process, the Ministry of Finance offered millions of rands in incentives to municipalities to encourage them to privatise basic services (Veotte, 2001; Miraftab, 2004). Following the introduction of GEAR, all legislation pertaining to water service delivery has subsequently made reference to the importance of cost recovery in the country's water sector. McDonald and Ruiters (2005:25) state that "(n)ew post-apartheid legislation has also entrenched the shift to corporatisation with the sanctioning of standalone corporations to run water services and with an increasing emphasis on cost recovery and fiscal ring-fencing".

Thus efforts at implementing cost recovery in the water sector have included the adoption of WMDs. The nature of the type of WMDs introduced in low income communities have generally been those that not only converge consumption volumes and costing, but also drastically reduce the amount of water available to communities and households that cannot pay. These WMDs have also been referred to as flow limiters in Cape Town's internal documents and flow limiters both in eThekwini's internal and public documents. Cape Town's public documents simply refer to these as WMDs. In this report we simply use WMDs for ease of reference, taking into account that all WMDs have a flow limiter component (Van Zyl, 2011).

The introduction of these devices has raised considerable debate in the South African water sector (e.g. Wilson and Pereira, 2010; Pereira, 2009). For example, for Pereira (2010) the WMDs 'represent a dangerous conflation of water conservation (response to resource scarcity) and debt management (response to financial scarcity), and as such they target households who cannot afford water over households that use excessive water. In the same vein, Loftus (2006) and Narsiah (2010) have argued that the introduction of WMDs in poor areas betrays the purpose of government's free basic water (FBW) policy, in that WMD policy implementation, coupled to FBW, is a tool to manage consumption by the poor, rather than a policy articulation of the constitutional right to water. This research interrogates the potential and actual tensions between the social justice components to FBW and the cost recovery aspect of WMDs. By way of case studies the research highlights:

- the introduction of WMDs;
- the perceptions of their acceptability on the part of the affected communities;
- the scope and actualised ambit for participation in the installation process;
- and the impact of WMDs on the citizen's right to water from a both a citizen and consumer's perceptive in low income communities of Cape Town (Saxonsea and Samora Machel) and eThekwini (Umlazi and Umbumbulu).

1.2. Objectives of the Research

The objectives of the research can be summarised as follows:

3.1 To assess the objectives of the installation of WMDs in Cape Town and eThekwini municipalities.

3.2 To describe the available mechanisms for public participation in water services in Cape Town and eThekwini municipalities and their perceived effectiveness by recipients of WMDs.

3.3 To evaluate the process followed by the Cape Town and eThekwini municipalities to obtain consent to install WMDs.

3.4 To describe the perceptions held by the communities on the impact of flow limiters as well as the acceptability of such devices in the targeted communities.

1.3. Research Methodology

1.3.1 Case Study areas

Selected study sites were Saxonsea and Samora Machel in Cape Town as well as Umlazi and Umbumbulu in eThekwini.

Saxonsea is an outlying suburb of Cape Town which is located in Atlantis and part of Ward 29 of the City of Cape Town Metropolitan Council. Atlantis was established in the early 1980s as part of Apartheid's social engineering and thus a dumping site for surplus coloured people from Cape Town against the background of the group Areas Act (Law No.77 of 1957). In keeping with much of Atlantis, Ward 32, within which Saxonsea largely falls, retains its apartheid era racial population mix, with 96.4% of the population being classified as Coloured, 2.5% African, 0.5% Indian and 0.3% White. While the City of Cape Town (CCT, 2010) estimates that Saxonsea has a population of 24 487 living in 2 506 plots which gives an average of 9.77 people per plot, our study indicates a population of approximately 13 282 based on a mean of 5.3 people per plot and a mean of 4.77 people per household.

Samora Machel, on the other hand, was first settled in 1993 when public land was appropriated and an informal settlement set up. The Samora Machel informal settlement grew rapidly from between 245 shacks in February 1994, to 735 shacks by November 1994 and 1010 by June 1995 (Anderson *et al.,* 2009). Government then sought to develop the area under the integrated serviced land project (ISLP). Due to a number of reasons, among them the cost overruns on servicing land, the resultant housing on the first phase of the project was less successful than it could be as evidenced by very small single room houses measuring 4 m by 3 m which have been described as 'dog kennels' (see Seeking *et al.*, 2010). According to the City of Cape Town, Samora Machel consists of 4 860 metered

connections and a population of 14 885 (a mean of 3.06 people per metered connection) (CCT 2010). The study results show a mean of 7.39 people per stand which would translate to a population of 35 915 people.

In eThekwini, Umlazi consists of an agglomeration of formal housing the majority which is low income housing with pockets of middle income housing, single sex hostels, informal settlements as well as traditional zones in transition. According to eThekwini Municipality (EM, 2008), Umlazi had a population of over 550 000 in 2008 making it one of the largest suburbs in South Africa. Umlazi is subdivided into a number of zones numbered from A to Z. Interviews for this research were conducted in the Umlazi G section which consists of low income housing and informal settlements. Umbumbulu is a rural area located some forty kilometres away from Durban city and forms part of the eThekwini Metropolitan Municipality jurisdiction. The land under which most of Umbumbulu is located is administered by the Ingonyama Trust (Urban-Econ Tourism 2010).

The selection of case studies was carefully done in order to provide a broad range of low income communities that have been affected by the installation of WMDs. For example, Saxonsea and Umlazi are old townships whose affected communities were migrating from fixed high pressure water supply system to a restricted supply. Samora Machel emerged from the upswell in post-apartheid informal housing. Umbumbulu is a peri-urban setting symbolising the post-apartheid government's ambition to extend basic water supply services to previously unserviced communities. In that context, the *raison d'etre* for the installation of water flow limiters differs from that of urban communities. For example, while the official line in eThekwini Municipality has been that flow limiters are installed as a credit control measure in the urban area when consumers fail to meet their obligations and apply for debt relief. Yet Umbumbulu provides a divergence from this policy as all homes being supplied by the municipality's water system are automatically placed on flow limiters.

1.3.2 Household and interviewee selection

A mixed method approach was followed using a questionnaire survey. Interviewees were drawn from a total of **500** respondents, followed by 20 qualitative in-depth interviews. In the Cape Town suburb of Saxonsea in Atlantis (250) questionnaires were administered , as well as Samora Machel (250). In eThekwini, interviewees were drawn from a total of **411** households drawn from Umbumbulu (207) and Umlazi (205). Households were defined as a group of people who live together and provide for themselves jointly with food or other essentials for living, or a single person who lives alone. Household selection in each of the areas was done through stratified random sampling using geographic locale as the stratifying mechanism due to relative homogeneity in terms

of socio-economic characteristics. All interviewees were older than 18 years and could be anyone available in the targeted household at the time of the visit by the fieldworkers.

1.3.3 Questionnaire Design

The questionnaires used in the two municipal cases were similar. However the questionnaire used for the eThekwini Municipality study was adapted from the questionnaire used in the Cape Town leg of the study. The adaptations included in the new questionnaires for eThekwini Municipality study were due to the differences between the two projects in relation to the installation of WMDs as well as the differences between the two study areas in eThekwini (Umlazi is an urban township while Umbumbulu is a peri-urban village with a rural character). Further to this, the majority of Umlazi residents on flow limiters had volunteered to migrate from fixed meters while in Umbumbulu, all installations in the selected section were new and everyone would automatically be on a flow limiter. In both Cape Town and eThekwini, all questions were translated into isiXhosa and isiZulu respectively so as to aid understanding by the local respondents.

1.3.4 Capturing of Quantitative and Qualitative Questions and Analysis

All questionnaire data was captured and analysed in SPSS Statistics 19. The researchers present frequency distributions using descriptive statistics. Follow-up qualitative questions in the questionnaire were further analysed for thematic and semantic content, categorised and are presented below in tables below the quantitative data, as a way of providing explanation for the frequency statistics while still capturing the diversity of responses. Over and above the questionnaire survey, the researchers undertook qualitative interviews with smaller samples of key informants familiar with the study sites in order to further understand locals' experiences of the WMDs in the two areas.

The rest of the report is structured as follows:

Section 2 of the report outlines a review of the relevant literature. In particular the section identifies the concepts of cost recovery and human rights approach to water service delivery at the municipal level. The state's legislative provisions and municipal policies to promote both cost recovery and basic water services in particular to low income communities are also discussed. The concept of citizen participation which was ushered in by economic liberation policy is also discussed insofar as it has influenced the trajectory of cost recovery measures in South Africa and how it has influenced the adaptation of this approach to incorporate water as a basic human right. The section concludes with

an analysis the extent to which citizen participation is incorporated into the decision-making processes influencing water service provision.

Section 3 discusses the use of WMDs as a cost recovery measure in South Africa municipalities. These have been touted as the solution for the management of water supply particularly to low income communities. Its emphasis on controlling water volumes is believed to be a panacea for either the nonpayment or reluctance to pay for water services by the low income groups.

Section 4 discusses the analytical framework used in the study. The Technology Adoption Model is used to understand user's perceptions on the adoption of utilisation of the WMDs themselves as instruments of water supply in Cape Town (Saxonsea and Samora Machel) and eThekwini (Umlazi and Umbumbulu).

The confirmation /disconfirmation model is used to analyse the consumption experience of water services by users of WMDs in Cape Town (Saxonsea and Samora Machel) and eThekwini (Umlazi and Umbumbulu). Finally, the 'citizen as user' perspective is used to evaluate the degree to which WMD policies comply with rights based perspectives while trying to balance consumption patterns within the context of water scarcity.

Section 5 and 6 are detailed collections of Cape Town (Saxonsea and Samora Machel) and eThekwini (Umlazi and Umbumbulu) low income communities' perceptions on the usefulness of WMDs. The two sections also detail the processes that were followed in the adoption and installation of WMDs in the above communities and in so doing analyse the extent of participation in municipal water management through the use of Arnstein's (1969) ladder of participation.

Section 7 analyses the study's findings in comparative perspective. It concludes that both the formulation and implementation processes tended to either exclude users or was carried out through manipulation and therapy, forms of mild citizen participation. Despite lack of participation, the study notes that to a large extent, low income users are satisfied with the utilisation of WMDs from a consumer perspective. The huge advantage of the devices is that they are able to reduce user fees among low income communities to zero and help annul their debts. However, case study material also shows that in an endeavour to remain within the basic limit, users have developed numerous coping strategies, some of which have significant negative effects on health and hygiene.

Section 8 summarises the main research findings, outcomes and offers basic guidelines for redressing the lack of effective participation in the rollout of WMDs. The principal conclusions are that, the installation of water management devices was done without prior consultation with the affected users. However therapeutic measures were taken to familiarise the users with the gadgets. However, despite the absence of credible citizen participation measures in the installation of WMDs, the study notes that WMD users have found great relief in their utilisation. They no longer worry about debts and possible water disconnections as they have free basic water which to many of the users is either sufficient or can be managed to meet all household requirements. However, the municipal policy framework for water conservation and management is not universally applied to all users. It is targeted at cutting consumption of the poor. From a rights based perspective this may be problematic in the long term.

Section 9 covers recommendations for future research. During the course of the study, a number of interesting issues arose that were outside the scope of the study and a number of them if pursued may provide a detail to better inform water governance policies at municipal level. There is a need for further research to understand complimentary measures that the municipalities are taking to conserve and manage water that are targeted at high income and bulk water users and gauge their effectiveness. Determining a balanced Water Demand Management strategy at municipal level that evaluates the consumption patterns of both the rich and the poor is an important exercise to help justify WMDs. Research needs to concretely establish that the rights of the poor are not compromised by cost recovery to the advantage of the rich.

SECTION 2

LITERATURE REVIEW – COST RECOVERY, HUMAN RIGHTS AND CITIZEN PARTICIPATION

2.1 Financial Cost Recovery

In line with focusing on user perceptions of WDMs, this section examines the debates around WDMs in both academic and policy terms. Essentially these debates revolve around how rights to water are protected in national legislation and policy, and how these are balanced with the fact that water is also an economic good. In addition to this debate is a secondary related debate about the effects of market liberalisation on the provision of services to the poor. Economic reform measures of the 1980s in Africa were premised on trade liberalisation, fiscal austerity and marketisation of commodities where public utilities traditionally had monopoly (Gillis, 2004).These were in response to economic crises. According to the IMF, World Bank and other multilateral agencies, reform prescriptions were meant to transform these economies, reduce debt, and restore a sustainable balance of payments and creating conditions for sustainable growth. When South Africa implemented its own version of these reforms under GEAR in 1996, Africa had 40 countries implementing such economic reforms that year, the highest concentration of countries with IMF and WB inspired reforms in the world (Muuka, 1998).

Current international trends have tended to support municipal financial cost-recovery, commercialisation, privatisation and/or long-term municipal water management contracts to private companies (i.e. the sub-contracting of services that differs from full scale privatisation but still outsources aspects of water service delivery to private companies.

In the area of water services, the International Financial Institutions (IFIs) have argued that African governments are too poor and too indebted to subsidise the services. The public sector is also deemed to be weak, corrupt, overstaffed, using obsolete equipment, low skilled human resources, deplorable maintenance, poor rate policies and also unwilling or unable to change (see for example McDonald and Ruiters, 2005:1). Therefore recovery of costs in water utilities is seen as a key element in sustainability of both the provider and of the water resource itself (Ntengwe, 2004:1301). Consequently, loans specific to water and sanitation routinely include conditions requiring increased cost recovery, full cost recovery or “economic pricing” for water services (Grusky, 2001). This is a very important aspect, because South Africa’s relative water scarcity (as with many African

countries) is seen as making it economically vulnerable should unnecessary consumption not be attended to in terms of effective policy (Thompson, 2005).

Cost recovery measures cover privatisation, commercialisation, outsourcing or a variety of public private partnerships that stimulate a profit making enterprise. Bond, McDonald and Ruiters (2003:10) aptly note that,

> *"private sector participation in the delivery of water services can take a variety of different forms – from one person fixing water pipes in a small section of a township to a large multi-national corporation providing bulk water supply and bulk sewerage treatment. The size and types of contracts can vary as well, from a one year fee-for-service, renewable contract to a thirty year license. Ownership of asserts also varies, with the state retaining ownership in some cases and the private company in others".*

This process treats water as an economic good that should be accessed upon paying a fair price. In fact the International Conference on Water and the Environment (ICWE) held in Dublin in 1992 specifically stated that water has an economic value in all its competing uses and should be recognised as an economic good. This perspective allows public utilities to commercialise, enter into partnerships or allows private players to enter water service delivery sector (Schwartz, 2008; Bond, 2011). Private players are deemed as valuable in that they would bring in superior technology, management and efficient operating systems, magnanimous investments into the water sector and relief to the public fiscus.

2.1.1 Arguments for Cost recovery

A number of advantages have been posited for the introduction of cost recovery measures. First, in its guidelines for user fees and cost recovery for urban, networked water and sanitation delivery, the African Development Bank (2010) states that the main aim of water pricing should be economic cost recovery, with the initial target being the recovery of full financial cost. Social equity and capacity to pay by the rural and urban poor may however be taken into consideration. Funds raised through such cost recovery measures would be used to expand access to new communities and households, especially in peri-urban and rural areas. The view is that in Africa, guaranteed water service delivery had been hampered by the fact that governments traditionally supported their public water providers through budgetary grants and low-cost loans without expecting or requiring full cost recovery. In theory, it is argued that cost recovery ensures sufficient revenue to support extension of service coverage.

Second, cost recovery ensures sufficient revenue to deliver services over the long term. An absence of cost recovery measures leads to weaknesses in operations and maintenance of the water system (Federation of Canadian Municipalities and National Research Council, 2006). Cost recovery measures guarantee finance for the expansion and replacement of water infrastructure in the face of increased competition for other funding sources in Africa (such as health and education, along with high debt servicing) and diminishing grants due to donor fatigue. Without cost recovery, financially strapped local authorities will be unable to finance network expansions or to properly maintain the existing services (Cardone and Fonsceca, 2003). This perspective argues that t is particularly relevant in Africa where population growth, high rates of urbanisation and aging infrastructure, mean that sustaining existing water services alone poses a daunting financial task.

Third, demand based differentiated water provision services is assumed to be attractive to consumers, users and households as consumption levels will be the level at which they are willing and able to pay (Ntengwe, 2004). Further, cost recovery measures ordinarily use measuring devices that provide notice to customers of levels and costs during consumption, thus supporting economic stability for the community.

Fourth, it is believed that low service levels and poor water quality decrease the willingness of customers to pay (Hensher, Shore, and Train, 2005:525). Cost recovery measures are believed to improve services and provide a technically defensible financing plan (i.e. the municipality can demonstrate accountability to its customers) to ease any water woes. Such a scenario, it is argued, increases willingness to pay on the part of customers thereby providing scope for improved, quality and reliable service delivery.

2.1.2 Arguments Against Cost Recovery

However, analysts critical of the cost recovery perspective argue that there are significant pitfalls associated with the pricing in the water sector that is pegged at cost recovery levels. The neoclassical economic perspective argues that efficient marginal pricing of all units leads to supply and demand meeting at a point of equilibrium; and since all people have a demand for a certain amount of water, all will be served at their equilibrium price. However, such an argument is believed to be defective in that this supply-side logic neglects the demand deficiency of the poor. While the demand of the poor is real, it is too negligible financially to attract a cost recovery-focused provider's service (Zaki and Amin, 2009: 2304). Consequently, it is argued from the rights perspective that cost recovery measures will only serve to further exclude already-excluded persons with their low capacities to

pay. Thus the spatial trends in these patterns of arrangement worsen urban inequalities and affect quality of service delivery (Smith, 2003:1519).

Those sceptical about the prudence of introducing the market to the water sector also argue that private enterprise will alienate low income consumers as they will see a higher value in supplying water to the wealthier citizen because they have the potential to spend on more than the basic requirements and include partly luxury consumption (Zaki and Amin, 2009). The water companies will invariably and logically concentrate their resources on supplying water to the higher value added customer – even if this customer's consumption is part-luxury and the poorer customer's consumption is wholly at a subsistence level (Public Citizen's Water for All Program, 2003). What matters is effective demand and profitable pricing in this privatised view. Certainly this seems to be the case in South Africa's current domestic water tariff structuring, both that which is privatised as well as that which remains under local government control.

Corporations are also known to have a poor track record on economic, social and environmental protection. Therefore, critics remind that given the record of corporate responsibility in other sectors, there is no reason to believe that they will demonstrate more responsible practices in the water sector. In fact, because the profit motive drives the corporate agenda rather than serving the public interest, environmental standards are continually compromised. In addition to these vices, the Coalition for Water Justice Groups (2007) also points out that those private enterprises may transfer their profits out of communities and into the pockets of distant shareholders and corporate executives, instead of reinvesting money into the water system.

Available evidence show that rate hikes have been used as a way for private water companies to maximise profits (for example, United States, Guinea, Bolivia) as the bottom line for these companies is profit, which translates into higher prices and at times coupled by an inferior service (Bayliss, 2002; Bluemel, 2005:966). The companies are under no obligation to provide service to everyone since it is defined as a marketable commodity. In is regard if consumers can no longer afford the price increases, water delivery is simply shut off. Loftus (2003) observes that restrictive measures are actually targeted at the poor anyway because of their inability to pay their water bills.

Further to the possibility of cut offs, once water rights have been signed over to corporations, undoing this process may be quite complicated, expensive and time-consuming should government conclude that private interests are not serving the best interests of the consumers. This is very likely

given their profit motive and no obligation to protect consumers. This problem is compounded by the fact that local authorities in countries such as South Africa often do not yet have the capacity to regulate or monitor how the private sector operates within their jurisdictions (Smith, 2003). This undermines the ability of local authorities to ensure that the private sector upholds its contractual obligations in extending services to low income areas.

One of the reasons for water services divestiture is to reduce overstaffing. Correlatively, privatisation or sub-contracting may lead to layoffs (Bayliss, 2002; Public Citizen's Water for All Program, 2003), at times putting service and water quality at risk due to understaffing. Layoffs are commonly used to reduce costs and increase profits and would be devastating to both workers and consumers.

Lastly, Smith (2003) observes that the decision-making procedures in the private enterprise model shifts power towards technocracies. This undermines democratic procedures that determine distribution patterns. When technocracies take control of city management, they are often ill-equipped to grapple with the political problems of poverty or the equitable distribution of public resources.

2.2 Contesting Cost Recovery – The Human Right to Water

In the 1990s, the international community began to criticise the role of cost recovery measures in water service provision as a measure of promoting equitable distribution of water. It was believed that cost recovery measures made water provision to the poor to become cost prohibitive. Gutierrez (2003: 2) notes that today, cost recovery in the water sector is the subject of what is arguably the most contentious debate in current development discourse. He posits that,

> *At the core of these battles is a spectrum of positions, characterised by two fundamentally-opposed approaches. On one hand is the idea of managing water as an economic good in an environment using market-like and market-friendly instruments, where prices function as the main mechanism that guide decisions on allocation, distribution and consumption. On the other is the idea of managing water as a common good, the property of all, to which access ought to be considered a human right that is respected, protected, promoted, and enforced by states and governments.*

The human rights approach, while premised on some of the general observation about the weaknesses of adopting cost recovery that were highlighted above, is framed around the argument

that water is a common good, non-substitutable (essential for life) and must be affordably accessed by all through the state mechanism as enshrined in international law. A rights-based approach is also premised upon the principle of freedom from discrimination and equality between men and women. As a result of this argument, over time, fierce opposition has built up against cost recovery in the water sector as a policy (Bakker, 2007:423).

This opposition is backed by a plethora of social movements at local national and international levels forming a global water justice movement (see McDonald and Ruiters, 2005:35; Spronk and Terhorst, 2012:139) and militant anti-privatisation campaigns have often erupted at global platforms. In SA service delivery protests at the grassroots level have become common place, some of which have turned violent, although the linkages of these protests to water services and WMDs is not well documented or understood.

The human rights argument makes reference to key UN conventions that are predicated on the assumed availability of water. The World Health Organization (WHO) calls for the attainment of the "highest attainable standard of health" as a fundamental right of all human beings (for which access to sufficient safe water is essential)(WHO, 1946).The Universal Declaration of Human Rights (UDHR) declares the right of all people to enjoy an adequate standard of living for good health (UDHR, 1948).

In addition, the International Covenant on Economic, Social and Cultural Rights (ICESCR) states that all human beings have a right to the enjoyment of the highest attainable standard of physical and mental health (ICESCR, 1966). While the Committee on Economic, Social, and Cultural Rights of the United Nations Economic and Social Council (ECOSOC, 2002)(General Comment No. 15) points out that, water is a human right, an indispensable factor for life with dignity and a prerequisite for the realisation of other rights. It calls for water to be treated as a social and cultural good, not as a fundamentally economic good. ECOSOC also specifically states that water facilities and services must be made affordable and accessible to all, requiring states to respect, protect, and fulfil this right of their citizens, regardless of citizens' ability to pay: "Under no circumstances shall an individual be deprived of the minimum essential level of water" (ECOSOC, 2002:18). Thus in terms of international instruments, water is a legal entitlement, rather than a commodity.

The human rights perspective points to successful examples of public water systems, and on research that private sector alternatives are not necessarily more efficient, and often much more expensive for users, than well-managed public sector systems (see, for example, Estache and Rossi,

2002). If the state is responsible for providing services, the means and mechanisms available in the United Nations human rights system can always be used to monitor the progress of State Parties in realising the right to water and to hold governments accountable (Bluemel, 2005:972). The state is expected to translate the internationally recognised rights into locally determined benchmarks for measuring progress. This requires the development of adequate laws, policies, institutions, administrative procedures and practices, and mechanisms of redress, thereby enhancing accountability.

Provision of water services by the state ought to target the "least served "in order to decrease inequality. The right to water specifically rules out exclusion from needed services according to ability to pay. This is crucial in ensuring the delivery of services to the poor. Related to this is the argument that human rights-based approach may deliver more sustainable solutions because decisions are focused on what communities and individuals require, understand and can manage, rather than what external agencies and corporations may deem as needed. This is achieved through the inclusion of communities and vulnerable groups in the decision- making processes.

Finally, in most developing contexts, achieving basic and improved levels of access can only be accelerated if the state is responsible for infrastructural development, maintenance and financing. This is because the state has the resources and policy reach to extend beyond the already developed regions of a given country. Such expansion is more suited to the state than corporations because it has a responsibility to ensure equitable development. It also stands to gain politically from such active and policy interventions *vis a vis* a potential electorate.

In South Africa, commentators favouring the human rights approach to water services provision argue that water is a right to every citizen regardless of ability to pay. South Africa is also lauded has having ground breaking legislative and policy provisions to ensure the right to water. Here reference can be made to the country's constitution; the Waters Services Act (WSA) and the Free Basic Water Policy (FBW) (Mehta, Thompson and Nleya, 2010). With regards to access to water, the SA constitution's section 27 states that, everyone has the right of access to sufficient food and water, and "… the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights".

2.3 Incorporating Cost recovery in South Africa's Water Services Sector

In its guidelines for user fees and cost recovery for urban, networked water and sanitation delivery, the African Development Bank (2010) states that the main aim of water pricing should be economic cost recovery, with the initial target being the recovery of full financial cost. Funds raised through such cost recovery measures would be used to expand access to new communities and households, especially in peri-urban and rural areas. In this context, the South African legislation, takes cognisance of the argument that user fees are a critical component of sustainable water service delivery. In that regard, it encourages the introduction of cost recovery (however, without neglecting those who cannot pay) to promote sustainable water service delivery.

Thus as the SA government's financial support to local authorities dwindles, cost recovery measures are seen as guarantee finance for the expansion and replacement of water infrastructure in the face of increased competition for other funding sources (such as health and education) and diminishing grants due to donor fatigue. It is believed that without cost recovery, financially strapped local authorities will be unable to finance network expansions or to properly maintain the existing services (Cardone and Fonsceca, 2003).This perspective argues that cost recovery is particularly relevant in South Africa and Africa in general where population growth, high rates of urbanisation and aging infrastructure, mean that sustaining existing water services alone poses a daunting financial task. Hence SA has moved towards cost recovery.

The White Paper on Water and Sanitation (1994) was the first document to highlight the country's direction towards commercialising water supplies. It emphasised the need for cost recovery and payments. It encompassed two critical provisions. First, it stated that the user pays and that this is a central principle to ensure sustainable and equitable development, as well as efficient and effective management. Second, it stated that it is not socially equitable for any community to expect not to pay for the recurrent cost of the service provisions.

The SA Water Act (1998) states that water user charges are to be used for purposes of funding costs of water resources management, development and use. In recognition of the differences in resource endowment among SA water users, the Act also stipulates that such user fees would be used to achieve an equitable and efficient allocation of water.

The concept of viable user fees would also support private enterprise in the water sector. The White Paper on Water Policy (1997) made important reference to third party water service providers at the

municipal level. It states that the Department of Water Affairs and Forestry will consider proposals for the private sector to provide services where these may be in the public interest and where this approach is supported by the community concerned. It also states that users would be charged for the full financial costs of providing access to water including infrastructure development and catchment management activities in order to promote the efficient use of water.

User charges are effected through an array of water metering processes in domestic water services. The SA Water Act states that in promoting cost recovery metering for all consumption is compulsory. This provides demand based differentiated water provision services. The Act specifically states that, "(t)he metering of all consumers on a 'pay for what you use' basis is legally called for in terms of requirements of the WSA". Thus "pay for what you use" is not only legal and fair but is assumed to be attractive to users as consumption levels will be the level at which they recognise benefits for which they are willing and able to pay (Ntengwe, 2004). Further to this, the measuring devices provide notice to users of levels and costs during consumption, thus supporting economic stability for the users.

The provisions of the Water Act (1998) and various policy instruments to govern the water sector promoted the introduction of WMDs with ability to provide detailed consumption information which provides a mechanism for users to determine their consumption and a fair mechanism of providing FBW support to low income communities. The Municipal Systems Act (2000) makes provision for differentiated tariffs based on proving indigence, but states that the delivery of municipal services should be as cost effective as possible.

The Guidelines for Compulsory National Standards Regulations (DWAF, 2002) issued under Section 9 of the Water Services Act (Act 108 of 1997) and the Norms and Standards for Water Services Tariffs Regulations (DWAF, 2002) under section 10 of the Water Services Act (Act 108 of 1997), states that water service institutions are required to:

a. fit a suitable water volume measuring device or volume controlling device to all user connections provided with water supply services that are existing at the time of commencement of these Regulations; and

b. fit a suitable water volume measuring device or volume controlling device to every user connection made after the commencement of these Regulations.

These measures, according to DWA, are not only meant to monitor and control water usage to promote fair billing but also to enhance water demand management, and water conservation. The provision of legislated metering processes that take cognisance of low income groups recognises water provision as a human right.

The government crafted the Strategic Framework for Water Services (SFWS) (2003) with a view among other things to operationalise the water rights enshrined in the WSA and the constitution including setting Free Basic Water (FBW) levels. The DWAF stated that the primary intention of the policy is to ensure that no one is completely denied access to a water supply simply because they are unable to pay for the service. Consumers are however expected to pay for services over and above the basic amount.

2.4 Incorporating Human Rights into Water Service Delivery in South Africa

In response to the call to incorporate human rights approach in water service delivery the SA government incorporated access to water as a basic necessity through a number of legislative provisions. The SA Constitution's section 27 states that, everyone has the right of access to sufficient food and water, and "the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights".

Further to this, in terms of the Constitution, municipalities are responsible for ensuring that their residents have access to water and other services. As water service providers they have to ensure that the water they provide is efficient, affordable, economical and sustainable.

It is against this provision in the constitution that the country's Water Services Act is framed to recognise the right to basic water supply. The WSA states that a central objective is to ensure "the right of access to basic water supply and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health or well-being (WSA, 2008: 11).

It is in this statutory legal context that the FBW policy is located. The FBW policy formalised an allocation of 6 kl a month for all households. In particular, it was aimed at addressing the needs of poor households as a form of minimum service provision socio-economic safety net. Thus the Free Basic Water Policy expands the right to water. The regulations promulgating the FBW service also make provision for quality service delivery. Water users are granted the right to report any failure to comply with these regulations by the service provider. This incorporation of the user into the water

service delivery process can also be viewed within the broader framework of civic and political rights following the advent of democracy in South Africa. The framework of participation in Cape Town and eThekwini following these rights is discussed in detail in section 7. However, among other problems, the full articulation of the FBW policy in practice has been mired by problems relating to the practicalities of implementing the household stipulation (see Bond and Duggard, 2010).

2.5 Citizen Participation

The introduction and success of any municipal programme is believed to be contingent upon recognition of citizen participation. Citizen participation has become a central feature of policy in municipal governance. Citizen participation has variably been referred to as community participation, user participation, people's participation, public participation, and popular participation. It gives citizens the opportunity to be involved in a meaningful way in making decisions that will affect them, or in which they have an interest. Citizen participation ordinarily involves a collectivity of individuals or even individuals in their own capacity expressing their views regarding public service or policy issues. This is mainly done through voices from communities, civic groups or other organisations able to synthesise or aggregate shared messages. The importance of citizen participation in municipal governance is that it enables the identification of problems, issues and solutions by the lay knowledge of ordinary people that experts miss. It increases the breadth and depth of information and thereby improves the quality of decisions.

2.5.1 Rationale of Citizen Participation

Citizen participation in theory contends that participation is a basis for project success. The World Bank (2004) defines participation as "a process through which stakeholders" influence and share control over development initiatives, and the decisions and resources which affects them". Masiya and Makanza (2009) contend that citizen participation relates to the involvement by local populations in the creation, content and conducting of a programme or policy designed to change their lives. They note that citizen participation is used to enhance sustainability and to achieve social justice through improvements in the quality of people's participation. It is believed that development success is achieved only when there is democratic participation, and popular involvement in the process to improve human and physical capacities. Another usual argument for citizen participation,

> *"… includes its positive contribution to the legitimacy and public acceptance of governance arrangements and outcomes; harnessing of local knowledge for substantive improvement of decisions and plans; resolution of political and societal conflicts by means of alternative*

mechanisms; and empowerment of marginalised groups" (Wesselink, Paavola, Fritsch, Renn, 2011: 2690)

The concept of citizen participation has gained prominence since the era of political and economic liberalisation. However, Gaventa (2002) contends that this is based on the notion that individual citizens act 'rationally' to advance their own interests, and that the role of the state is to protect citizens in the exercise of their rights. It is based on the assumption that citizens have the resources and opportunities to do so. Thus it is important to observe that effective public participation requires that citizens be informed and knowledgeable about the issues that may be tabled for discussion. They must also be willing and able to be involved or having the interest, the time, and the opportunity or access.

The neoliberal approach to citizen participation thus implies that non participation is a recipe for project failure. Citizen participation based on shared ownership of decision-making in municipal governance emerged as an indictment of the top-down driven development approaches of the pre 1980s in which power and decision-making would largely be in the hands of professionals external to the targeted communities. Shar and Baporikar (2012) point out that citizen participation was a response to the failure of development projects when social activists and fieldworkers observed that the populations concerned were not included in project design and implementation. Thus failure was linked to the lack of local people's involvement in developmental projects. The top down approach system required a long chain of command from the centre to the periphery thereby curtailing efficiency as decisions had to pass through a very complicated system. The approach reduced the innovativeness of locals and their ability to use local resources. It was at most a disempowering process. More importantly, top-down approach viewed recipients of the projects especially the poor as part of the problem rather than the solution. Municipal authorities also tended to exclude civic groups and individual contributions. Even when acting in good faith, municipal governments have often misallocated resources, by not understanding the nature of political power and representation at local level and thus awarding resources to the most politically active and vociferous rather than the most needy. At best this is a flawed form of public participation that contradicts inclusive democratic decision-making which is advocated by people centred development. Sher and Baporika (2012) and Arnstein (1969) would argue that this is not citizen participation and as a result development along these lines is once again a recipe for failure.

In South African municipal water governance today, strong arguments have been advanced for citizen participation. Campaigners for citizen participation argue that a participatory and transparent model of water management by municipalities can guarantee water for all in a socially and environmentally sustainable way.

In the context of this study, an understanding of the theory of effective citizen participation enables us to grasp the consequences of the nature of participation in municipal governance in the South African context. It helps us to understand what actually occurs in spaces of participation. It also helps to establish who is accountable to whom in the municipal water service delivery or how a citizen might deal with multiple and often conflicting individual and group obligations and rights.

However, while a lot of literature confirms the results of effective participation in the form of empowerment of communities, social capital and sustainability of the projects to a greater extent, the same approach has also met criticism and been considered as being a slow and complex process, the benefits of which are questionable (Mansuri and Rao, 2004). Analysts such as Arnstein (1969) have already alluded to this fact and thus accounting for the different or mixed results of citizen participation in policy. Nonetheless, forms of participation can be categorised to test the strength thereof in term of citizen gains. Arnstein's categorisation is used in this report.

2.5.2 The Citizen Participation Continuum

Arnstein's (1969) work on the subject of participation recognises that there are different levels of participation, from manipulation or therapy of citizens, through to consultation, and to what may be viewed as genuine participation (see Fig. 1). This study takes cognisant of the levels of participation in the municipalities under review.

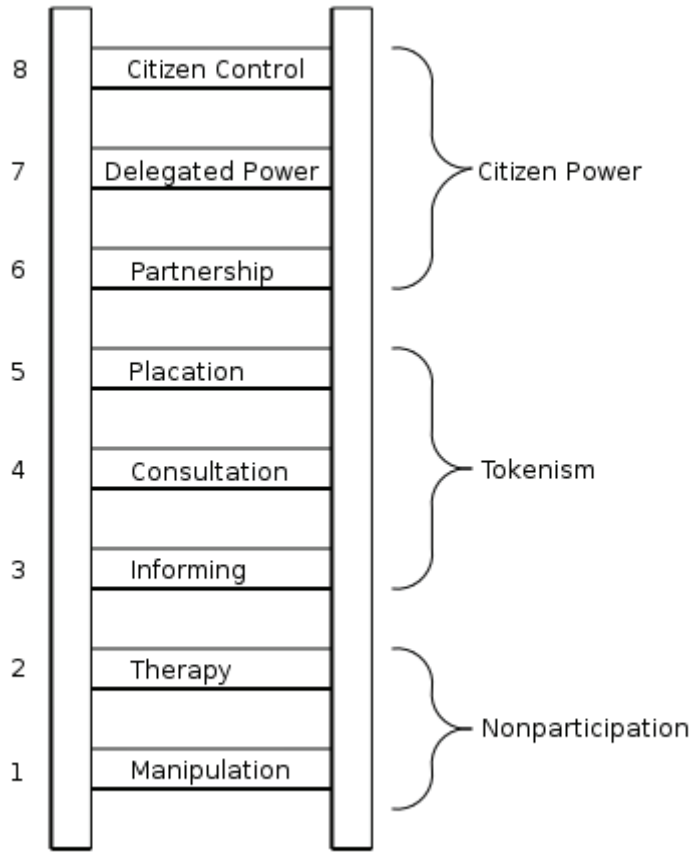

Figure 1 Arnstein's Ladder of Participation

Arnstein (1969) utilises the ladder of participation to explain the different levels of participation. The ladder's categories are explained as follows;

i. Manipulation and ii. Therapy – Both are non-participative. Public participation becomes nothing more than manipulation when participatory rhetoric is used, but the process is imposed on citizens to achieve an outcome that they have no influence over and which is not likely to serve their interests. Public participation is merely a form of "therapy" when citizens are involved in a "feel-good" exercise, which might allow them to reflect on the condition, but they have no influence over related decision-making processes that affect their lives The proposed service delivery plan is best and the job of participation is to achieve public support by public relations.

iii. Informing – A most important first step to legitimate participation if practiced but frequently the emphasis is on a one way flow of information and there is no provision for citizens to feedback and influence decisions that affect their lives.

iv. Consultation – Again a legitimate step – attitude surveys, neighbourhood meetings and public enquiries. Consultation as participation involves the intervening party (e.g. the municipality or other

service providers) soliciting information in order to make decisions that affect their citizens, but the citizens themselves are unable to exercise power in order to influence the decision-making process, Consultation often takes the form of attitude surveys, neighbourhood meetings and public enquiries. Arnstein views this form of participation as window dressing.

v. Placation. Citizens exercise very limited influence over the decision-making process. Often this involves the co-option of hand-picked 'worthies' onto committees It allows citizens to advise or plan ad infinitum, but retains for power holders the right to judge the legitimacy or feasibility of the advice.

vi. Partnership. Power is in fact redistributed through negotiation between citizens and power holders. Planning and decision-making responsibilities are shared, e.g. through joint committees. It involves the equal sharing of power between all stakeholders in the partnership.

vii. Delegated power. When power is delegated, citizens hold a clear majority of seats on committees with delegated powers of decision-making.

viii. Citizen Control. Ordinary citizens are fully involved in and control the entire process of planning, policy making and managing a programme (e.g. a neighbourhood corporation with no intermediaries between it and the source of funds). Ordinary citizens have the power to direct the decision-making process and achieve their desired outcomes.

2.5.3 Legislative Provisions for Citizen Participation in SA

In recognition of the need to embrace citizen participation, South Africa has in place an array of pieces of legislation to facilitate such participation. The South African municipal government system provides for citizen participation, which is aimed at benefiting development. Specifically, Chapter 10 of the 1996 Constitution ensures that citizens have direct access to elected local government representatives and that they have the opportunity to participate in local governance. The White Paper on Local Government (DPLG, 1998) provides for active citizen participation. Section 152(1) of the constitution states that, “local government must encourage the involvement of communities and community organisations in the matters of local government”.

Section 16 of the Municipal Systems Act 2000 states that municipal governments should “develop a culture of municipal governance that complements formal representative government with a system of participatory governance, and must for this purpose (a) encourage, and create conditions for, the local community to participate in the affairs of the municipality, including in (I) Integrated Development Plan; (ii) the performance management system; (iii) performance, (iv) the budget (v)

and strategic decisions relating to services". The Act makes it clear that residents have the right to contribute to the municipality's decision-making processes.

Further to this, the Municipal Structures Act (1998) provides for the establishment of ward committees. These are intended to act as the main means of communication between the council and local communities. The White Paper on Local Government (1998) emphasis that municipal government should work with citizens and groups within the community to find sustainable ways to meet their social, economic and material needs and improve the quality of their lives.

However despite this array of legislative provisions to promote participation, in practice participation remains an area that local government has difficulty in applying on policy rollouts, a general finding that is well illustrated in the research on WMDs discussed in this report.

2.6 Conclusion

In general the concept of cost recovery in local service delivery can be traced back to the 1980s' push to develop a new consensus on policies for developing nations. The introduction of WMDs in the provision of in the City of Cape Town and eThekwini municipality is part of broader strategies that South African local authorities have been adopting to promote cost recovery in service provision. However, critics of cost recovery have argued that these measures impinge on the human rights of consumers. As a result the South African government has put in place legislative arrangements that promote the incorporation of basic water service provision and participation of users in decisions affecting them regarding water service delivery by municipal governments. The report now turns to an evaluation of the type of WMDs used in an effort to balance rights and cost recovery to poor and/or indigent households.

SECTION 3

WATER MANAGEMENT DEVICES TECHNOLOGY

3.1 Water Management Devices

A broad array of water management devices are identified as WMDs. Some limit the volume of water going through the tape while others limit the quantity used by households per each day. As a result the definitions proffered for WMDs have differed between institutions. These definitions range from the very general to the more specific. For example the City of Cape Town, defines a WMD as 'a meter which replaces the existing meter, and is programmed to dispense a pre-agreed amount of water each day'. USC (2011) identifies a WMD as a low-cost, intelligent, electronic control valve that is capable of controlling the flow of water to a domestic consumer at full pressure. It further notes that, the WMD is seen as a solution for the management of water supply to domestic or small commercial consumers and can be configured to:

- Dispense a fixed daily quantity of water, thereby providing the ability to limit a consumer to a finite (or pre-negotiated) level of supply;
- Be linked to a fixed (flat rate) tariff , and limit consumers to voluntarily limit consumption according to their budget;
- Provide meter readings by the radio signal to a drive or walk by collector;
- Be shut off remotely, or operate at reduced daily or monthly quantity;
- Default to a trickle flow if required, once the full pressure allowance has been consumed;
- Efficient disconnection/reconnection of supply.

This study adopts the USC (2011) definition of a WMD that recognises it as an intelligent, electronic control valve that is capable of controlling the flow of water to a domestic consumer at full pressure or trickle flow if required. In South Africa many different WMDs exist that serve this function. Excluding the prepayment meters, the most commonly available devices include the Efteq Intelligent Meter, Utility Systems' Water Management Device and the WEG-Wise Water Management System.

3.1.1 Efteq Intelligent Meter

The Intelligent Water Meter (Fig. 2) can be set to operate in a number of different modes and it can be electronically switched between modes without removing the meter. This provides both customers and service providers with complete flexibility.

Figure 2 The Efteq Intelligent Meter

The meter can be operated in a number of different modes, for example:

•Water Management Device to control daily consumption

•Standard Prepayment meter allowing customers to manage their water consumption and provide water to the user at the lowest possible cost.

•Post pay mode with a settable credit limit to provide standard meter advantages but with no billing required

According to the manufacturers of the device, the unit consists of a Class B multi jet water meter with electronic read out and integrated flow control valve. The unit is designed to operate at high and low temperatures, can handle entrained sand and dirt, compensate for air in the water supply and withstand lightning strikes. The unit is meterologically sealed and provides a high level of resistance to physical tamper and is immune to magnetic tamper. Should the meter become faulty it can be replaced in the field within ten minutes. The meter is powered by a long-life battery which is field replaceable.

3.1.2 Utility Systems' Water Management Device

According to the Utility Systems Corporation, the Utility Systems Water Management Device (WMD) (see Fig. 3) is a low-cost, intelligent, electronic control valve that is capable of controlling the flow of water to a domestic consumer at full pressure.

Figure 3 Utility Systems' Water Management Device

They view the WMD as the solution for the management of water supply to domestic or small commercial consumers, and when linked to a pulse output water meter, enable:

- leak and tamper detection,
- management of delinquent customers , and most importantly,
- Remote data capture and meter control- Automated Meter Reading (AMR) with the ability to provide control, which is the essence of Advanced Metering Infrastructure (AMI).

3.1.3 WEG-Wise Water Management System

The WEG-Wise developed flow-limiter-meter (Fig.4) system's strongest features include the ability to monitor and record flow patterns and regulates water flow to each household's water-usage patterns accordingly. This creates the advantage of being able, if required, to reduce pressure and flow during non-peak times only which have little or no impact on the daily lives of consumers whilst significantly reducing night flow and off peak consumption. According to the manufacturers, the Free Basic Water allocated to each household could be monitored by the client as well as the home owner, thereby saving the colossal waste of non-revenue water by the municipality and generating awareness and responsibility of the user. Furthermore, leaks and illegal connections can be detected and addressed through this system, and certain homeowners can increase their water allocation if so desired (in accordance with regulations). These detections and adjustments can all be done remotely and immediately would not require a call out, thereby reducing response turnaround time as well as the cost of sending a maintenance team out.

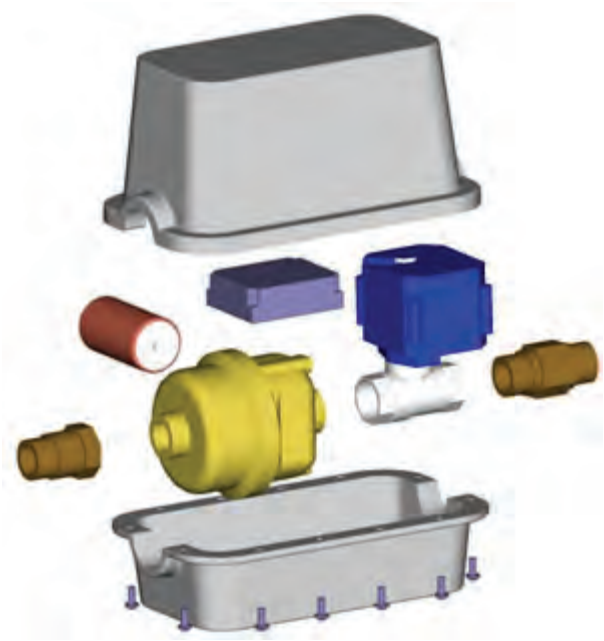

Figure 4 WEG-Wise Water Management System.

Municipal governments are increasingly making use of water management devices particularly in household water consumption. Projects for installing water management devices are initiated where there is an increase in water demand as a result of population growth, new developments, water shortages and economic growth. Thus the purpose of a water management device is identified as to control and manage water use. The WMD is an object that speaks both to the apparent need to ration and manage water carefully in the face of scarcity, and to water's increasing status as a commodity.

The municipalities under review (Cape Town and eThekwini) use two different water management devices that however perform the same function. They are principally designed to limit the maximum quantity of water available to a low income household to between 300 l and 450 l or some such defined levels. Cape Town interchangeably uses terms WMD or flow limiter to refer to its device. eThekwini refers to its own device as a flow limiter.

3.2 Arguments for Water Management Devices

The prime rationale for the introduction of WMDs is the preoccupation of modern economic liberalisation with sustainable service delivery through cost recovery. Merrifield and Collinge (1999) argue that cost recovery through proper pricing is considered the best approach to sustainable water services.

It has been argued that the introduction and implementation of the WMDs is an effective way of overcoming some of the common challenges faced by conventional billing systems. In view of the fact that poor communities are characterised by high levels of illiteracy, it is believed that in South Africa, WMDs can help overcome the problem posed by illiteracy and failure to interpret due bills. Poor postal services and general delivery of water bills in homes particularly emanating from the apartheid era billing system could be rectified through the adoption of WMDs. Further to this, domestic water systems that are not on the formal revenue system can be brought into the system.

WMDs are also believed to retain a significant advantage over other water meters as there will be limited community resistance when users become aware that they stand to have budgetary control of their water expenditures. Thus it provides effortless budgeting for water expenses as daily and monthly consumption is established and daily water allowance is pre-agreed, thereby creating a habit of responsible water use and appreciation of the importance of water.

With water management devices it is easier to determine if there are leaks in the water system and the fact that individuals become implicitly responsible for identifying and reporting water leakages, it leads to swift repair of infrastructure and heightens water saving measures.

While it was easy to illegally divert water from the fixed water system, the WMD is equipped with a water detection mechanism. It is thus possible for the service provider to determine if the system has been tempered with or if indeed any illegal diversion may have occurred. Tampering and illegal diversions are common among delinquent customers in the law income areas. Delinquent customers can also be those who are failing or unwilling to pay their bills. WMDs enable the service provider to isolate such users or limit their consumption levels or consumption rate. For example, it can be set to trickle up to a maximum of 1 ltr of water per hour for a delinquent customer (USC, 2013).

3.3 Introduction of Water Management Devices in South Africa

The introduction of WMDs came as a strategy to arrest ballooning consumer debts, decreasing state grants and continued disregard or perceived unwillingness to settle water services bills on the part of municipal residents.

During the apartheid era, the billing system was chaotic and there was no effort made to improve the system. At the onset of new government in 1994, many households' utility bills carried over

unexplainable accumulated arrears from the apartheid era (Smith, 2003: 153). Citizens were thus reluctant to settle bills whose rationale they did not understand.

In the wake of increasing arrears local authorities attempted to rectify the billing system and devised debt management policies to address the problem. Through the debt management policy recovering debts owed to the local authorities entailed charging interest for non-payment by households and sanctions (warning, disconnection, legal process and evictions) in the event of non-payment of accounts (City of Cape Town, 2001: 3; Calfucoy *et al*., 2009: 39).

For example, Msunduzi municipality utilised an array of strategies and tactics to enforce payment including restrictions, disconnections, removing water meters, interest on arrears, and financial penalties for tampering, handing over to debt collectors, litigation, disposition, eviction and even criminal conviction (Smith, 2009: 161). In Queenstown, Stutterheim and Fort Beaufort, Ruiters (2002: 51-52) states that drastic measures were taken including literal cut offs, engaging special debt collectors, litigation and disconnection of other services such as electricity for non-payment of water. However, this policy met with limited success in addressing non-payment for water services by households. There are numerous reasons that have proffered for the continued non-payment of bills and accumulation of debt despite a raft of sanctions, particularly among indigent communities.

3.3.1 Residue of apartheid boycotts

It has been argued that non-payment is a result of the residue of protest-motivated payment boycotts of the 1980s and early 1990s (Breier and Visser, 2006). Fjeldstad (2004: 540) states that, "During the apartheid period, boycotts of rents and user charges became chief weapons against what was considered an illegitimate regime". According to Kumwenda (2006), this 'boycott culture' was directed against the quality of services and stringent cost recovery measures. Fjeldstad (2004,:540) argues that the payment boycotts of the 1980s and early 1990s, were expected to cease, but did not and have become an established norm.

3.3.2 Billing Problems

Another explanation proffered for the arrears was that residents were generally confused by the frequency of incorrect billing procedures, false estimations on their accounts and discrepancies in billing systems (Smith, 2001: 1541). These discrepancies tended to fuel resentment among households and unwillingness to pay. Simply paying a bill regardless of understanding its content did

not seem an option. In this regard some residents did not pay because they believed that rates were too high (Fjeldstad, 2004).

3.3.3 Poverty and unemployment

Non-payment has also been ascribed to poverty and unemployment, two factors that are prevalent in the communities that seem prone to skip paying for water services. For many residents, insufficient income could be an explanation for their inability to pay their water bills. In this regard, the Centre for Development Support (2001) argued that non-payment for water services is primarily an issue of inability to pay. The Centre concluded that the poverty of many households makes them unable rather than unwilling to pay.

3.3.4 Right to water

The final suggested reason for non-payment of bills by residents is that some residents did not pay simply because they believe that water is a God-given right and do not understand why they would be asked to pay for water services.

Unfortunately there is insufficient statistical evidence to conclusively establish which of the above explanations holds the most weight. In this study, the question of non-payment is addressed purely in terms of the option to choose a water management device as per the policies of municipalities. Establishing reasons for non-payment were unfortunately beyond the scope of the study. However this still remains a central aspect of understanding water management at household level.

3.4 Free Basic Water Policy (FBW)

As highlighted earlier, South Africa has put in place numerous legislative pieces with the aim of ensuring that despite the introduction of cost recovery measures, water remains recognised as a human right. It is in this regard that a FBW was implemented in South Africa. FBW is a National Government policy but is implemented by municipal governments. It is framed in terms of the Water Services Act 108 of 1997, where provision was to supply water to those people who cannot afford to pay for a basic water supply. The policy came into effect in February 2001 (Kasrils, 2001).

This policy clearly targets the poor. It seeks to ensure that all households have access to a minimum set basic supply of water on a daily basis. The policy recommends that 6000 litres of clean water is provided free per household per month for a household of 8 people. This is about thirty full 200-litre drums. It means that it is calculated at 25 litres per person per day for a family of eight. However, municipal governments still retain the final prerogative to determine the amount of free basic water

that they can provide to their citizens. Further to this, while the policy is aimed at the poor households, municipal governments have the legal right to decide whether to provide free basic water to all or only to the poor. On these grounds, implementation of Free Basic Water varies in the different municipalities and there seems to be different interpretations of the policy that has caused the level of provision to differ within the country. As a result, the amount of water that should be provided free to poor users, as well as the use of WMDs meters in general, has been the subject of contention in South Africa. Civil society groups such as the Anti-Privatisation Forum (APF) have mobilised communities to resist the installation of WMDs

3.5 Conclusion

WMDs are perceived to be a solution for the management of water supply to domestic or small commercial consumers. In low income communities, WMDs are being rolled out. They are being introduced following wide adoption of economic liberalisation policy. The policy emphasises sustainable service delivery through cost recovery. It is in this context that WMDs have been embraced in SA as a strategy to arrest ballooning consumer debts, decreasing state grants and continued disregard or perceived unwillingness to settle water services bills on the part of municipal residents. However, the degree to which they compromise the rights of the poor remains a topic of fierce contention. The next section of the report looks at ways of analysing the perceptions of the users of WMDs so as to determine whether the different expectations of users are met.

SECTION 4

ANALYTICAL FRAMEWORKS

This study sought to determine perceptions of recipients of WMDs regarding their water supply situation. An analysis of these perceptions is done at three levels. The first level is to understand user's perceptions on the adoption of utilisation of the WMDs themselves as instruments of water supply. The Technology Adoption Model was used to determine the attitudes of water users towards the WMD technology. The second level of analysis of the users' perceptions is done to determine their satisfaction or dissatisfaction with water supplies following the installation of WMDs. The confirmation /disconfirmation model borrowed from marketing literature is used to understand the users' water consumption experience.

Pursuant to these two frameworks, the third level of analysis examined the 'citizen as user' rights based frame, and how this links to the other frames. The study flags the ideal water supply situation for municipal governments in low income areas is from a 'citizen as user's perspective that balances the users and provider's expectations, and the rights of the former, thereby paving the way for a harmonious relationship. Users' perceptions of the utilisation of water management devices are ordinarily derived from the human rights framework which puts increasing emphasis on citizen participation in municipal governance as a prerequisite for project success. It is assumed therefore that the balance between the users' and providers' expectations will be easily reached where citizen participation is integral part of municipal water governance.

The following discussion elucidates the three analytical framings and the linkages and tensions between them.

4.1 *Technology Adoption Model (TAM)*

An analysis of the water users' perceptions of WMDs in this study was based on the *Technology Adoption Model (TAM) (Fig.5).*

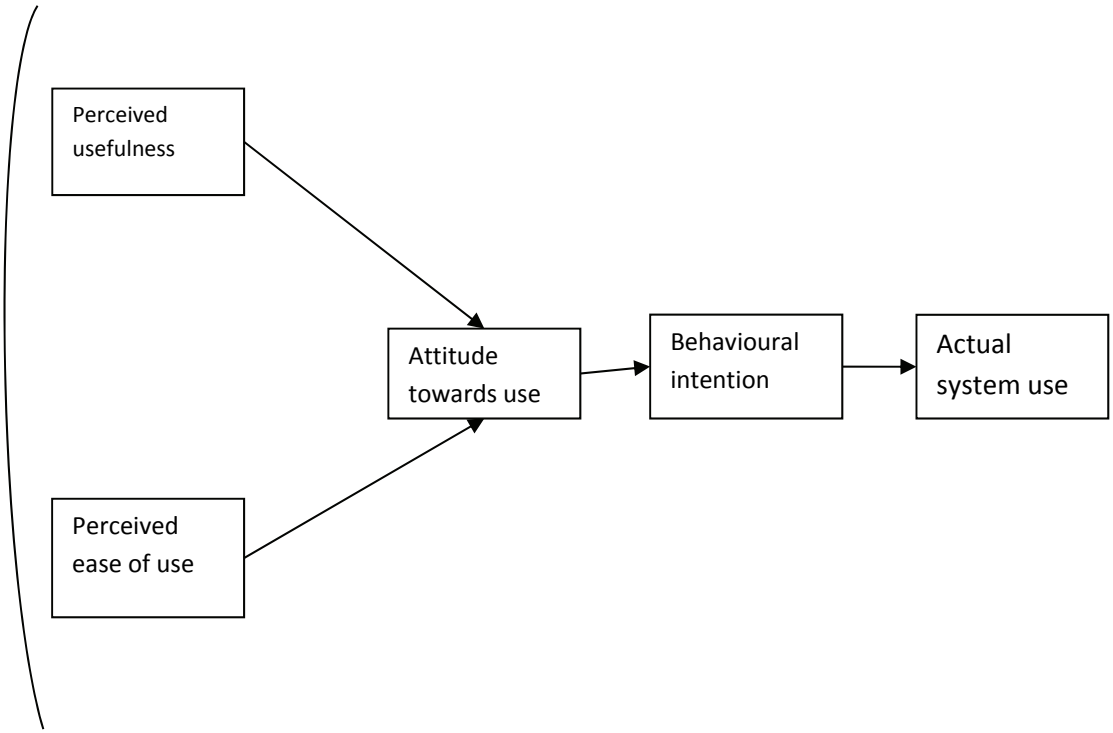

Figure 5 The Technology Adoption Model

The TAM posits that the attitude toward a technology and intention to use a technology are largely explained by perceived usefulness of the technology and the perceived ease of use of the technology. The TAM has found application largely in the IT industry (Wu and Wang, 2005; Mathieson and Peacock, 2001; Dishaw and Strong, 1999). TAM is derived from the theory of action (Fisbien and Ajzen, 1975).

Perceived usefulness is defined as the extent to which a person believes in using a system that would enhance their performance while perceived ease refers to relative lack of mental and physical effort (Lu *et al*., 2003). While TAM is used as a predictive model for system use in the IT industry, we find aspects of it illuminating in this study. In particular its utility in linking perceived usefulness and perceived ease of use to attitude towards use to be of immense value to our study. The attitudes towards WMDs would thus in part derive from their perceived usefulness and perceived ease of use. We hypothesise that both perceived ease of use and perceived usefulness is in part derived from comparison of WMDs and conventional meters previously used. If WMDs are adjudged to be relatively more useful and easier to use, we would expect a positive attitude towards their use.

4.2 The confirmation /disconfirmation model

In this section we present a simplified model that can be used to understand the interplay between the supply of services and user satisfaction. We draw on the confirmation /disconfirmation model

from marketing literature, used to explain satisfaction with products and services, and link this to rights and participation.

From the field of marketing we know that while purchasing a product results in the exchange of tangible product in services one rarely takes ownership of anything other than the consumption experience. Unlike a manufactured product whose quality can be objectively measured, measuring service quality is an abstract concept owing to the intangibility, inseparability and heterogeneity of services. Water services can be seen as involving both a tangible product – the actual quantity of water consumed as well as the actual experience acquiring such water. Upon completion of the consumption experience the consumer has an overall impression of the whole experience. In marketing literature this falls within the domain of consumer satisfaction which is focussed on understanding people as cognitive beings whose satisfaction is based on comparisons between expectations and perceived performance, the so-called confirmation/disconfirmation model attributed to Oliver (1980) as well as Churchill and Surprenant (1982).

The disconfirmation model postulates that consumers 'bring expectations into an exchange encounter and then to compare these expectations with perceived performance' (Alford and Sherrell, 1996:71). In its simplest form this model postulates that satisfaction results from actual performance is greater than expectations and dissatisfaction occurs when expectations are higher than performance, as represented in Figure 3 below. According to Ryzin (2005), expectations are predictions which are formed based on prior experience, word of mouth, and communications by the product manufacturer /service provider which largely focus on product / service attributes and the interactions between the producer/provider and the consumer. Figure 6 is the complete disconfirmation model which shows that different components can be related to satisfaction.

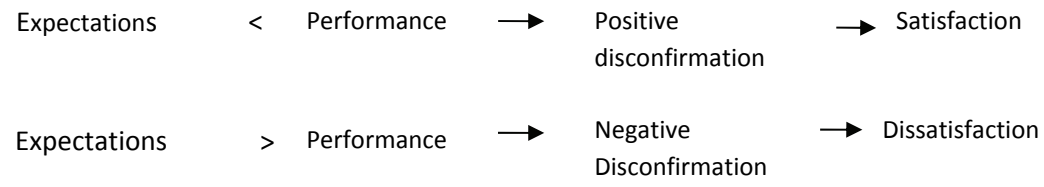

Figure 6: Components of the Disconfirmation Model of Satisfaction

Direct relationships in the figure are the influence of low expectations correlating with higher satisfaction. Similarly as is higher performance is correlated with higher satisfaction – the principal relationship that most surveys on satisfaction focus on.

In terms of water services in poor and largely black communities in South Africa, the expectations of citizens as consumers can be assumed to be a product of the aspirations and anticipated dividend of their participation in the anti-apartheid struggle codified in the documents such as the RDP (ANC, 1994) and the Constitution (RSA, 1996) – see Fig. 7 below.

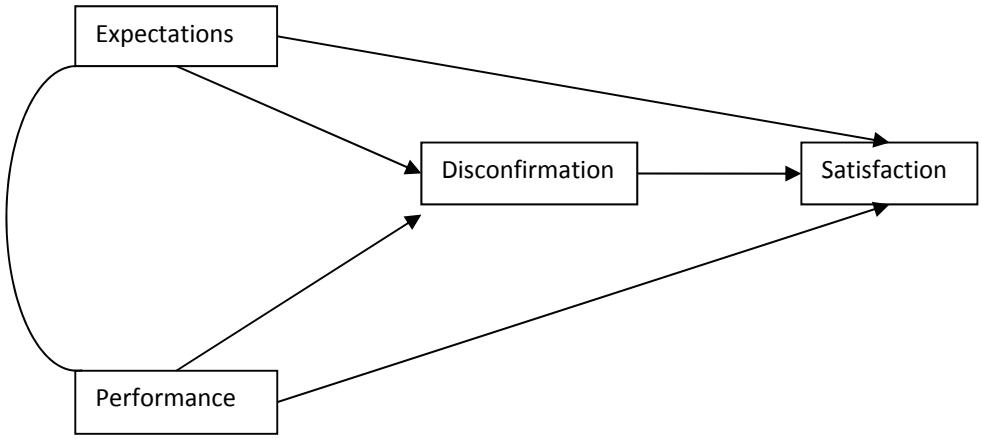

Figure 7 Expectancy Disconfirmation Model

During apartheid, black people were not accorded full citizenship, with many living under difficult conditions without access to clean water. Unsurprisingly, many of the urban poor hold the expectation of an improved status of their objective living conditions in addition to the 'freedom' that was ushered in 1994. During this period, the white population enjoyed levels of service comparable to those of the developed world. Coming to power on the back of an ambitious programme of social transformation entitled the Reconstruction and Development Programme (RDP) the ANC led government promised 'to provide all households with clean, safe water supply of 20-30 litres per capita per day (lcd) within 200 metres' and in the medium term 'to provide an on-site supply of 50-60 litres per capita per day (lcd) of clean water' (ANC, 1994:29).

We theorise that the location of WMDs within broader expectations and performance framings are related to consumer satisfaction attributes:

Expectations

(a) the articulation of water access rights provided for in the constitution
(b) the service attributes related to the previous conventional meters
(c) the continuation of the form of relationship between the consumers and the water services provider

Performance

(a) the form and level of participation afforded to the consumers in the project/programme to roll out the water management devices
(b) the form and content of communication regarding the water management devices
(c) the effects of water management devices
(d) prior knowledge of effects of similar devices in other areas
(e) socio-economic status of the consumers
(f) incentives for using water management devices

4.3. Ideal Water Supply Situation

In line with the central question this research seeks to examine, namely users perceptions of and satisfaction with WMD policies and rollout, a central assumption is that the ideal water supply mechanism to consumers would balance the users and provider's expectations, in terms of the expectations, policy pronouncements and promises on debt relief, as well as ease of household water management, and rights, by way of participation that is seen as effective and inclusive. Given the focus of this study, Figure 5 below is an ideal impression of satisfactory water supply from a 'user as citizen' perspective. It postulates that if there can be an ideal balance between cost recovery and basic rights to water, there will be a harmonious relationship between the water service provide and the users. This rights based framing necessarily invokes the need to consider the duties of service providers that pertain to upholding those rights. These, in turn, ought to inform the water services provider policy implantation perspective, including its participatory dimension. Fig. 8 below fleshes out the dimensions of the 'citizen as user' perspective.

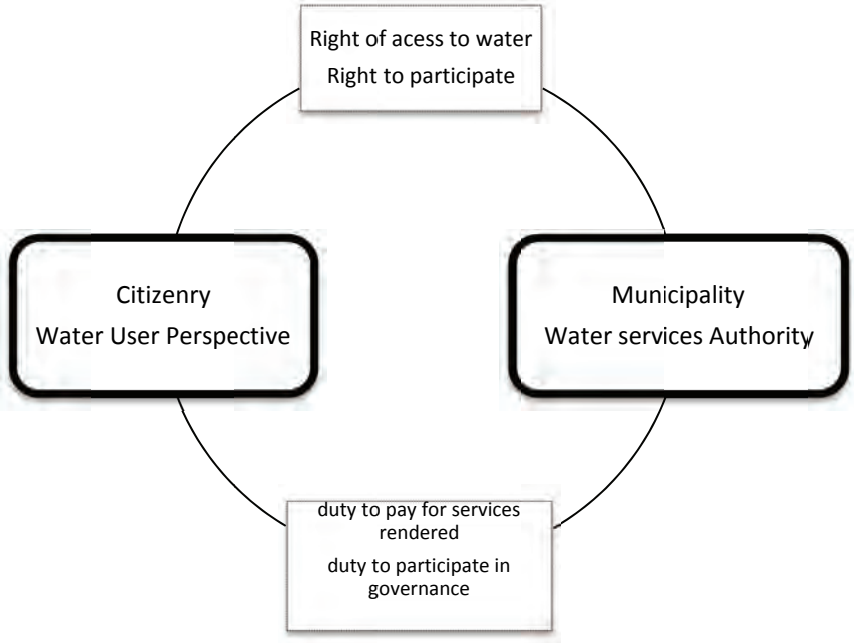

Figure 8 The 'Citizen as Water User' Perspective

4.4 Conclusion

This study determined perceptions of recipients of WMDs by utilising the Technology Adoption Model to determine the attitudes of water users towards the WMD technology. The study also utilises the confirmation /disconfirmation model to understand the users' water consumption experience, as well as the 'citizen as user' perspective to gauge whether rights and cost recovery are balanced, and whether satisfaction is enhanced by effective participation. In this context the study is able to determine user's perceptions at two levels. First the study is able to find out if users are averse to the use of WMDs. Second it is possible to determine if users are satisfied with service delivery through the use of these devices, and whether they perceive their rights to have been upheld during the process of WMD rollout.

SECTION 5

CASE STUDY OF CAPE TOWN

Cape Town is located on the southern peninsula of the Western Cape Province covering a geographical area of 2 479 km^2. It is largely regarded as the economic heartbeat of the Western Cape Province, accounting for 76,5% of the province's economic activity, with key economic indicators underpinning the performance of the province. The main drivers of economic growth are Finance and Business Services, Manufacturing, and Wholesale and Retail Trade sectors. A large number of financial head offices are located in the City, and as a result the Finance and Business Services sector has grown consistently since 1995.

In 2011 the total population of Cape Town was estimated to be approximately 3.82 million. In 2010 the estimated annual population growth was 3% (Demographic and Socio-economic Characteristics of Cape Town report of April 2011). The population of Cape Town is projected to reach 4 million in 2016. Cape Town is the second-largest economic contributor in SA. International trade and investment is a component of Cape Town's economy.

Institutional Arrangements

The City of Cape Town, through the Water and Sanitation Department plays the dual role of Water Service Authority and Water Services Provider although a decision was made as early as 2001 to separate these two functions (CCT, 2001). The Water Services Act (RSA, 1997) makes a distinction between the duties of a water services authority[1] and those of the water services provider[2]. According to SALGA (2011), most municipalities do not appoint a water services provider but play both these roles and 'without making this distinction'. The City of Cape Town's Water and Sanitation department operates under the functional control of the Director of Water and Sanitation who in turn reports to the Chief Director of Utilities

Water Resources Situation

The City of Cape Town derives its raw water from the Western Cape Water Supply System (WCWSS), which consists of raw water storage and conveyance infrastructure located largely in catchments

[1] According to the Water Services Act a 'water services authority' means any municipality, including a district or rural council as defined in the Local Government Transition Act, 1993 (Act No. 209 of 1993). responsible for ensuring access to water services:(xix)

[2] According to the Water Services Act a "water services provider" means any person who provides water services to consumers or to another water services institution. but does not include a water services intermediary: (xxi)

outside the borders of the city (DWA, 2011; Killick and Anderson, 2007). According to the Western Cape Water Reconciliation Strategy (WCWRS), the WCWSS has a current capacity of 556 million KL, of which 398.7 million KL is provided to the City of Cape Town (DWA, 2011). The WCWSS allocation to the City of Cape Town consists of 73% derived from storage facilities owned by the Department of Water Affairs and 27% is derived from City of Cape Town owned schemes. It is postulated that, between the years 2017 and 2019, the water available to the users from the WCWSS will be totally depleted as a result of a number of pressures, in particular population and economic growth (DWA, 2011).

In response, a number of water demand management (WDM) strategies are being implemented across Cape Town with the aim of maximising efficiency in the use of existing water supply infrastructure. These strategies include the following: integrated leaks repair projects; the fix it project; education/ awareness campaigns; treated effluent recycling; rollout of water management devices; pressure management and automated meter reading (DWA, 2011; CCT, 2011a). Although the City of Cape Town has been able to implement a 'number of successful WC/WDM projects' (CCT, 2011a:85) in the past four years, the water demand has not levelled out as initially planned (CCT, 2011a:86). This failure to meet WDM targets has been attributed to inadequate financial resources, inadequate human resources, ineffective management information systems, inadequate demand measurement systems (CCT, 2011).

The Integrated Water Leaks Project

On 4 December 2007 the City Of Cape Town announced that it was installing 'new water demand management system for its residents' that it called the 'water management device' (CCT, 2007).

The installation of WMDs would emerge as a key component of the Integrated Water Leaks Project as a way of to ensuring the sustainability of the leak repairs and curtailing water consumption among indigent households and thus reduce the burden of water services charges. The key aim of the project is specified in two separate documents as stated below:

> *Although the project is referred to as a 'leaks repair' projects, the purpose is to ensure that all aspects around delivery of water and sanitation services to poor communities are addressed. The end goal is to save water and ensure households only consume that the amount of water they need and can afford. Future leaks must be minimised and repairs must be affordable to households (CCTb, n.d).*

> *The project aims to save water and make your water and waste water (sewage) bill more affordable by empowering you to identify and repair your water leaks and reduce wasteful consumption. (CCTa, n.d:3)*

As part of the integrated water leaks project, a number of promotional materials were produced including the following:

- Leaks booklet: A 20-page leaks booklet with practical information on the project and how to deal with leaks
- A meters flyer explaining water meters
- Leaks poster
- Leaks flyer
- Saving water banner

An extensive roll-out of Water Management Devices (WMDs) is currently being implemented by the City of Cape Town with more than 45000[3] devices installed by the end of 2010 (CCT, 2011a) and 5000 installed per month(CCT, 2011b). The City of Cape Town has appointed four contractors on a two year tender to assist the operations branch in the Water and Sanitation Directorate in order to increase the installation rate of WMDs (Siyengo, 2011). The installation of WMDs has been prioritised on indigent households as a 'mechanism to prevent water consumption reaching unaffordable levels' and a way of reducing high water losses that are associated with leakages (CCT, 2011a:75-76). According to the IDP 2011-2012 Review, the City of Cape Town is also extending the implementation of WMDs to other income groups. (CCT, 2011b).

The WMDs are being installed with a daily allocation of 350 litres a day but can be set at higher level on agreement with the consumer. The 350 litres a day is based on an allocation of 6000 litres of Free Basic Water (FBW) and a further 4500 litres for indigents. According to the City of Cape Town, there are presently 211 879 households qualifying for an indigent grant based on property values below R300 000 and a further 3044 based on income (CCT, 2011a). In 2009, 46% of the households in the city earned below R2500 a month and thus were on the indigent register. At the time the City of Cape Town had set R2880 as the limit for qualifying for the indigent support. There is a further 181 498 poor households live in the 223 informal settlements scattered across the city who access water from standpipes (CCT, 2011b).

The Cape Town case studies of WMDs in this report are drawn from two areas namely Saxonsea, and Samora Machel. As highlighted earlier, the installation of WMDs in Saxonsea and Samora Machel was undertaken under the so-called integrated water leaks project. It is important to note that the areas stated above are poor areas which is in keeping with the aims of the Integrated Water Leaks Project which the City of Cape Town states as being to 'ensure that all aspects around delivery of water and sanitation services to poor communities are addressed' (CCT, nd). Despite this, the City of

[3] 55 000 by end of June 2011 according to email from Linda Syengo

Cape Town in its submissions to Parliament argues that the programme is not targeted at poor households but 'the truth of the matter is that these devices are installed in all areas where the problem of high consumption and consequent high debt are encountered.' (CCT, 2010).

The Water Management Device

The water management device (Fig. 9) is programmable and it is an electronic device which allows users to have a predetermined volume of water for the day.

Figure 9 Water Management Device in Cape Town

The water starts at 4am in the morning and once the user has used up 350 litre allocation for the day then the water will be stopped and will restart at 4am the next morning. Further to this if users were in arrears at the time of installation, the City of Cape Town offered the user the ability to write off the arrears, look at water leaks on the property for free of charge and settle for the 10.5 kl for consumption for the month. The device is programmable and the 10.5 kl of water can increase on request depending why the device was installed.

5.1 Saxonsea

5.1.1 Introduction

Saxonsea is an outlying suburb of Cape Town which is located in Atlantis and part of Ward 29 of the City of Cape Town Metropolitan Council. Atlantis was established in the early 1980s as part of the apartheids' social engineering and thus a dumping site for surplus coloured people from Cape Town against the background of the Group Areas Act (Law No. 77 of 1957). For the project planners the Industrial Development Policy of 1962 which was aimed at promoting industrial growth in less developed areas was of immense utility in promoting the economic growth of Atlantis. This section outlines the key characteristics of the Saxonsea communities, how they have been affected by the installation of WMDs and their perception of this mode of water service delivery.

5.1.2 Social Structure in Saxonsea

In keeping with much of Atlantis, Ward 32 in which Saxonsea largely retains the apartheid era racial population mix, with 96.4% of the population being classified as coloured, 2.5% African, 0.5% Indian and 0.3% white. While the City of Cape Town (CCT, 2010) estimates that Saxonsea has a population of 24 487 living in 2 506 plots which gives an average of 9.77 people per plot, our study indicates a population of approximately 13282 based on a mean 5.3 people per plot and a mean of 4.77 people per household.

5.1.3 Employment and Income Status

In terms of occupational status of the head of household, we found that 41% of heads of households are unemployed while a further 25% are pensioners. Only a quarter is employed fulltime while a further 6% is employed on a part-time basis. These statistics explain the low income levels that were found in the area which are shown in Fig. 10 below.

n=250

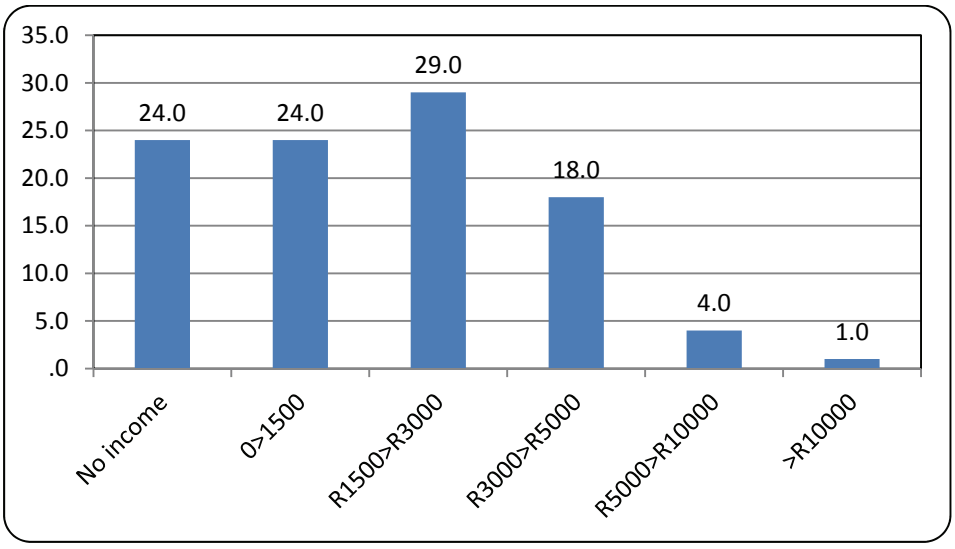

Figure 10 Household Income

Up to 77% of the households live on income below R3000 of whom 24% claim to have no income. The above description of social structure of Saxonsea indicates a highly impoverished community. A fifth of the households have backyard dwellings as a means to supplement income although this has negative consequences on water availability for both tenant household and the property owner household.

As a result of low incomes, Figure 11 below shows that the majority of property owners in Saxonsea, 57% owe up to R250, and 9% of the accounts are above R5000.

n=250

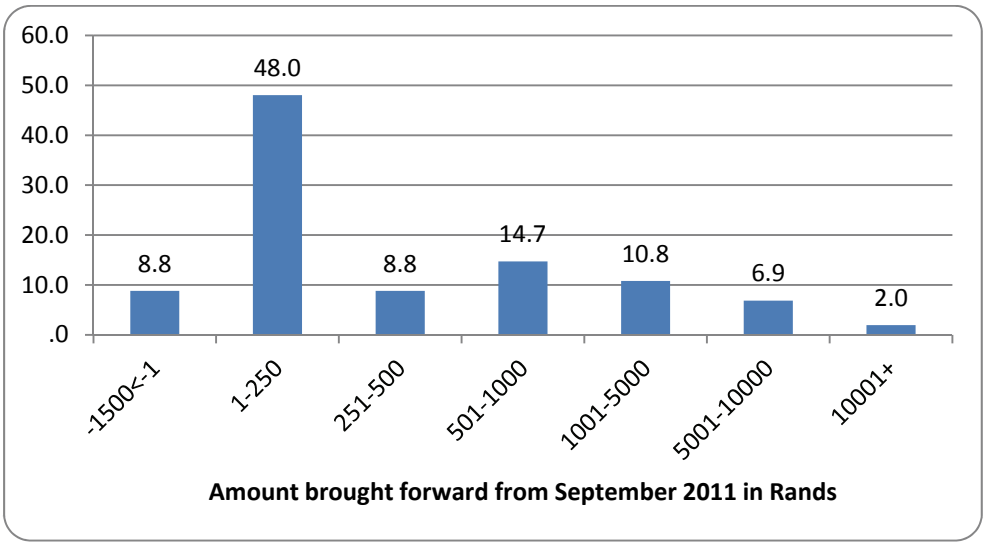

Figure 11 Municipal Debt in Saxonsea as measured through balance brought forward

5.1.4 Property values

The property values of the areas surveyed were found to range from R40 000 to R250 000. The majority (44%) of properties in Saxonsea are valued between R50 001 and R75 000 . Figure 12 below shows a typically low income house in Saxonsea.

Figure 12 Low income house in Saxonsea

All properties surveyed in Saxonsea are valued below R300 000, and therefore automatically qualify for indigency status. Such indigent households are exempt from paying property rates; qualify for an additional 4500 litres of water over and above the 6000 litres offered to every registered residential plot. In addition these households are allowed 4200 litres of sewerage disposal for free and free solid waste removal.

5.1.5 Water Management Devices in Saxonsea – An assessment of perceptions and Impacts

The data presented in this section provides an assessment of the impact of water management devices on citizens living in Saxonsea. It highlights the advantages and disadvantages of the WMDs and the impact of WMDs on the social relations within the household. It also assesses the technical problems relating to the WMDs.

(SAMPLE SIZE) 250 respondents

5.1.5.1 Adequacy of water supplies

As per the figure 13 below, 24% of the respondents indicated that they had run out of the allocated daily water supply in the past.

n=250

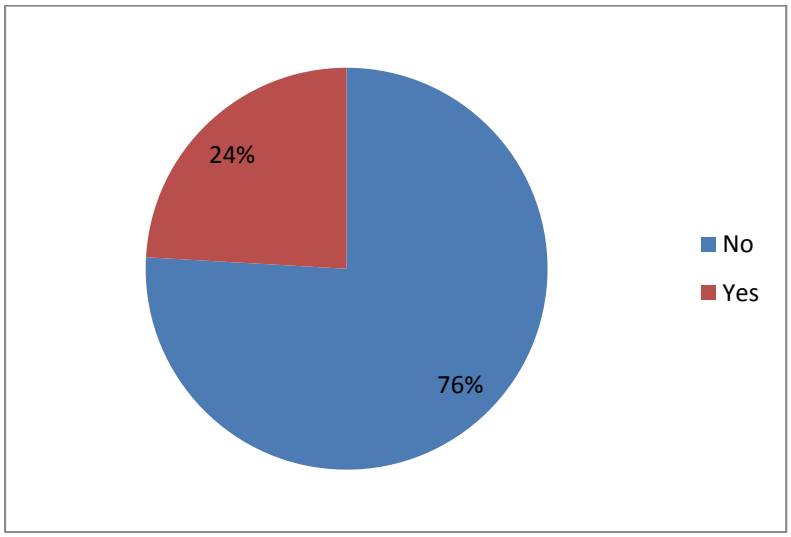

Figure 13 Running out of allocated water

Of the 24% who have exhausted their daily allocation, 9% report that they have exhausted their daily allocation on a weekly or daily basis. Respondents indicated that when people run-out of water they ask for emergency water from their neighbours, friends and relatives while a few just wait till the next morning.

5.1.5.2 WMDs and Water Management

When respondents were asked how WMDs assist in managing water consumption, most of the responses that we got related to ways in which the respondents have coped after the installation of the devices. While the overriding response was that the respondents now use less water, it was the nature of some of the coping strategies that we found disconcerting. In addition to ordinary coping strategies such as fixing all leaks, not watering the garden or using used bath water for watering,

using twin tubs rather than top loading washing machines, it was coping strategies such as a whole family sharing bath water from the eldest to the youngest member of the family; bathing once or twice a week and sharing bath water with the babies.

Those who argued that WMDs have not assisted indicate that they have not changed their water use behaviour after the installation of the devices because they had already been using little water before the installation of WMDs and as such they have continued on the same trajectory of water conservation.

5.1.5.3 Advantages and Disadvantages of WMDs

In order to further illuminate the impact of WMDs, we asked respondents to tell us the advantages and disadvantages of WMDs from their experiences and Table 1 summarises the advantages and Table 2 the disadvantages. The main advantages of the WMDs were said to be reduction in water consumption which translated into less or no water bills, the fixing of water leaks free of charge, and the lower levels theft as WMDs are made of plastic and do not have a scrap value unlike the conventional meters which are largely made from copper.

Table 1: The Advantages of WMDs

Item No.	The Advantages of WMDs
1.	With the new meter we use less water and do not pay huge bills
2.	Thieves don't steal plastic meters unlike the old copper meter that got stolen often.
3.	We have no leaks because they fixed it with installation
4.	We do not pay for water anymore
5.	We use less water than before, and I am aware that water must be saved

According to the respondents, the main disadvantages of WMDs relate to frequent water cut-offs, controlled water access, leases on the devices, many technical faults with WMDs as well as unexplained increases as shown in 2 below.

Table 2: The disadvantages of WMDs

Item No	The disadvantages of WMDs
1.	The meter cuts our water frequently and then we just wait till the next day
2.	I applied for free flow but never got it
3.	The old meter was better because we always had water, compared to the WMD through which we get very little water
4.	The lifespan of the old meter was much longer compared to the new meter which has been replaced three times since its first installation in 2007
5.	The old meter was never faulty, but the WMD cuts water supply anytime of the day
6.	With the old meter we had no problems of leaks
7.	The meter is faulty it runs even if the water is off, and cuts off water as a result
8.	The water bill is not a true reflection of the water we use. I think there is a big leak somewhere and I cannot be held responsible for it. The City of Cape Town must do a thorough check to establish the reason for such high bills.

5.1.5.4 Impact of WMDs on household relations

The study also sought to understand how the WMDs were impacting on social relationships in the households. We found that 84% of the respondents said that the devices had not had any effect at all while 16% attributed changes in their household to the WMDs. Positive impacts of the WMDs on the household relationships relate to the improvement of the family financial situation since the WMDs have reduced water bills.

However a much more disconcerting picture emerges when considering the negative household dynamics of WMDs. The installation of the devices has led to an escalation of household conflicts such as arguments over the responsibility between household members for the water cut-offs when the daily allocation is exhausted, for example '[t]he WMD has caused a lot of arguments between me and my husband especially when water runs out'. Similarly another respondent retorted that they 'argue about water bills and which has forced my family to share their bath water which is very unpleasant. I bath once a week and because we have removed the bath tub, only children sit in the plastic bath and adults wash standing up, we do not even have a shower'.

5.1.5.5 Satisfaction with WMDs

Despite a significant percentage of households running out of water, engaging in not so hygienic coping methods and increased social conflicts, a surprisingly high level of satisfaction with water services exists in Saxonsea as shown in Figure 14.

n=250

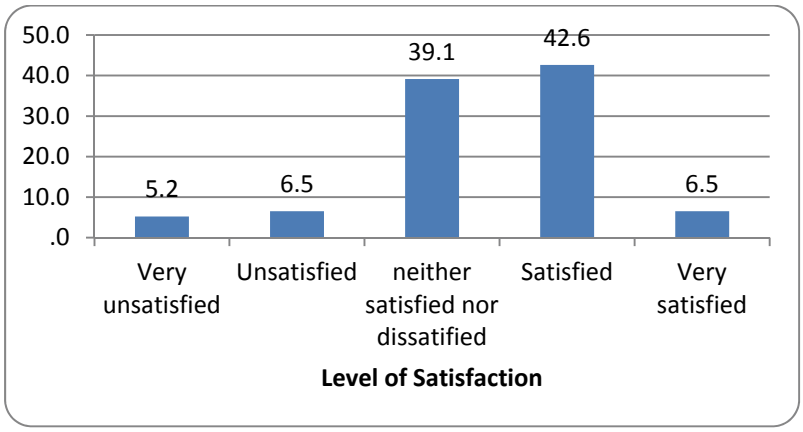

Figure 14 Level of Satisfaction with Water Services

For example only 12% of the respondents were very unsatisfied or unsatisfied. A large proportion of respondents, 39% are ambivalent with regards to water services while a significant majority of 49% is satisfied or very satisfied.

The key reasons for satisfaction relate to high-quality water services, speedy response to problems when these occur and the benefit water saving derived from the installation of WMDs and the concomitant low accounts. It is noteworthy that one of the reasons given is the availability of free flow water services rather than services controlled through the use of WMDs.

5.1.5.6 WMDs technical problems

In Saxonsea, 22% of respondents indicated that they had experienced problems with the WMD of whom 9% experienced these problems on a frequent basis, i.e. a few times a week or daily (see figure 15 below). The other 78% indicated that they had not experienced any problems.

n=250

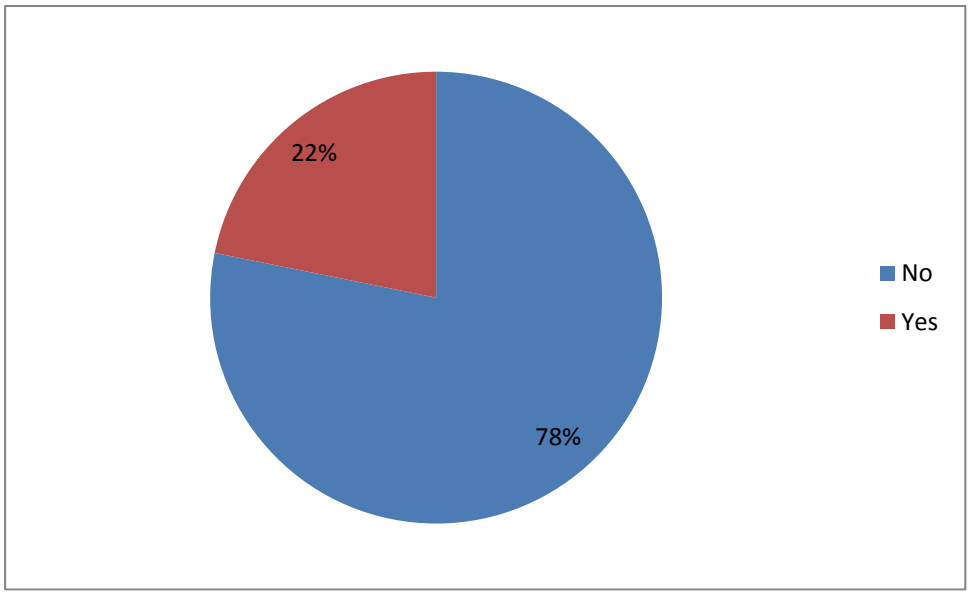

Figure 15 Technical problems with the WMD

In this study, we found that the WMDs are prone to technical failure relating, in most instances, to water leaks on the devices and unanticipated discontinuation of supplies.

5.1.5.7 Debt write-offs

In promoting the WMDs, the City of Cape Town indicated that these would be installed free of charge for indigent households, and debts would be written off if these residents managed their water use and kept within their daily allocation.

Responses to the question "did the City Of Cape Town write-off all the water arrears as promised if people signed for WMDs?" show that 28% of households reported that their debt had been written whilst 26% reported that their debt had not been written off. However, a further 46% did not know whether their debt had been written off or not.

5.1.5.8 Citizen involvement in the decision-making on installation of WMDs

The tender document outlined that community engagement be led by the main contractor as well as a subcontracted professional communication company. This citizen involvement process can be divided into two components involving the community and the individual account holders according to the city of Cape Town. It states that meetings with community leaders and the community were held to canvass the support for the project at the level of community. In this way the City concludes that direct interaction with individual owners and households permitted the contracted company's

customer service agents (CSAs) and the plumbers to focus on so-called “water awareness, education and buy-in process”.

Although the tender documents prevent cases where the installation of WMDs would take place without the head of household’s consent, field data indicates otherwise. At community level, 72% of the respondents indicated that they were not aware if the City had consulted with the community about the new water access restrictions and the WMDs through public meetings. 17% indicated that no meetings were held while 11% said the City held meetings. At individual household level, 43% of the survey respondents said they were consulted in some way before WMDs were installed whilst 57% claim that they were never consulted.

Consequently, an alleged lack of community participation has emerged as one of the most controversial parts of the installation of WMDs in Cape Town. In fact it has been alleged that the devices are installed without the prior knowledge and consent of households. In response to this allegation the presentation to the Parliamentary Portfolio Committee on Water and Forestry in December 2010 by officials of the City of Cape Town (CCT, 2010a) asserts that the City of Cape Town undertakes ‘educational and awareness campaigns’ and in addition:

- Engages on these issues with stakeholders, namely ward councillors, community leaders and make representations at community forums to create awareness around water conservation.
- At individual household level, the engagement is triggered by high consumption and high debt. At this level the City would then enter into negotiation with the affected households and sell the use of the flow management device, explaining how the device would save not only water but assist them with the management of their water accounts.

This assertion is broadly in line with the specifications in the project tender documents (see, e.g. CCT 2010b) which prescribe that the project buy-in process by the community can be divided into community level and household level processes. The community level processes involve seeking buy-in from community leaders and would include the ward councillor and those identified in active NGOS and CBOs as well as convening community meetings with residents to raise awareness of the project and its objectives. The household level processes may be categorised as the door to door general awareness campaign involving leaflet distribution and face to face contact with owner with the intention of creating awareness of the project and its objectives, water demand management

education and the elicitation of project buy-in in terms of repairs of own leaks. The installation of the WMD does not need the owner's consent as shown in item 1 in the plumber column Table 4.1 below. Further on the tender documents specify that it ought to be communicated that while the owner must sign the agreement letter for plumbing repairs to be carried out, the flow limiter will still be installed (CCT, 2010b). As will become apparent in the case studies for a majority of respondents in the three case study areas, this did not constitute consultation or authentic participation but technocratic *managerialism*. We use the term managerialism to denote the shifting of the basic social unit from the individual in capitalism and the state in socialism to the organisation and its managers (Enteman, 1993:152-155).

5.1.6 Conclusion

Section 5 outlined our findings in terms of the socio-economic conditions, the consultation process leading to installation of WMDs and the actual impact of these WMDs on the respondents. We conclude that the residents of Saxonsea are relatively satisfied with the water services they currently receive, with only 12% being unsatisfied. Similarly, the comparison of WMDs to conventional meters shows that only 14% adjudge the WMDs to be worse than the conventional meters. It is important to highlight that a large proportion of the respondents were ambivalent a) with regards to their level of satisfaction with water services at 39%; and b) with regards to the comparison between WMDs and conventional meters at 55%.

We found that Saxonsea is a relatively poor settlement whose property values are largely below R300 000 set as automatic qualifying criteria for indigent assistance by the City of Cape Town. As a result most of these properties are exempt from paying municipal rates, receive 10 500 litres of water per month free, and can dispose 7350 litres of sewerage per month for free and do not pay for solid waste disposal.

Most of the household heads are either unemployed or are pensioners with little on or no income. This underpins the City of Cape Town's determination to curtail water use to the level that is free of charge, although only 64% of the households use water below the limit set for Saxonsea on the WMDs of 450 litres per day.

We were able to ascertain that although 93% of the properties had WMDs fitted, the resetting of WMDs to 'free flow' has undermined the project objectives from the municipal perspective, but

allowed for unrestrained access to water for the respondents. The debt write-off process as promised by the municipality during the initial stages of the project has not been yet completed.

The impacts of the WMDs on the respondents as captured through the study shows a variegated situation. These impacts can be categorised as being negative and positive and as already indicated. A minority of the respondents indicated that WMDs were negatively affecting them. Beyond the quantitative dimension, the negative effects can be summarised as follows:

- The WMDs have been fraught with technical problems, and as a result, families have sometimes gone for days without water access with implications on hygiene.
- The WMDs have led to intra-household conflict with regards to responsibility for use of the daily allocation of water. We noted disquiet about the 'heated arguments' in the different households about water, with one respondent remarking that it was 'never like this before the installation of the blue meter, I hate it so much but I am powerless'.

The benefits from using the WMDs relate to less water being used and therefore less money being spent on water bills. For some, there seems to be a culture of water conservation emerging as opposed to profligacy.

5.2 Samora Machel

5.2.1 Introduction

Samora Machel, which forms part of a larger Philippi area, is located some 18 kilometres from the Cape Town CBD (CCT 2009). Philippi is located in the area bounded by the three major roads; the R300, Vanguard Drive and Lansdowne Road. First settled in 1993, the Samora Machel informal settlement grew rapidly between from 245 shacks in February 1994, 735 shacks by November 1994 and 1010 by June 1995 (Anderson *et al*., 2009). Samora Machel is today characterised by a huge concentration of shacks. This section outlines the key characteristics of the Samora Machel communities, how they have been affected by the installation of WMDs and their perception of this mode of water service delivery.

5.2.2 Social Structure of Samora Machel

According to the City of Cape Town Samora Machel consists of 4860 metered connections and a population of 14 885 (a mean of 3.06 people per metered connection) (CCT, 2010). The study results show a mean of 7.39 people per stand which would translate to a population of 35915 people.

For most of this analysis, Samora Machel is dichotomised into backyard dwellings and the main dwellings. The mean household size for backyard dwellings is 3.75 while that of main dwellings is 4.41.

5.2.3 Employment and income status

Regarding the occupational status of the household heads we found higher levels of unemployment (51%) in the main dwellings than backyard dwellings with unemployment of figures 40%. Similarly, higher levels of employment were noted for the head of household in backyard dwellings than those of heads of household in main dwellings. In terms of part-time employment, the backyard employment stands at 20% compared to 9%, while in terms of fulltime employment 34% of backyard dwelling heads of household are employed compared to 27% in the main dwellings. These higher levels of employment in backyard dwelling family units are expected as these households need an income to pay rent in addition to other requirements.

The household income statistics (Fig 16) show that up to 42% of main dwelling residents either refused to divulge their household income or stated that they did not know it compared to 39% of the backyard dwelling households. As with occupational status, the income status of backyard households is higher than those of the main dwelling. While only 21% of backyard households had no income, 37% of the main dwelling households reported that they had no income. In the income categories 1501-3000, 3001-5000 and 5001-10 000, the backyard dwellings exhibited higher proportions, totalling 46% , than the main dwelling households whose total was 21%.

n=250

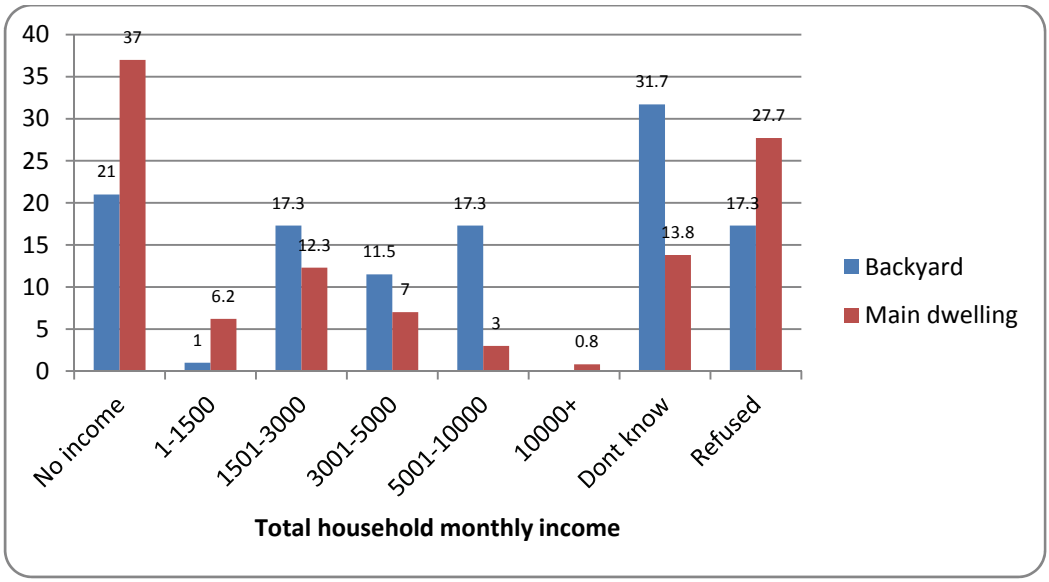

Figure 16: Household Income

5.2.4 Property values

The houses surveyed in Samora Machel had property values ranging between R10 000 and R150 000. Ninety four percent of the properties are valued between R10 000 and R75 000 with 40% of properties, in the R40 000-R50 000 range. Therefore, all these properties are automatically classified as indigent.

This data is consistent with the overall appearance of area and the predominance of the one-room prefabricated housing built in the late 1990s when the area was established.

5.2.5 Debt Write- offs

We were also interested in understanding the level of municipal debt in Samora Machel which we measured using the balance brought forward from the previous account in October 2011. The majority of account holders, 54%, owe the City of Cape Town less than R500. Of major concern is the 16% that owes more than R10 000, of whom some have debts owing that are more than the total value of the property. Given that water consumption is below 500 litres for 99% of the households, we inferred that debts owing over R5000 relate to accounts that have not been written off after the installation of the WMDs. In terms of debt write-off, we found that 22% of the respondents said their debts had not been written off; this percentage corresponds with the proportion of people with debts above R5000.

(SAMPLE SIZE) 250 respondents

5.2.6 Citizen Participation in the decision-making on installation of WMDs

In terms of the level of consultation, the tender document shows that community engagement is led by the main contractor, Best Plumbing, as well as a subcontracted professional communication company. As with Saxonsea, the citizen involvement entails the community process and the interaction with individual owners and households. In Samora Machel, 90% of the respondents in main dwellings indicated that they had not been consulted about the project and only 10% indicated they had been consulted, 8% of whom found the consultation process informative. Since the consultation process was largely aimed at main dwelling residents, only 2% backyard dweller respondents reported being consulted. The high percentage of respondents indicating that they were not consulted is inconsistent with the requirement to have a designated household member sign-off the installation of WMDs. Yet the mere fact of going door-to-door encouraging residents to sign up for the WMDs does not in itself constitute consultation but mere informing and the residents recognise it as such.

5.2.7 Water Management Devices in Samora Machel – An assessment of perceptions and Impacts

5.2.7.1 Adequacy of Water Supplies

Figure 17 below shows that 42% of the respondents from backyard dwellings have exhausted their daily allocation compared to 33% of respondents from the main dwellings.

n=250

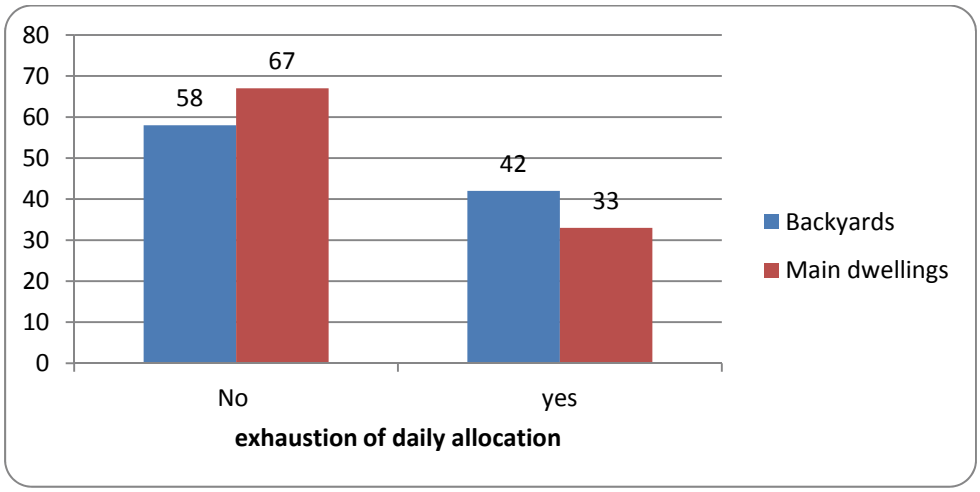

Figure 17: Exhaustion of Daily Water Allocation

5.2.7.2 WMDs and Water management

Table 3 reveals that WMDs are seen as a positive tool for managing water consumption, it helps prevent water wastage and coupled with the in-house display unit assist respondents to track their water consumption.

Table 3: How WMDs assist in the Management of Water Consumption.

Item No.	How WMDs assist in the Management of Water Consumption
1.	I don't get water cuts because I manage my water
2.	My children do not play with water anymore
3.	I don't waste water anymore
4.	It helps me manage my water
5.	it helps me manage water
6.	We know how much water is remaining

Those who disagree with the notion that WMDs assist in the management of water indicate that the device does not help them in any way to manage water and that they have not changed the way they use water as a result.

5.2.7.3 Advantages and Disadvantages of WMDs

The respondents of Samora Machel indicated that the WMDs present a number of advantages (see Table 4). These include that the device is a useful tool for the efficient management of water use, that it guarantees water on daily basis, that the municipality is prompt when called upon to fix faults pertaining the devices, that it promotes equity because everyone get the same amount of free water.

Table 4: Advantages associated with WMDs

Item No.	Advantages of the WMDs
1.	The device helps with the efficient use of water
2.	We are guaranteed water daily
3.	The municipality fixes the devices quickly when they are broken
4.	We get all our water for free
5.	promotes equitability because everyone gets the same amount

The disadvantages outlined in Table 5 are associated with the WMDs relate to the limited allocation per day, the high frequency of water cuts sometimes even when the daily limit has not been exhausted and the complications they bring to water supply interaction of between the municipality and the residents as highlighted in Figure 6.10 below.

Table 5: Disadvantages associated with WMDs

Item No.	Disadvantages of the WMDs
1.	There are too many water cuts
2.	The device cuts water before daily limit is finished
3.	Our water is limited
4.	The devices complicate our lives

We asked respondents who lived in multiple household stands about the arrangement they have in place for sharing water equitably. We found that water is not always shared equitably, in fact in some cases the plot owners said they limited water use to one bucket a day and sometimes instructed the backyard dwellers that they could not use the water do their laundry. This indicates a precarious existence for backyard dwellers. Other responses included that there were neither arrangements nor equitable use.

In order to assist in the reading of water usage process and conservation an in house water display unit is used in the main houses (see Figure 18). The advantages of using this display unit relate to the households being able to monitor their water usage from inside their house which empowers these households to take remedial steps before water is exhausted before the end of the day.

Figure 18: The In-house water display unit

The in-house water display unit above was photographed on top of a white lined writing pad to show the relative size of the unit. The unit can be hand-held is more or less the same size as wide screen cellular phones.

A number of advantages of the in-house display unit were identified by the respondents. Principally these units are credited for allowing the household members to know how much water has been used and how much is still available. It is said to be useful in providing information to identify water usage, and helps in saving water.

The negative issues related to the in-house water display unit are pertain to the unit being unhelpful in water management as, people are not using it or that they do not know how to use it.

5.2.7.4 Impact of water Management devices on household relations

The impact of WMDs on household relation in Samora Machel has not been pronounced with 5% of respondents reporting these devices as affecting their relations while 95% said they did not affect their relations. 2% of the respondents indicated that they now fought all the time about water.

5.2.7.5 Satisfaction with WMDs

The residents of Samora Machel are generally satisfied with water services provided by the municipality as shown in Figure 19 below. The figure shows that 65% of the main dwelling respondents are satisfied with water services as are 59% of the back yard dwellers. The level of dissatisfaction stands at 38% for back yard dwellers and 32% for main dwelling respondents.

n=250

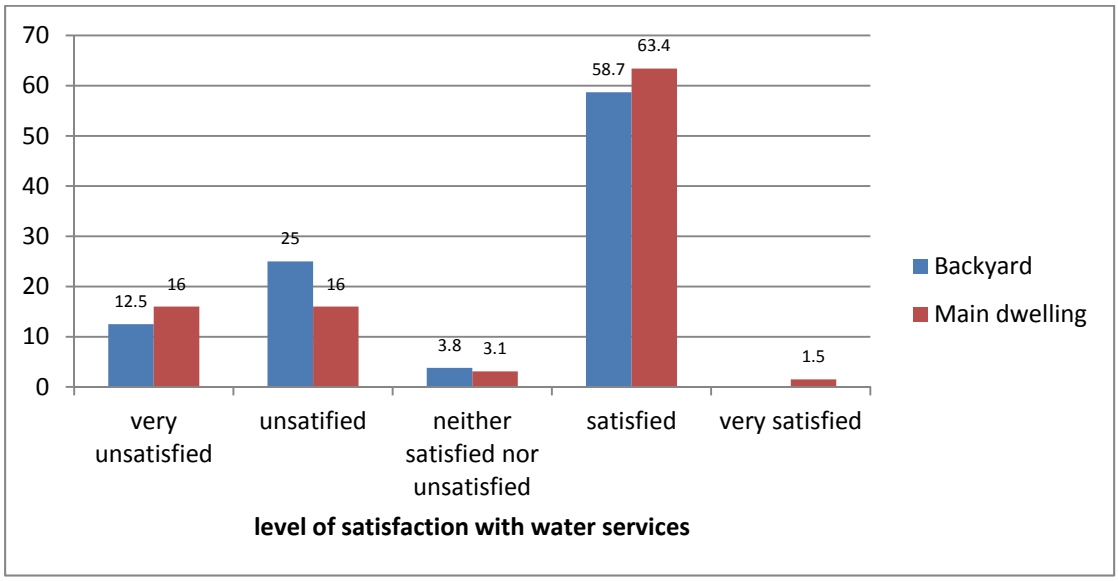

Figure 19 Level of satisfaction with water services in Samora Machel.

The reasons for the dissatisfaction, given include the limited supply of water dispensed through the WMD, the frequent water cuts, lack of control over water supply

5.2.7.6 WMDs Technical problems

As figure 20 below shows,20% of the main dwelling respondents and 24% of the backyard dwellings indicated that they had experienced technical problems with the WMDs.

n=250

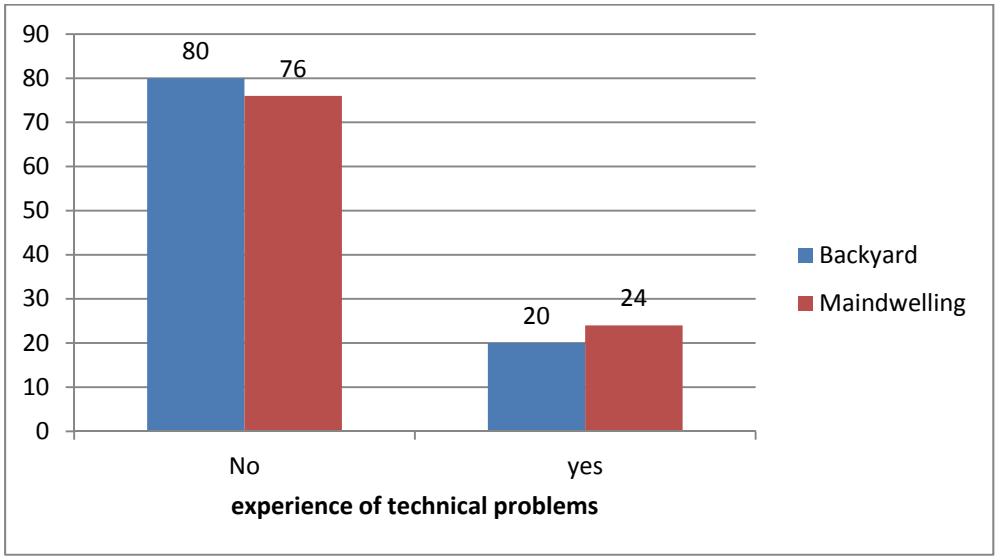

Figure 20 Technical Problems with WMDs

The types of technical problems relate, largely, to unspecified malfunctioning of the WMDs, the frequent water cut-offs which are perhaps the result of the exhaustion of the daily allocation and leakages on the WMDs.

5.2.7.7 Conclusion

The case of Samora Machel, just as the case of Saxonsea indicates that while there are numerous problems relating to the installation of WMDs such as the municipalities drive for acquiescence in the installation of WMDs rather than empowered participation, it is still possible to attain high levels of satisfaction with water services. It is therefore important for the municipality to continue to engage the affected communities post installation of WMDs rather than the current situation where the Water Demand Management section withdraws entirely. The high failure rate of WMDs also needs to be attended to ensure that they remain a credible instrument.

SECTION 6

CASE STUDY OF eTHEKWINI

eThekwini Municipality is the local government responsible for planning and managing Durban. eThekwini (*which means at the Harbour*) is a Municipal Area (EMA) located on the eastern seaboard of South Africa within the Province of KwaZulu-Natal. The IWA Water Wiki (2013) notes that the EMA was formed in December 2001. The boundary of the new EMA increased the boundary of the previous Durban Metropolitan Area by 68% whilst increasing the population by only 9%. Some 35% of the EMA is predominantly urban in character, with over 80% of the population living in these areas. The remainder is rural in nature. While the total area of the EMA is only 1.4% of the total area of the province of KZN, it contains just over a third of the population of KwaZulu-Natal and 60% of its economic activity (eThekwini Municipality Water Services Development Plan, 2011). Further, the municipal area is 2297 square kilometres in size and it is home to approximately 3,584,681 or 7% of the total South African population, making it the second most populated area in the country (Durban's Sustainability Best Practices Portfolio, Water, 2007/8 Special Edition; EDGE, 2011).

The eThekwini Municipality Economic Review highlights its Durban economy as follows; it plays a major role in the South African economy as the third largest economic center. It accounts for 10% of South Africa's economic output. Its economy has grown at an average annual rate of 3.65%. Its economic growth is consistent with that of Cape Town's (3.52%) and the City of Tshwane (3.23%). The economy is centered around tourism, transport, logistics activities of the Port and manufacturing industries such as the petroleum and chemical, food and beverage, tobacco, transport equipment (including automotive) and metal industries. Water is a central component for these activities. At this rate of growth, the demand for water is expected to increase in order to accommodate future growth in Durban's economy and population.

Institutional Arrangements for Water Services in eThekwini

eThekwini Municipality plays a dual role as the water services authority and water services provider. The actual water services provision is the responsibility of eThekwini Municipality Water and Sanitation Unit (EMWS). The EMWS obtains the bulk water from Umgeni Water, a state-owned entity, established in 1974 as supplier of bulk potable water for the City of Durban. Loftus (2006) points to that the Umgeni Water was established by government against the wishes of Durban and Even though the entity has six municipal customers, namely eThekwini Metropolitan Municipality, Ilembe District Municipality, Sisonke District Municipality, Umgungundlovu District Municipality, Ugu

District Municipality and Msunduzi Local Municipality, 80% of water provision is to eThekwini Municipality (Umgeni Water n.d) something that Loftus (2006) argues shows its anomalous role .

Water Resources Situation

The eThekwini Water and Sanitation (EWS) division reported that average daily water exceeded supply, which could lead to water shortages and restrictions between 2013 and 2015 if no remedial action was taken. In response the municipality is embarking on a host of measures to try and solve the water crunch. These include major infrastructure development of the Spring Grove and Hazelmere dams, and the Lower Thukela bulk water supply scheme (Kings, 2012).

In its study report for the eThekwini Municipality, Golder Associates (2012) stated that critical water shortage coupled with increased water demand have brought eThekwini Municipality to a critical point and the issues of water supply and use could no longer be deferred. A number of measures have been recommended to deal with eThekwini's water supply situation. eThekwini may be set to become the first city in the country to begin desalinating seawater for drinking-quality tap water among its host of measures to address the water demand problem (Carnie, 2012). A study by Golder Associates recommended the immediate purification of sewage water as a critical short term measure to bridge the water supply gap.

Other proposed short-term measures to bridge the gap between existing supply and escalating demand include water conservation and demand management activities such as fixing leaks, limiting supplies to consumers and reducing water theft. A report by Knight Piesold and Phelemanaga Projects showed that between 36 and 39% of water in eThekwini was going to waste due to leaking pipes and water theft.

These proposed projects require significant funding. eThekwini like other municipalities have sort to develop principles that would promote sustainable cost recovery in the water sector. One way in which cost recovery could be enforced was to utilise a water management devices it calls a "flow limiter) in low income areas such as Umlazi and Umbumbulu.

The Flow Limiter

A typical flow limiter in eThekwini is shown below (Figure 21). Flow limiters are metered water dispensing devices installed by the municipality on household properties.

Figure 21 Water Management Device/ Flow Limiter – eThekwini

Flow limiters in Umlazi (voluntary) and Umbumbulu (compulsory) are meant to regulate the flow of water to 9 kl a month (or 300 l a day) which is free to each household in the area. The flow limiters are automatically designed to kick on at 4:45am every morning. Thus they send messages about beginning time and stop time of the valves. Hence, the system ceases to dispense water as soon as the dispensed amount reaches 300 l on any particular day. In the event that the 300 l on a particular day is not exhausted, there is no carryover to the next day. However households have the option of dispensing any portion of the 300 l they are unlikely to use into containers for later use.

6.1 Umlazi

6.1.1 Introduction

Umlazi was originally discovered by King Shaka and his men and named Umlazi because when Shaka tasted the water in the area it tested like *umlasa* (like sour milk). Today, it is an outlying suburb located approximately 17 kilometres southwest of Durban, just west of the old Durban International Airport. Although formally established in the 1950s (SDCEA), the settlement has much earlier beginnings long before the British occupied Natal. According to Ngcobo (1998) the area on which the majority of Umlazi stands today was under the control of the Cele chieftaincy as well as parts under the Ngcobo chieftaincy both which still exercise control up to now. With British annexation the Zulu traditional character would gradually make way for present day settlement patterns which would be formally racialised during both colonial and apartheid periods. Under British colonial control, the majority of what is Umlazi today was named Umlazi Mission Reserve. At the end of the colonial era, in the early 1940s, the area was identified as a decanting site for what was perceived as problematic

slums in Cato Manor, a plan that would find willing implementers with the victory of the National Party in the 1948 elections.

The Umlazi settlement consists of an agglomeration of formal housing the majority which is low income housing with pockets middle income housing , single sex hostels, informal settlements as well as traditional zones in transition. According to eThekwini Municipality (EM 2008), Umlazi had a population of over 550 000 in 2008 making it one of the largest suburbs in South Africa. Umlazi is subdivided into a number of zones numbered from A to Z with interviews for this research conducted in the Umlazi G section which consists of low income housing and informal settlements.

6.1.2 Social Structure in Umlazi

The study established that 96% of the households have eight people or less. Based on a mean of 4.75 people per household, each person has a 63.16 litres a day which is more than double the free basic water allocation of 25 litres per person a day. A large household of ten people has an average allocation of 30 litres per person a day which is still above the free basic water allocation prescribed by national policy. Based on the eThekwini FBW policy, in an average family of eight, each member is entitled to 37.5 litres of water per day.

6.1.3 Employment statuses of head of household

In terms of the occupational status of the head of household in the study area we found that the 42% of these were pensioners, 38% were unemployed while only 15% were employed. This highlights the levels of impoverishment of the area and the high presence of flow limiters which are installed on demand by the residents as a way of limiting water usage, frequently after running high water bills and leading disconnections. The area also shows very low income levels with 74% of the households subsisting on below R3000 per month (Fig. 22). With such low income levels, most of the money would be directed at food and other components of basic survival. These income levels can be deduced from the high unemployment (38%) and reliance on pension income (42%).

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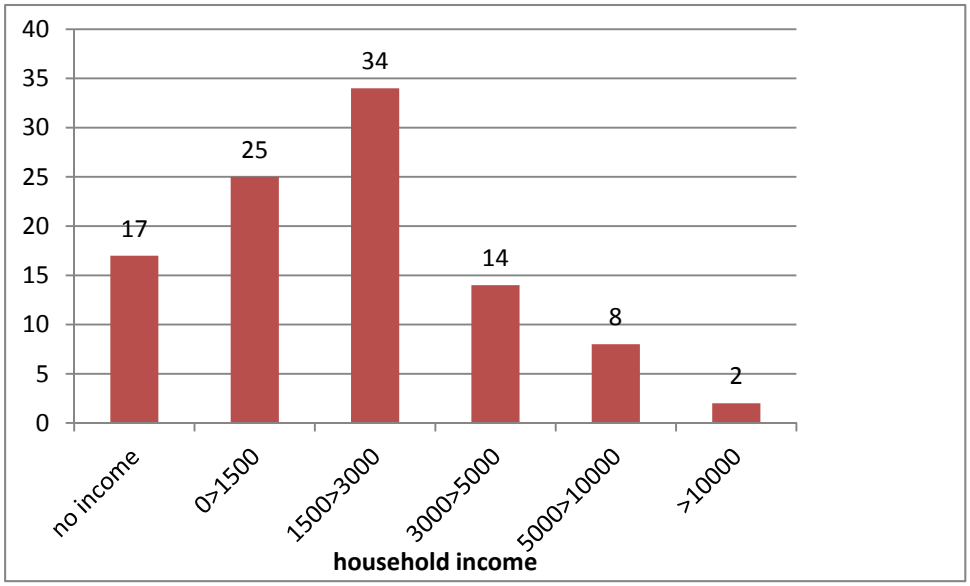

Figure 22 Household Income

Consequently, the prevalence of flow limiters in this area with the above statistics indicated that flow limiters may be targeted at the poor, who do not have the capacity to pay for services in a cost recovery based context. It is a water management measure for the municipality that reduces the water production costs associated with this group of consumers, cuts consumption levels by this group of consumers and enhancing water conservation measures by the same group. The study did not establish any other group of consumers being implicitly subjected to the same multiplicity of water management measures.

6.1.4 Property Values

The property values of the areas are valued at R250 000. Figure 23 below shows a typical low income house in Umlazi.

Figure 23 Low income house in Umlazi

6.1.5 Debt Write Offs

Flow limiters in Umlazi are not necessarily a compulsory device for households. Individuals do voluntarily apply to have the flow limiters installed on their properties so that they limit their water consumption to the free allocation of 300 l a day. The 300 l a day or 9 kl a month volume is free of charge to Umlazi residents as their properties are valued below R250 000. However in the event that a household is in arrears, the municipality will take the initiative to ensure that the water supply for that household is limited to 300 l a day and where applicable until debt payment plan is agreed upon between the resident and the municipality. This is an exercise designed to enforce compliance with payment of the owing bill as well as to ensure that the bill does not keep on accumulating.

The majority of those who volunteer to go on flow limiters are those who owe council debts and cannot cope with payments and thus prefer to go on zero payment under the flow limiter project. Those who choose to remain on full pressure supply but are on debt will have their debt parked. As long as they pay the current amount due on time every month a portion of the debt is cancelled over a period of 20-24 months.

6.1.6 Citizen participation in decision-making on installation of WMDs

An array of measures is used to involve the citizens in water services delivery and the installation of WMDs in general. eThekwini Municipality officials contended that the municipality has an elaborate citizen participation process in the provision of water though in some instances constraints were noted. The main idea of participation is to solicit public views about how best they think the city can make water service delivery policies to benefit consumers. Consequently, various initiatives were started aimed at leveraging interest and involving community members in the accountability and decision-making processes of the municipality with a view to ensuring that the voice of the public is empowered and people are able to influence service delivery levels and activities. The problem with the language of participation is that it is easy to use but difficult to translate. At times officials and politicians have got different views and ordinary people have different views. Participation is a progressive discipline and the ideal is not achievable in one meeting or workshop.

The importance of participation in the water services sector is highlighted in the Vision of the EWS unit. Among other issues, the vision states that the EWS engages in public participation in order to;

- Open two way communication with the community to foster active involvement of the citizens and to encourage their honest views to be expressed (Public interaction).
- Ensure that people influence service delivery levels and activities.

- Promote improvement of service delivery
- Provide a platform for people to raise concerns
- Receive public feedback with a view to changing behavior both internally and externally (in terms of roles and responsibilities)
- Increase public satisfaction
- Promote accountability of government to the community
- Facilitate dialogue with the community; and
- Ensure better understanding of customers.

6.1.6.1 Citizen participation initiatives

Citizen participation is promoted through a number of initiatives. The most common initiatives in the municipality are customer perception analysis studies (through focus group discussions); user platforms (through raising citizen's voices training) and the customer service charter.

Focus group discussions

Focus groups are groups of individuals, business, civil society and people with disabilities that the city invites for regular meetings and discussions regarding water and sanitation delivery services. As a public participation structure focus group mechanism ensures that the public influences the service delivery standards and levels when it came to strategic decision-making processes in water and sanitation. Focus Groups ensure that there is an ongoing dialogue and interaction between the municipality and the public, guaranteeing that there is better understanding of customers, and provision of feedback with a view to changing behaviour both internally and externally in terms of roles and responsibilities.

The Raising Citizens Voice – Rights and Responsibilities Programme

The raising Citizens is intended to support a bottom up approach to water services regulation by actively involving the citizens in the local monitoring of water and sanitation services. The EWS argues that the RCV empowers citizens to influence water service provision. Through this programme citizens can hold the municipality to account. In order to raise the capacity of the public to participate in the EWS service delivery processes, the RCV provides training of the public about its rights and responsibilities. The training covers basic legislation, municipal water policies, water conservation, health hygiene and sanitation and sanitation policies. The training target councillors, ward Committees, Civil Society Organisations, Organs / individuals (who work directly with communities deployed by various government spheres (if interested), e.g. Councillor's offices

administrators, Community Development Workers, Community Care Givers, Youth Ambassadors, etc.) and any other interested groups or structures. Following public training, user platforms are set up and serve as quarterly meetings between the municipality and the community for ongoing community and civil society water services monitoring and problem solving. The user platforms are made up of the public and both administrative and political representation from the municipality to ensure municipal responsiveness, and to monitor that the issues raised by the community are indeed followed up within the municipality.

Customer Service Charter

The Customer Service Charter is a piece developed with an intention to guide both the city authorities and the public to promote efficient and effective service delivery. It spells out what the unit does and the unit's commitment to the public. In particular, the charter spells out that EWS seeks to provide all citizens within the eThekwini Municipality access to appropriate, acceptable, safe and affordable basic water supply and sanitation services. In line with the Batho Pele principles, the unit's charter, points out that eThekwini wants the needs of the people to come first. In that regard its service is customer oriented. Customers are consulted on the water services that the municipality currently provides. The charter informs customers about the municipality's service standards and what they should expect from the service provider. Further to this, the charter also notes that EWS and indeed eThekwini will strive to be honest and open about everything it does; and to offer a full explanation and an effective solution if its promised standard of delivery is not met.

Service Level Standards

eThekwini also has an elaborate framework of service level standards. These standards are meant to improve relations and understanding between the Municipality who provides the services and the customers who make use of the services. Availed both to municipal employees and the public, the standards outline is aimed at ensuring that public expectations of service delivery are matched by achievable and measurable performance standards. In this regard, they detail;

- How the members of the public can have access to the municipal water services.
- Where customers can get service, nature of the services provided and the timeframe which EWS commits itself to in resolving the query/complaint.
- How the customers can take the municipality to task in case it fails to deliver as per the dictates of the standards
- In instances of disputes, the processes to resolve disputes are outlined
- the standards of service that the public can expect,

In this regard, the public service level standards are an important means at the disposal of the citizens to hold the municipal government to account. Further, while the standards can be used by the public to identify the gap in expected service delivery, they are also a critical instrument used by the municipality to gaps and inequalities in service delivery and assessing citizens' awareness of their rights and responsibilities.

Internal and External Communication.

The eThekwini Water and Sanitation Unit is using various media ranging from print to electronic with the purpose of providing eThekwini citizens with information to enable easy access to water and sanitation services. These include: Suggestion Boxes; Electronic Media Programs; Road show; Education Awareness Centre; Internet website and Call Centre.

Citizen Report Cards

The Citizen Report Cards is a new initiative which the municipality is taking on board. It is aimed at identifying gaps in service delivery and also creating consciousness on the side of the members of the public so that the municipality can improve measures of trust, overall satisfaction, transparency, accountability, efficiency and effectiveness.

(SAMPLE SIZE) 205 respondents

6.1.7 Water Management Devices – An Assessment of Impacts

The data presented in this section provides an assessment of the impact of water management devices on citizens living in Umlazi. It highlights the advantages and disadvantages of the WMDs and the impact of WMDs on the social relations within the household. It also assesses the technical problems relating to the WMDs.

6.1.7.1 Adequacy of water supplies

Figure 24 shows that a total of 22% of the respondents reported that they had run out of their daily allocation at least once with the remaining 78% reporting that they had never run out of the daily allocation. Further research interviews to understand the causes of the running out of water, established that household consumption levels are not only affected by family sizes but by composition as well.

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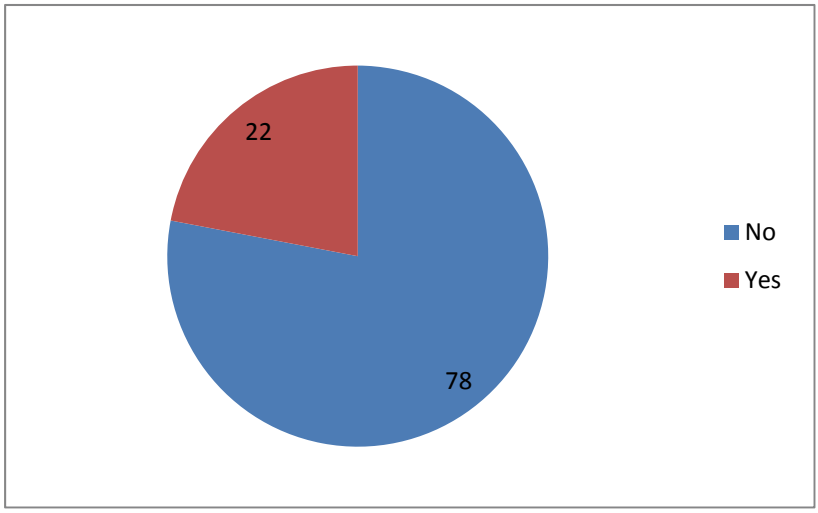

Figure 24 Running out of daily water allocation

We established that a family with more children as part of the household is likely to exhaust its daily allocation as compared to a family of the same size mainly made up of adults. This may be explained by the argument that adult members do not ordinarily stay at home all day but only return home in the evenings. This is unlike children who are either too young to go anywhere or arrive early in the day from school.

6.1.7.2 WMDs and Water Management

When respondents were asked if the flow limiters had assisted them to manage water usage, they agreed and pointed out that the finite amount of water meant that the household had to plan its daily water usage. More importantly, they posited that the use of flow limiters ensured that they would not be compelled to pay for the water services, many of whom have historically struggled to do so. The majority of respondents indicated that they had been conscientised to live within the free allocation and had made necessary adjustments to lifestyle and water use patterns. The respondents indicated that the flow limiters ensured they remained on the free water limit and they found this to be financially beneficial.

6.1.7.3 Advantages and Disadvantages of WMDs

In analyzing the impact of flow limiters, the respondents were asked to enumerate the advantages and disadvantages of these devices and it became clear that the advantages listed in Table 6 relate to ensuring that water consumption remained in the free basic water allocation and thus did not accumulate any debt which often led to squabbles in the households, that consumers had water daily and that respondents felt they were contributing to water conservation efforts.

Table 6 Advantages of flow limiters

	Advantages of flow limiters
1.	It ensures we remain on the free water limit
2.	it ensures that we have water everyday
3.	We don't squabble over who should pay for water use in the family
4.	We don't accumulate debt
5.	We conserve water

The disadvantages summarized in Table 7 related to the use of flow limiters include relatively low water allocation allowed for under the free basic water which many respondents pointed was only enough for small households, that respondents were not able to use toilets when the allocation was finished which could lead to a public health disaster. In addition it was pointed that the allocation through flow limiters was not enough to take care of the sick and that the devices frequently broke down

Table 7 Disadvantages of flow limiters

	Disadvantages of flow limiters
1.	The water allocation is suited for small families
2.	we are unable to use the toilets when the water allocation is finished
3.	If there is a sick person in the household, it makes it difficult to take care of them
4.	The flow limiters frequently break down
5.	The low was allocation was a recipe for public health disaster

6.1.7.4 Impact of WMDs on household relations

While the majority of respondents 91% indicated that the devices had not affected social relations in the household, the remaining 9% indicated that the devices had an impact on the relations. The impact on social relations in the household can be classified into positive and negative dynamics. The positive effects related to removal of water as a financial burden to the household and learning that each one's way of using water had an impact on the availability of water for use by others and thus instilled a greater sense of interdependences in the family.

The negative dynamics of flow limiters related to squabbles on who was responsible for the exhaustion of the daily allocation of water and arguments on who should bear the burden of seeking alternative sources of water when the allocation got exhausted before the end of the day.

6.1.7.5 Satisfaction with WMDs

Figure 25 below shows the high level of satisfaction with water services provided by eThekwini Municipality with 63% of the respondents satisfied with water services and 29% very satisfied (which adds to a total of 92% satisfied or very satisfied). The level of unsatisfied is only 2% and another 2% for very unsatisfied with the remaining 4% neither unsatisfied nor satisfied.

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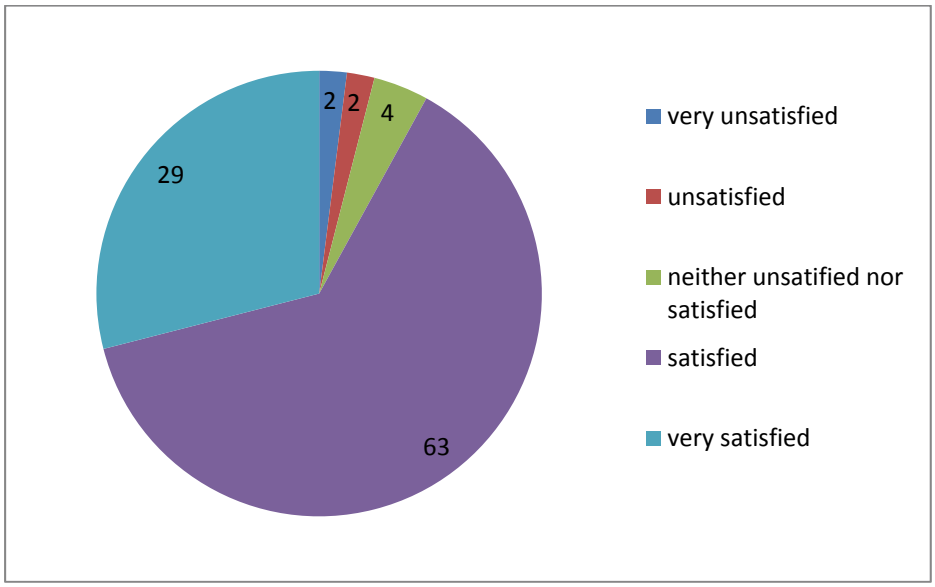

Figure 25 Satisfaction with water services

The respondents indicated that they have been taught to use water efficiently, and that the allocation was enough for their requirements, that they no longer have to pay for the water service since they started using the free basic water allocation and that the municipality attends to their concerns expeditiously. The unsatisfied on the other hand argued that water is not enough for subsistence requirements, the flow limiters are unreliable and that the municipality takes time to respond to complaints

6.1.7.6 Technical Problems of WMDs

However flow limiters as mechanical instruments are not always functional. A number of problems may arise during their usage. The most common technical problems associated with flow limiters are that;

a) The flow limiter may not dispense water at all.

b) The flow limiter may dispense insufficient water, which is less than the recommended 300 l per day.

c) The flow limiter may issue an excessive amount of water.

In Umlazi we found that 15% of the respondents had experienced problems with these flow limiters with the remaining 85% saying they had not experienced any problems as shown in Figure 26 below.

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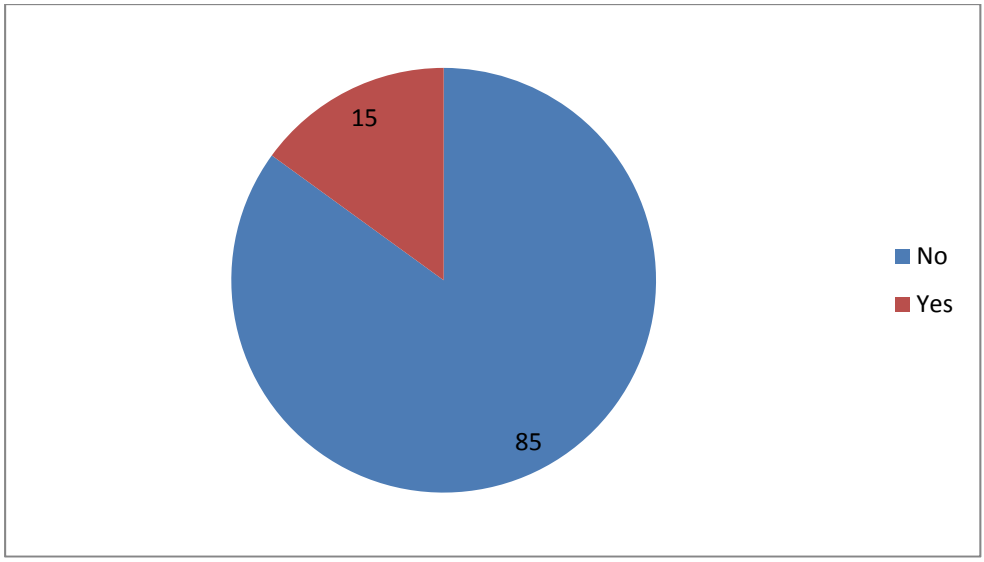

Figure 26 Technical Problems with Flow Limiters

These reasons relate to faulty flow limiters which dispense less water than promised, flow limiters failing to replenish supplies in the morning, as well as leakages on the flow limiter.

In order to mitigate these possible technical problems, monitoring of dispensed water by consumers is regarded as an essential element. Consumers are issued with log books (Fig. 27.).

Figure 27 Log Book with Toll Free Number

The log books are filled in with the amount that the flow limiter will have dispensed on any particular day. By consistently recording flows each day at the same time, the consumer is able to identify if there are any technical problems with their flow limiters, of which they are obliged to report to the city's department of water services. Consumers are also encouraged to check any possible leaks on their water supplies. The process of checking leaks as described in the municipality's flow limiter fliers involves closing the tap on the property and making sure that no one is using it during the checking process. The consumer reads the meter in the first instance, and writes down the last three red numbers appearing. After 10-15 minutes, the consumer is supposed to check the numbers again. If the numbers have changed then this implies that there is a water leak and it must be reported to the EWS.

6.2 Umbumbulu

6.2.1 Introduction

Umbumbulu is rural area located some forty kilometres away from Durban and forms part of the eThekwini Metropolitan Municipality jurisdiction. The land under which most of Umbumbulu is located on land administered by the Ingonyama Trust (Urban-Econ Tourism 2010). While many areas already had onsite water supply, a number of areas were still being upgraded from communal water supply at the time of the survey in May/June 2012. Surveys were carried out only in sections that already had a functional n site water supply mediated by the flow limiter. While the official line in eThekwini Municipality has been that flow limiters are installed as a credit control measure when consumers fail to meet their villages' obligations and apply for debt relief, Umbumbulu provides a divergence from that. All home visited by the interviewers had flow limiters installed.

6.2.2 Social Structure in Umbumbulu

Study findings in Umbumbulu reveal that the mean size of household size is 8.04 and a mode of 9. Figure 3.1 below shows the distribution of household size. As stated the mode household size is 9 of which 15% of the households have a size of 9, while 13% of household size of 8 and 10 respectively. From a water service perspective, the crucial statistic is that only 60% of the households have a size of up to eight, the figure use to calculate free basic water allocation per household.

6.2.3 Employment and Income Status

In terms of occupational status of the head of household, we found that 18% of heads of households are unemployed while a further 49% are pensioners. Those employed fulltime constitute 21% of the sample while a further 7% is employed on a part-time basis.

The data on employment statistics presented above explains the low income levels that were found in the area which are shown in Figure 28 below. Up to 77% of the households live on income below R3000 of whom 24% claim to have no income.

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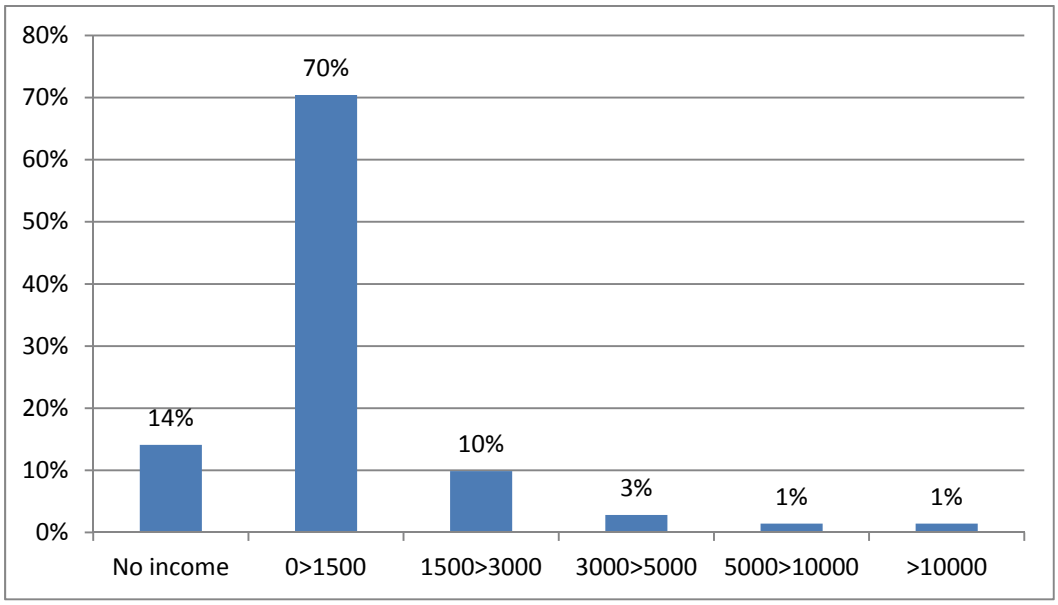

Figure 28 Household Income

6.2.4 Property values

The majority of Umbumbulu houses are typically low cost houses valued at around R10 000. Figure 29 below shows a low cost Umbumbulu homestead.

Figure 29 Low cost Umbumbulu Homestead.

6.2.5 Citizen Involvement in the decision to install WMDs

One of the key objectives of the study was to understand the form and level of participation of residents in each of the areas where the flow limiters were installed. When asked if they had been consulted before the installation of flow limiters 82% of the respondents acknowledged this consultation while the remainder of 18% said there had not been any consultation as shown in Fig 30 below.

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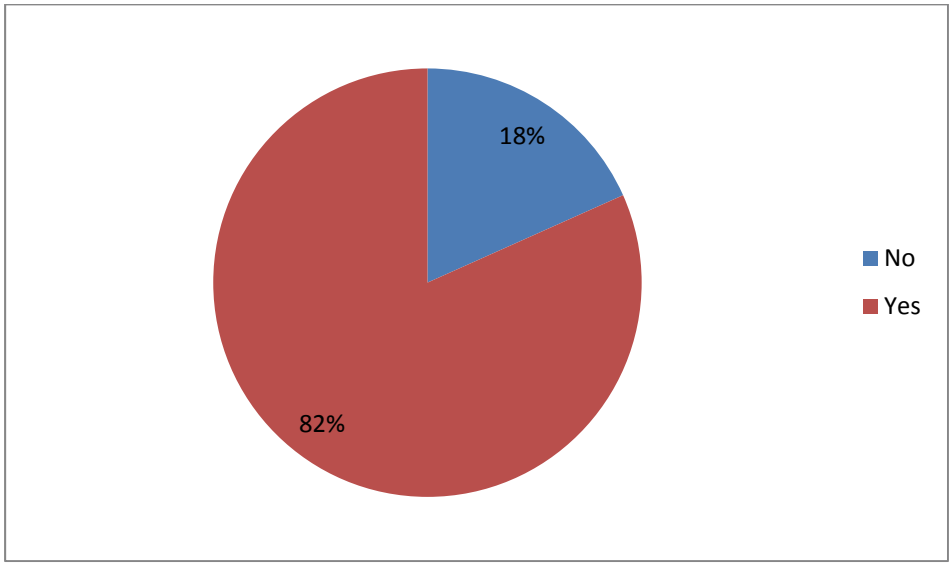

Figure 30 Prior Appraisal and Information before installation of flow Limiters

As highlighted in the case of Umlazi, consultation was in regard to informing the consumers about the pending roll out programme rather than whether or not they wished to have tapped water with flow limiters installed. This was well articulated by one respondent who quipped 'when there is a project, the officials come here with the project details already in place; they would have made decisions already.' Many of the residents were happy to be allowed to choose the exact site in their homestead where the tap would be located.

As a result of the emphasis on consultation rather than participation, civil society interviewees also revealed that at the preliminary phase, there was some resistance to the eThekwini rural water roll out programme because word on the utility of flow limiters had not reached many prospective recipients (Interviews with Claribell Mthembu). However, further training and involvement of communities have now led to more awareness and buy-ins.

(SAMPLE SIZE) 207 respondents

6.2.6 Water Management Devices – An Assessment of perceptions and impact

The data presented in this section provides an assessment of the impact of water management devices on citizens living in Umlazi. It highlights the advantages and disadvantages of the WMDs and the impact of WMDs on the social relations within the household. It also assesses the technical problems relating to the WMDs.

6.2.6.1 Adequacy of water supplies

When respondents were asked how flow limiters assist in managing water consumption, many responses related to the advantage of in yard connection as compared to fetching water from standpipes and from the river. The responses related to the utility of flow are centred on ways in which the respondents have coped with flow limiters in place. The flow limiters were useful in inculcating awareness of the limits of water availability and the need to actively pursue water conservation.

6.2.6.2 Advantages and Disadvantages of WMDs

In order to further access the impact of flow limiters, we asked respondents to tell us the advantages and disadvantages of flow limiters from their experiences and summarise the results in Table 5.14 for advantages and Table 5.15 for disadvantages. The advantages of flow limiters mentioned by the respondents can be summarized as (i) free water access (ii) access to water from the yard (iii) flow limiters inculcating wise water use and (iv) improved water access with yard connections

Table 8 Advantages of flow limiters

	Advantages of flow limiters
1.	We don't have to pay for the water access
2.	We have access to water from our yards
3.	Flow limiters help inculcate wise water use
4.	We do not struggle with water access anymore

The disadvantages of flow limiters mentioned by the relate to the (i) the restricted water access led to cut off of water access when the daily allocation is finished and that the respondents then have to wait till the next day to access more water (ii)the inadequacy of the volume permitted, i.e. 200 litres.

Table 9 Disadvantages of flow limiters

	Disadvantages of flow limiters
1.	Sometimes we finish the water allocation and are left with no water
2.	The water allocation of eight buckets per household per day is not enough, 12 buckets would be better
3.	When there are many people in the homestead, the water allocation gets exhausted very early in the day
4.	If the water allocation is exhausted early in the day, we have to wait till the next day inconveniencing us.

6.2.6.3 Satisfaction with Water Services Provision

When respondents were asked about their level of satisfaction with water services through WMDs, 80% responded that they were satisfied with water services, with 20% unsatisfied as shown in Figure 31. In general satisfaction issues relate to the reliability of water supplies and the quality of water supplies. These in the case of eThekwini have always been highly rated.

n=207

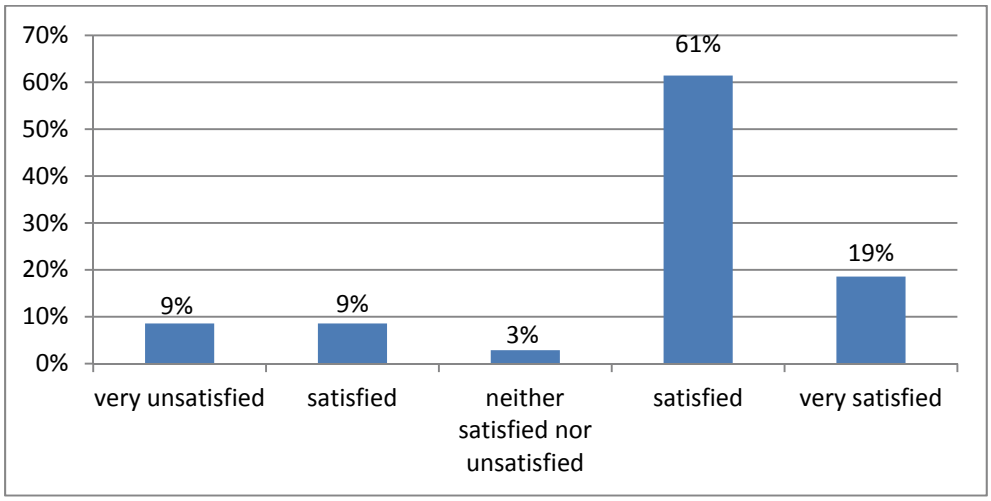

Figure 31 Level of Satisfaction with Water Services

Further to this, the relatively high level of satisfaction can be understood in the context of a community that previously did not have access to in yard connection to water supply. In the recent past the community accessed water from the river and then distant standpipes. Typically the reasons for dissatisfaction relate to the WMDs being faulty, the lack of choice relating to the installation of WMDs, slow response times when faults are reported. The dominance of WMD related issues in the determination of satisfaction with water services

However, the move to supply water in the yard would necessarily make lives of the respondents much better. This can be seen from Table 5.16 which summarises responses why the respondents are happy with water supply.

6.2.6.4 Reliability of Flow Limiters

In terms of their experience with the flow limiters in Umbumbulu, 23% of respondents indicated that they had experienced problems with the gadgets while the other 77% indicated that they had not experienced any problems (Fig. 32).

n=207

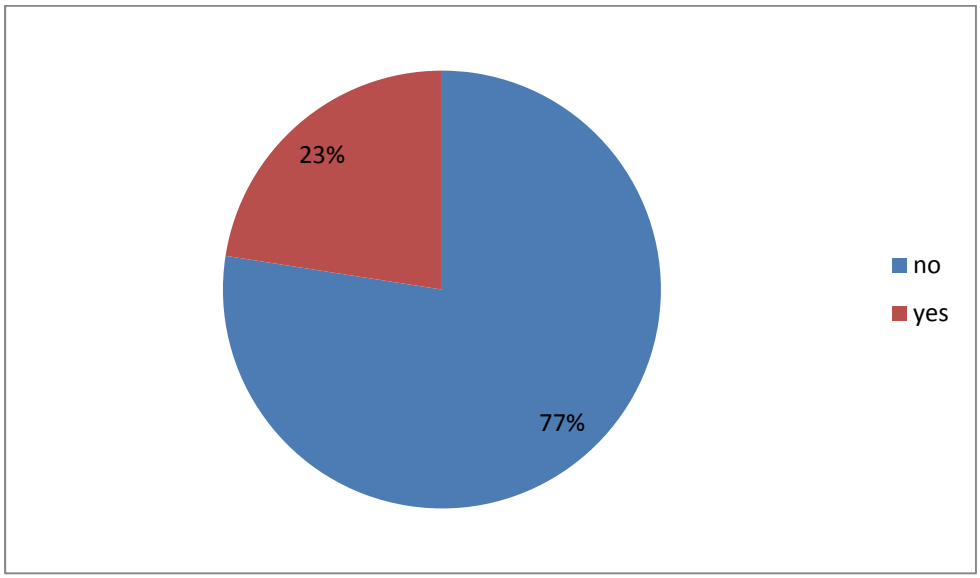

Figure 32 Technical problems with the WMD

The problems with the flow limiter relate to the following: (i) the flow limiter no longer dispensing water, (ii) the flow limiter burst, (iii) leaks from the flow limiter and (iv) interruptions in water supply.

6.2.6.5 Conclusion

As part of the broad study on the comparative analysis of the utilisation of water management devices in South Africa, this report presented an in-depth study of the adoption of water management devices in eThekwini Municipality. The study focused on one of a number of water management devices used by eThekwini, referred to as a "flow limiter". The study established that the flow limiter can be installed on any eThekwini household property upon request by the property owner. Further, to this, there were cases of involuntary installation where the municipality used the device as a cost recovery measure. The flow limiter has predominantly been installed in formal low

income properties valued below R250 000. In these areas, it is used both as a debt management instrument and as a way of limiting poor consumers to a FBW limit of 300 l a day or 9 kl a month. The majority of the property owners in one such area, Umlazi, can be classified as poor and non wage earners. The study established that 80% of property owners in this area were either unemployed or lived on meagre pensions. The flow limiter with a FBW limit can however be installed in properties of a higher value if such owners make a specific request based on an absence or loss of income or being child headed families.

Another case study, Umbumbulu, is a rural area. Unlike Umlazi, the installation of flow limiters in Umbumbulu case is done on every property where eThekwini is rolling out its tapped water service provision. In this case, the property owner is also automatically subjected to a FBW limit of 300 l a day or 9 kl a month. An optional 200 l a day or 6 kl a month can be supplied to the property at a cost to the consumer. Installation of tapped water in Umbumbulu is done at no cost to the consumer and comes with a urine diversion sanitary system. In a similar case to Umlazi, the study established that only 21% of Umbumbulu citizens are employed on a fulltime basis. However, it is theoretically possible for any household in Umbumbulu to be on a full pressure free flow system. Installation of such a facility is done at full cost to the applicant. The applicant is expected to have installed a full flash toilet and a sceptic tank as part of the condition of securing a full pressure water supply. Just as the installation is done at applicant's cost, applicant will also be expected to pay for their monthly water consumption.

eThekwini stated that its use of flow limiters is part of a wide range of measures that the municipality is taking to prudently manage its water supplies as its average daily water demand now exceed supply. This situation was expected to lead to water shortages and tighter restrictions between 2013 and 2015 if no immediate water management measures were taken. In addition to flow limiters, other measures being taken include major infrastructure development of the Spring Grove and Hazelmere dams and the Lower Thukela water supply scheme. eThekwini may also set to become the first municipality in the country to begin desalinating seawater for drinking – quality tap water. Pending the resolution of mostly religious and cultural objections, eThekwini also proposes to have up to 10% of its water supplies coming from the purification of sewage water.

As a debt control measure, flow limiters are tacitly used to restrict water supplies to FBW levels for low income groups, in particular those who are unable to pay for water services. It is for this reason there is a prevalence of such devices in low income areas such as Umlazi and the rural areas (where

the municipality is extending its basic water services). Flow limiters are also used to attract back into the formal system, all illegal water connections by domestic users.

eThekwini municipality's water services unit has in place what it believes is an elaborate structure to foster citizen participation in the water service delivery process. In the case of the installation of flow limiters, the municipality popularises the device through measures such as focus group discussions, raising citizens' voice – rights and responsibilities programme, customer service charter, service level standards, internal and external communication, toll free number as well as soon to be introduced citizen report cards.

However an analysis of both Umlazi and Umbumbulu highlighted that the conceptualisation of the flow limiters project was not done through the participation of citizens. Participation entails involvement of citizens in the conceptualisation of a project. Instead consultations were done to inform citizens of the pending installation of the devices, its pros and cons and how to optimise its use. In the study, over 80% of respondents in both Umlazi and Umbumbulu pointed out that the consultation process is very informative. Through the consultation process however, it is possible to influence changes in some of the municipality's water policies. It is through consultations that the FBW limit was increased from 6 kl to 9 kl per month.

Despite lack of participation in the decision processes that led to the adoption of low limiters, a majority of citizens in both cases argued that the FBW policy took off the burden of payments from their shoulders and they have adjusted to working with less water. In both Umlazi and Umbumbulu, almost 80% of respondents never exhausted their water limits. For Umlazi in particular, cases of households that exhausted their limits seem to be influenced not only by the size of their families, but by the composition of families and the technical problems of some of the flow limiters. These develop a wide range of coping mechanisms including utilising communal standpipes in adjacent settlements and asking from neighbours. In Umbumbulu, consumers mainly supplement tap water with water from rivers and springs. With regards to technical problems, some consumers were unable to realise the technical problems because despite being taught how to use the log book, they still found it difficult to use and abandoned it.

At the same time water service delivery by eThekwini is highly rated. In particular the quality of water and the reliability of water supplies make eThekwini one of the most reliable municipalities with regards to water supplies.

From the study in Umlazi, it emerged that the method used in eThekwini Municipality for identifying customers who needed flow limiters was working very well as people felt empowered to make choices about the type of water service they wanted to receive. Those in high debt or were poor often chose to use flow limiters so as to take advantage of the free basic water services.

From the study in Umbumbulu it is clear that the flow limiters can be used successfully to manage water consumption while providing the free basic water. This intervention can thus be rolled out in semi-urban and rural areas more easily especially in cases where the communities were previously supplied through communal taps or other lower levels of service.

SECTION 7

SUMMARY OF KEY CASE STUDY FINDINGS IN COMPARATIVE PERSPECTIVE

7.1 WMDs in Cape Town and eThekwini

This section examines our research data in comparative perspective; with particular reference to the 3 analytical framings outlined earlier, namely the TAM, the confirmation/disconfirmation model, and the Citizen as user. The section compares and contrasts the degree to which users' perceptions of the technology of WMDs and their effectiveness in controlling debt contributes to their levels of satisfaction. It also evaluates the degree to which rollout processes in the two case study areas balances rights with cost recovery.

7.1.1 Cape Town

In 2007, the City Of Cape Town announced that it was installing a 'new water demand management system for its residents' that it called a 'water management device'. In its press statement, the city in particular, contended that the new system, would help customers to save water and to manage their monthly water bills, and it would help the City to manage debt'. Second, residents would receive their free 6 kilolitre portion of FBW water per month, and the system allows them to receive an additional amount according to what they commit to paying. Third, should residents require more water they could commit to pay for that additional water, and the water management device would then be set to a higher maximum flow.

An extensive roll-out of Water Management Devices (WMDs) is currently being implemented by the City of Cape Town with more than 45 000 devices to be installed by the end of 2010 (CCT, 2011a) and 5000 installed per month (CCT, 2011b). The City of Cape Town appointed four contractors to assist the operations branch in the Water and Sanitation Directorate in order to increase the installation rate of WMDs (Siyengo, 2011). The installation of WMDs has been prioritised on indigent households as a 'mechanism to prevent water consumption reaching unaffordable levels' and a way of reducing high water losses that are associated with leakages (CCT 2011a:75-76). The City argued that high water consumption properties are often occupied by poor families who are unable to pay for such consumption hence the installation of the device to curtail water use to within that provided for in the Free Basic Water (FBW) policy and the city's own indigent policy would provide real and tangible benefits to the city's poorer citizens. It is also viewed as an effective debt management mechanism.

7.1.2 eThekwini

eThekwini pioneered its flow limiting devices in the 1990s, beginning with provision of water in informal settlements with low-cost solutions to providing water in Cato Manor, a shack settlement close to the centre of the Durban city, established by residents fleeing the violence in the rural and peri-urban fringes of the city. After having introduced standpipes to the area, the municipality then began to experiment with a "ground tank system" in order to deliver a basic amount of water to individual households on a daily basis. More intelligent devices – flow limiters, were later introduced.

As in the case of Cape Town, these devices support a programmed volume allocation to households. eThekwini set the trend of providing Free Basic Water (FBW) of six kilolitres per household per month. In fact the FBW policy promulgated by the government was borrowed from its pioneer, the eThekwini municipality (Interview, Lucky Sibiya, March 2013). This basic amount (25 litres per person per day x eight people = 6 kl per household per month) was identified as the break-even point for the cost of administering bills. However eThekwini has since increased this. Effective from July 2008 the Council agreed an increase in free basic water from 6 kls per month (200 litres per day) to 9 kls per month (300 litres per day). A further development since 2012 has been that not all domestic residential customers are provided with 9 kl free basic water per month. eThekwini has also adopted what may be called a Proxy Indigent Register. This covers all urban domestic properties valued up to a maximum of R250 000, rural and informal consumer units. These users do not pay for the allocated 9 kl per month.

However unlike Cape Town, in eThekwini, a flow limiter is installed for households who volunteer to have it installed on their properties so that their allocations would not exceed the free basic water allocation. Users in affluent properties may qualify for the FBW services and the installation of flow limiters if their financial circumstances have drastically changed or have become child headed. The municipal social workers work with ward councillors in assessing and recommending such inclusions.

eThekwini Water Services has been praised by the central government for being one of the most effective municipal water providers at ensuring full-cost recovery. In particular, eThekwini Water Services (eTWS) has been praised for its dynamic and innovative approach to water provision. By 2000, it was said to be 98% efficient at achieving full-cost recovery.

The differences in the amount of FBW and the targeted communities between Cape Town and eThekwini is derived from the FBW policy which gives discretion to municipalities to define local

poverty indicators and to identify which households fall within the local definition. It also allows municipalities flexibility to define this as a greater or smaller quantity.

7.2 Social Structure of Users affected by WMDs

7.2.1 Household Characteristics

The majority of users targeted by WMDs are those living in low income areas. These areas are characterised by high household population sizes. For example, in Umlazi, 79% of households have a minimum of 8 occupants per family dwelling. While in Umbumbulu, 60% of the households have a size of up to eight. The high number of occupants in Umbumbulu is typical of rural dwellings. In Samora Machel and Saxonsea, 77.3% and 66% of households respectively are occupied by family sizes of at least 4 individuals. The percentage for Samora Machel is lower as many of the households have backyard dwellings.

7.2.2 Employment Characteristics of Study Sites

As highlighted above, the majority affected by WMDs are in low income areas. In Samora Machel for example we found higher levels of unemployment (51%) in the main dwellings than backyard dwellings (40%). In Saxonsea, we found that 41% of heads of households are unemployed while a further 25% are pensioners. On the other hand, in the Durban suburb of Umlazi, in terms of the occupational status of the head of household in the study area we found that the 42% of these were pensioners, 38% were unemployed while only 15% were employed. In Umbumbulu, we found that 18% of heads of households were unemployed while a further 49% were pensioners. The high number of pensioners can be ascribed to the use of rural dwellings as retirement homes. The high number of unemployment and pensioners also highlights the levels of impoverishment of the areas and the high presence of WMDs.

7.2.3 Property values

Saxonsea is a relatively poor settlement whose property values are largely below R300 000 set as automatic qualifying criteria for indigent assistance by the City of Cape Town. As a result most of these properties are exempt from paying municipal rates, receive 10 500 litres of water per month free, can dispose 7350 litres of sewerage per month for free and do not pay for solid waste disposal. In Samora Machel, 94% of the properties valued between R10 000 and R75 000 with 40% of properties, in the R40 000-R50 000 range. Therefore, all these properties are automatically classified as indigent. In Umlazi, properties are valued at between R250 000 to R300 000. Most rural homes in the Umbumbulu area are valued below R20 000.

7.3 The Installation Process

The installation processes between Cape Town and eThekwini differ with regards to the identification of the recipients of WMDs and the parties involved in the installation process.

7.3.1 Cape Town

The city of Cape Town identified low income areas such as Saxonsea and Samora Machel as priority areas for the installation of WMDs though its policy documents project an open system. In that regard, prospective applicants can always make an application to have the WMD installed in their homes. In the case of Samora Machel and Saxonsea recipients were not given a choice. The municipality of Cape Town's Water and Sanitation Directorate appointed four contractors private contractors that rolled out WMDs. The contracted companies employed customer service agents and plumbers. The customer service agents undertook user educational awareness activities regarding the utility of WMDs. The plumbers were responsible for installing the WMDs and were instructed to install the devices whether the property owners were available or not on the day that they arrived at a particular property. Pursuant to the installation of WMDs the City of Cape Town further promotes the project by engaging stakeholders, namely, ward councillors, community leaders and making representations to community forums.

7.3.2 eThekwini

In eThekwini the Municipality installs Flow limiters predominantly in low income households that voluntarily apply for such devices. Water users come forward to request such devices if they believe this will bring any advantages to them. Most of the users appear to make financial considerations in this regard. However, in accordance with the eThekwini Municipality Credit Control and Debt Collection Policy 2012/2013, flow restrictors will also be installed when a customer whose water charges have not been paid for 60 days or more or those who owe the Municipality more than an amount determined by the CFO from time to time or have failed to respond to make arrangements to settle debt.

eThekwini obliges prospective recipients of WMDs to attend a 15 minute training session to make customers aware of how to utilise the device, manage with the free basic water per day and the implications of tempering with the flow limiting device. Further to this eThekwini undertakes other user participation activities including customer perception analysis studies (through focus group

discussions); user platforms (through raising citizen's voices training) and the customer service charter.

7.4. Citizen Participation

The extent to which the 'citizen as user' participation has been encompassed in the rollout of WMDs is considered in this study with specific reference to Arnstein's theory. This is because, users would most likely be satisfied with the service provision if they have been involved in the decision process and if there are structures for participation. Further, the key dimensions of participation included in the study are the scope (who actually participates) and the timing of the participation process as all these have a bearing on the acceptability of the WMDs and the effectiveness of participation.

Citizen participation in water service delivery (and the installation of WMDs) in South Africa is based on a number of pieces of legislation which the democratic state has framed. South Africa's supreme law endorses public participation by its citizens. The constitution encourages citizens to engage in policy making processes, and further obliges municipalities to respond to people`s needs (Van Donk, Swilling, Pieterse and Parnell, 2008). The integrated development plans (IDPs) provide for indirect participation through the ward committees, ward councillors, and five yearly municipal elections. A number of provisions of the Municipal Systems Act require that municipal administrations ensure participation so that local democracy thrives. Section 4(2)(c) requires municipalities to encourage the involvement of the local community and while 4(2)(e) requires the municipality to consult the local community about the level, quality, range and impact of municipal services, and the available options for service delivery. Section 5 of the Municipal Systems Act outlines the rights of the local community to contribute to the decision-making processes of the municipality and to be informed of decisions of the municipal council.

However, authorities such as MacFarlane (1993) and McArthur *et al*. (1996) have highlighted critical barriers to effective participation in municipal governance that result in cycles of disempowerment despite the existence of such legislation. In particular they note that even where participatory structures exist, the characteristic processes of governance (with an emphasis on formality, outputs and quick results) often preclude perceptions of meaningful participation on the part of the citizen as user. Consequently, the failure to truly empower users result in them becoming increasingly disenchanted and disinterested in engaging with policy processes. Such studies have led to the recognition of the need for processes as well as structures which facilitate effective participation. It

has also been increasingly recognised that attention needs to be paid to the capacity of the users to engage. The extent to which water users are empowered to participate is therefore an important aspect of this study.

7.4.1 Participation at Project formulation phase

In Cape Town and eThekwini lack of user participation at formulation phase has emerged as one of the most controversial parts of the installation of WMDs. In Cape Town, fieldwork interviews established that rather than allowing citizens an input into the project, the City of Cape Town brought in the projects as a fait accompli and rolled-out what it termed "community awareness and project buy-in processes". In fact, the municipality decided that the installation of WMDs would occur regardless of (dis)approval by the user. In eThekwini, the adoption of flow limiters was also an entirely municipal management driven process with cost recovery imperatives overriding user preferences.

An absence of initial participation is problematic in the context of a highly developed constitutional and legislative framework enjoining local authorities to allow citizens to participate in matters of governance and service delivery in South Africa (Thompson and Tapscott, 2012). Further, international human rights law requires that policies be devised, implemented and monitored in a manner that allows for popular participation. All people including the poor must be allowed to participate in key decisions affecting their lives. Many citizens expressed the perception that their views made no difference, that they are bullied by government and that the rights of the poor are of no concern to government. This is consistent with data generated by ACCEDE's larger surveys on citizens perceptions of local governance participatory processes (Thompson, Nleya and Africa, 2011) As a result, with regards to the installation of WMDs, the two communities were mere endorsees of a predesigned project characterised by administrative manipulation. Arnstein (1969) explains that manipulation and therapy are actually forms of nonparticipation as the power holders prefer to "'educate' and 'cure' the participants."

7.4.2 Participation at Project implementation phase

In both Cape Town and eThekwini municipalities, the installation of WMDs has been prioritised on indigent households as a 'mechanism to prevent water consumption reaching unaffordable levels' and as a way of reducing high water losses that are associated with leakages (CCT, 2011a:75-76). Cape Town and eThekwini adopted different strategies in the roll out of WMDs. The municipality of Cape Town introduced the private sector by appointing four contractors on a two year tender to assist the operations branch in the Water and Sanitation Directorate in order to increase the

installation rate of WMDs. Fears always abound that introduction of the private sector may lead to poor quality service delivery in local authorities as their objective is always to make a higher profit margin. Contracted companies employed customer service agents and plumbers. The customer service agents were responsible for educating households about the devices. The plumbers were responsible for installing the WMDs and were instructed to install the devices whether the property owners were available or not on the day that they arrived at a particular property.

This research established that some consumers complain of poor workmanship in the installation processes. In fact allegations were made to the effect that contracted companies simply hired individuals from the street and trained them for short periods of two weeks as plumbers. These poorly trained plumbers are often referred to as “limited plumbers” by the communities. The term limited is probably used to refer to the argument that their training was limited or the service they provide is also of a limited quality. As a result following the installation of WMDs, reports of frequent leaks, malfunctioning of WMDs and untimely repairs were recorded. However, the City of Cape Town asserts that it then undertakes educational and awareness campaigns on the project. In addition the city posited that it engaged with stakeholders, namely, ward councillors, community leaders and made representations at community forums to create awareness around broader water conservation issues.

Engagement of private companies by the Cape Town municipalities seems to have resulted in severely limited participation by users. For example despite the municipality arguing that it keeps an indigent register where the poor can register and be exempted from paying for water to a set limit, users interviewed were automatic indigents, yet 85% had never heard of the indigent grant, and only 14% were aware of the indigent grant. However 84% of the interviewees said that they would apply for the indigent grant but 16% said they would not apply because of the stigma associated with it. Furthermore, where consultants did undertake consultations, they were expected by the residents to have the answers to their concerns about the new gadgets that were being installed on their properties. However respondents among the smaller number of residents who were consulted in focus group interviews indicated that consultants lacked clarity on how to handle technical queries from residents. Consultants’ assistants (Community Service Agents and restricted plumbers) lacked knowledge on how to market the devices adequately as they appeared not to be fully equipped with the technical know-how of the WMDs and could therefore not provide adequate information.

In eThekwini the Municipality through its Water and Sanitation unit installs flow limiters mainly in low income households that voluntarily apply for such devices. Water users come forward to request

such devices if they believe this will reduce the financial burden associated with paying for water. However, in accordance with the eThekwini Municipality Credit Control and Debt Collection Policy 2012/2013, flow restrictors will be installed when a customer whose water charges have not been paid for 60 days or more or those and who owe the Municipality more than an amount determined by the CFO from time to time or have failed to respond to make arrangements to settle debt. According to the municipality, flow restrictors are meant to force the customer to make arrangements with the municipality. However, unlike Cape Town, eThekwini obliges prospective recipients of WMDs to attend a 15 minute training session to make customers aware of how to utilise the device, manage with the free basic water per day and the implications of tempering with the flow limiting device. Further to this eThekwini undertakes other user participation activities including customer perception analysis studies (through focus group discussions); user platforms (through raising citizen's voices training) and the customer service charter. Both municipalities state that they also target individuals at household level, a process which is normally triggered by high debt. At this level the City would then enter into negotiation with the affected households and sell the use of the flow management device, explaining how the device would save not only water but assist them with the management of their water debt.

7.5 Satisfaction with Water Services Provision

There is generally a high level of satisfaction with water service provision in both Cape Town and eThekwini municipal areas affected by WMDs. For example, in eThekwini Municipality, 63% of the respondents said they were satisfied with water services and 29% very satisfied (which adds to a total of 92% satisfied or very satisfied). The level of unsatisfied is only 2% and another 2% for very unsatisfied with the remaining 4% neither unsatisfied nor satisfied. In Cape Town, 63% of Samora Machel respondents in the main dwelling households were satisfied with water services compared to 59% of backyard dwellers who were satisfied with their water services. In Saxonsea 50% of residents were satisfied by the installation of WMDs, 39% were ambivalent, while 11% were unsatisfied. The unsatisfied households were mostly those who live in plots with a large number of people living in a plot. The general strand of the reasoning against WMDs in these households is that in the past they never ran out of water and with the devices they are struggling to use water below the set limit.

The common thread for high levels of satisfaction was the direct result of water regulation that translated into zero payment of arrears, and the promise that these would be written off or parked on acceptance of the WMD. In general satisfaction issues also related to the reliability of water supplies and the quality of water supplies. These in both cases have always been highly rated.

Those respondents that were ambivalent and unsatisfied by the installation of the WMDs cited inadequate information on how the devices functioned, coercion, lack of consultation and the feeling of unfair treatment because of their economic and educational status.

7.6 Debt Write Offs

A key condition for the installation of WMDs in the two municipals has been the pledge that they will write off debts. In Cape Town, the municipality argued that they would write off debts for everyone on the WMDs. However, the study established that users felt that the information that was conveyed concerning the benefits accruing to them if they agreed to have the WMDs installed was misleading. Three reasons were advanced to support this view. First, communities were advised that if they accepted the WMDs, existing arrears that accrued during the period when they were using fixed meters would all be cancelled. However, the arrears have not been written off, as had been promised by the municipality. Second prospective WMD 'clients' were advised that they were not going to pay for any water following the installation of the devices. However this is contrary to the fact that residents have to pay for any water used beyond the monthly limit in the event that they apply for additional water. This was not made clear to residents. Thirdly, residents also felt that they were tricked into accepting the WMDs, because those responsible for information dissemination advised them that if they did not accept the WMDs in the first instance, they would have to pay for the devices if they were to be installed at a later time. According to focus group interviews, installation was done even in the absence of the property owner.

In eThekwini debts would be "parked" instead of outright cancellation. In this context, water users will be asked to start paying user charges accruing over and above the FBW following the installation of WMDs. In the event that a user fails to settle the accruing amount over four months, the "parked" will be reinstated and the customer immediately restricted to 9 kl a month. However if the customer is not defaulting, a proportion of the debt is cancelled every month over a period of 20-24 months. Given this generous offer by eThekwini, one would believe that customers had been given an opportunity to start afresh and commit themselves to paying because it has previously been argued that non-payment for water services could be ascribed to unwillingness to pay on the part of low income groups (Peters, 2011), with the apartheid resistance culture being blamed at times. However the study established that in many instances, failure to pay is a genuine case of poverty rather than unwillingness to pay as users easily fail back into arrears again. As noted by Booysen (2001) the reason used to explain non-payment appears to be the inability to pay, as a result of poverty. Thus this study established that Booysen's argument is plausible.

7.7 Impacts on Household Budgets

Users in both Cape Town and eThekwini posited that the use of WMDs ensured that they would not be compelled to pay for the water services of which many of whom have historically struggled to do so. In eThekwini the majority of respondents indicated that they had been conscientised to live within the free allocation and had made necessary adjustments to lifestyle and water use patterns. In this regard users indicated that the WMDs ensured they remained on the free water limit and they found this to be financially beneficial. Indeed in both municipalities, nearly 80% of interviewed users indicated that they never exhausted their limits. Funds that ordinarily have been used to pay for water could now be channelled to meet other basic costs.

7.8 Impact on water use patterns

As highlighted above, the water use patterns have changed with users developing alternative means of utilising the limited water that they have. They have developed numerous coping mechanisms, some of which are unhygienic. Coping mechanisms included fixing all leaks, not watering the garden or using used bath water for watering and using twin tubs rather than top loading washing machines. Further strategies involved a whole family sharing bath water from the eldest to the youngest member of the family; bathing once or twice a week and sharing bath water with the babies. Where property owners have to share the same water with their backyard tenants, the property owners limit the amount of water their tenants could use, how often they should bath and how frequent they could use the toilets. In fact in some cases the plot owners said they limited water use to one bucket a day and sometimes instructed the backyard dwellers that they could not use the water to do their laundry. When people run-out of water they ask for emergency water from their neighbours, friends and relatives while a few just wait till the next morning. These kinds of copying mechanisms do carry a health risk and infringe upon the right to quality of life. Water supply that adequately addresses social justice criteria ought to be sufficient for personal and domestic uses as determined by household size and economic status.

7.9 Usefulness of WMDs

The main advantages of the WMDs were said to be reduction in water consumption which translated into less or no water bills, the fixing of water leaks free of charge, and the lower levels of theft as WMDs are made of plastic and do not have a scrap value unlike the conventional meters which are largely made from copper. Indeed, from the interviews, water consumption has been reduced as users acknowledge that they now use less water. The majority of the residents indicated

that they now ensure that they use less water and in general do not pay for this water. However, use of less water should not only be viewed as a sign of good conservation methods but may also be attributed to fear by the poor that they either will have to be made to pay for any use beyond the daily maximum, or that they simply are unaware that they can apply for additional water rather than having to adopt mostly unhealthy measures that they have resorted to. Reduced usage is also simply as a result of the fact that taps run dry as soon as the limit has been reached thereby implying forced reduction by the municipalities.

7.10 Water Disconnections

While under the fixed metre system, the municipalities would physically disconnect water. However they now indirectly disconnect water by way of limiting consumption thereby keeping debts to a minimum. The WMDs effectively get round the procedures for discontinuing a service laid down in the Water Services Act.

7.11 Technical Experiences using WMDs

The proportion of interviewed users who experienced technical problems with the WMDs was on average no more than 20%. From the types of problems listed it would seem that WMDs are prone to technical failure especially over time. In Cape Town, we found that many of the respondents' meters were actually recording "zero" consumption while in fact they continued to use water. It was not put across to them as a technical problem which warranted notifying municipal office. In eThekwini the most commonly mentioned technical problems of the device were that it may dispense less water than the daily maximum; it may not dispense water at all or dispense more water than it is scheduled to release. eThekwini residents could detect more facets of the WMDs technical problems because of the rigorous user training programme that every applicant user is supposed to undergo before the device is installed on their property. However, in both cases, municipal responses to requests for repairs were considered very poor as it took many days before the problems were attended to. In general the municipalities need to continue to engage the affected communities post installation of WMDs. The technological failure rate of WMDs also needs to be attended to ensure that they remain a credible instrument. However the above findings show that analytically, in terms of the TAM and the confirmation/disconfirmation satisfaction model, the WMDs are viewed overwhelmingly positively by users. The section below and the concluding section argue that this satisfaction needs further buttressing by improving the 'citizen as user' rights dimension of the WMD policies.

7.12 WMDs a project targeting the poor

The two areas of Saxonsea and Samora Machel are poor areas in the Cape Flats. As mentioned earlier, the installation of WMDs has been entirely located within poor urban and peri-urban areas. The very few installed in affluent areas are not linked to a broader balanced WDM strategy that targets consumption patterns of all stakeholders, including the municipality itself. Despite the City of Cape Town having argued in its submissions to Parliament that the programme is not targeted at poor households, the devices are installed in areas where there is poverty and consequent high debt.

Consumers in the two areas viewed the selection of their areas as a form of discrimination based on poverty. Interviewees also observed that even within these poor communities, installation of devices first targeted households that had high outstanding payments with the City Council. Thus the way the WMDs were installed in Cape Town does not sufficiently uphold the principle of equality and non-discrimination. The constitution points to the protection of the most vulnerable, the poor and socially excluded groups against discrimination by state and private actors. In view of the limitation this imposes on water usage by the poor as opposed to the more affluent, it can also be concluded that adoption of cost recovery measures leads to a situation whereby managing water scarcity becomes a problem that the poor take greater de facto responsibility for than the rich. Furthermore, the way that cost recovery is implemented in terms of patterns of consumption can be seen as in the interests of those who can pay, at the expense of those who cannot pay. When viewed from within the broader framework of linking social justice to development, a better balance between rights and recovery may be achieved by a clearer explication of how the onus of managing scarcity is spread across income groups.

SECTION 8

KEY RESEARCH OUTCOMES, GUIDELINES AND RECOMMENDATIONS FOR FUTURE RESEARCH

This report presented an in-depth study of the adoption of water management devices in Cape Town (Saxonsea and Samora Machel) and eThekwini Municipalities (Umlazi and Umbumbulu). Objectives of the Research were to:

- Assess the policy objectives of the installation of WMDs in Cape Town and eThekwini municipalities;
- Describe the available mechanisms for public participation in water services in Cape Town and eThekwini municipalities and their effectiveness;
- Evaluate the process followed by the Cape Town and eThekwini municipalities to obtain consent to install WMDs;
- Describe the perceptions held by the communities on the flow limiters as well as the acceptability of such devices in the targeted communities.

Objectives of the installation of WMDs

The study established that WMDs are being installed in order to:

- Promote cost recovery in service provision in order to expand their revenue base
- Curtail the escalation of water users' debts
- Proficiently costing water service delivery
- In the case of flow limiters, to enforce payment.
- Promote conservation and avoiding wastage
- Restrict through a flow limiting or water management device water connections for consumers who fail to pay
- Enable for 'leak and tamper' detection, remote data capturing and meter control
- Reducing the demand for water.

Social structure of affected users

The study established that WMDs have predominantly been installed in formal low income properties valued below R300 000. Unemployment in these communities averages 40%. In addition to unemployment, there is a huge pool of pensioners in these communities. The largest number of pensioners was found in Umbumbulu (49% of respondents were pensioners). In areas where backyard dwellings can be installed, such as in Samora Machel, property owners were also mainly

pensioners and the shack dwellers were gainfully employed in most instances. These features (unemployment and pension) account for the high levels of poverty in these communities.

This study primarily sought to determine perceptions of recipients of WMDs regarding their water supply situation. Analytically this has been done at three levels. The first level entails understanding user's perceptions on the adoption of utilisation of the WMDs themselves as instruments of water supply. The Technology Adoption Model has used to determine the attitudes of water users towards the WMD technology. The second level of analysis of the users' perceptions is done to determine their satisfaction or dissatisfaction with water supplies following the installation of WMDs. The confirmation /disconfirmation model borrowed from marketing literature is used to understand the users' water consumption experience. This is then linked to the 'citizen as user' perspective to evaluate the degree to which the citizen as consumer affects rights based framings of water supply to poor households.

In line with the central question this research seeks to examine, namely users perceptions of and satisfaction with WMD policies and rollout, a central assumption is that the ideal water supply mechanism to consumers would balance the users and provider's expectations, in terms of the expectations, policy pronouncements and promises on debt relief, as well as ease of household water management, and rights, by way of participation that is seen as effective and inclusive. Users' perceptions of the utilisation of water management devices are ordinarily derived from the human rights framework which puts increasing emphasis on citizen participation in municipal governance as a prerequisite for project success. It is assumed therefore that the balance between the users' and providers' expectations will be easily reached where citizen participation is integral part of municipal water governance.

The TAM posits that the attitude toward a technology and intention to use a technology are largely explained by perceived usefulness of the technology and the perceived ease of its use. Perceived usefulness is defined as the extent to which a person believes in using a system that would enhance their performance while perceived ease refers to relative lack of mental and physical effort (Lu *et al*., 2003). The attitudes towards WMDs would thus in part derive from their perceived usefulness and perceived ease of use.

The disconfirmation model postulates that consumers 'bring expectations into an exchange encounter and then to compare these expectations with perceived performance' (Alford and Sherrell, 1996:71). In its simplest form this model postulates that satisfaction results from actual

performance is greater than expectations and dissatisfaction occurs when expectations are higher than performance.

The TAM and confirmation/disconfirmation frameworks as a form of evaluation of satisfaction are contextualised in relation to the third level of analysis, namely the 'citizen as user' which examines the balance between rights and cost recovery, particularly in South Africa's historical context. In terms of water services in poor and largely black communities in South Africa, the expectations of citizens as consumers can be assumed to be a product of the aspirations and anticipated dividend of their participation in the anti-apartheid struggle codified in the documents such as the RDP (ANC, 1994) and the Constitution (RSA, 1996). During apartheid, black people were not accorded full citizenship, with many living under difficult conditions without access to clean water. Unsurprisingly, many of the urban poor hold the expectation of an improved status of their objective living conditions in addition to the 'freedom' that was ushered in 1994. During this period, the white population enjoyed levels of service comparable to those of the developed world. Coming to power on the back of an ambitious programme of social transformation entitled the Reconstruction and Development Programme (RDP) the ANC led government promised 'to provide all households with clean, safe water supply of 20-30 litres per capita per day (lcd) within 200 metres' and in the medium term 'to provide an on-site supply of 50-60 litres per capita per day (lcd) of clean water' (ANC, 1994:29).

We theorise that the location of WMDs within broader expectations and performance framings are related to consumer satisfaction attributes:

Expectations

(a) the articulation of water access rights provided for in the constitution
(b) the service attributes related to the previous conventional meters
(c) the continuation of the form of relationship between the consumers and the water services provider

Performance

(a) the form and level of participation afforded to the consumers in the project/programme to roll out the water management devices
(b) the form and content of communication regarding the water management devices
(c) the effects of water management devices

(d) prior knowledge of effects of similar devices in other areas
(e) socio-economic status of the consumers
(f) incentives for using water management devices

The research posits that the ideal water supply mechanism to consumers would balance the users and provider's expectations.

Evaluating users perceptions of WMDs using the TAM and confirmation/disconfirmation model

The research findings make clear that despite lack of participation in the decision processes that led to the adoption of WMDs, a majority of users in both case study areas were satisfied with the devices in terms of the technology provided in terms of managing their consumption as linked the FBW policy. In terms of the confirmation/disconfirmation model, the research also shows that the devices satisfied expectations by taking the burden of payments from their shoulders and the majority have adjusted to working with less water. Numerous coping strategies have been devised by users attempting to use only the FBW portion of their allocation. Unfortunately some of these mechanisms pose health dangers to water users, for example limiting bathing and washing in order to save water.

WMDs and 'Citizen as User's' Perspective

The study noted that the citizen as user's perspective of WMDs is framed around the human right to water. In this framing, water service provision is seen as an inalienable right that all citizens should be entitled to. This contrasts with the cost recovery measures being pursued by municipalities. However government has put in place legislative and policy provisions that seek to strike a balance between the human right to water and cost recovery. The Water Services Act, White Paper on Water and Sanitation (1994); Guidelines for Compulsory National Standards Regulations; Municipal Systems Act (2000); and Norms and Standards for Water Services Tariffs Regulations are some of the instruments that the government has put in place to bring effect to the utilisation of standard WMDs and differentiated water tariffs.

The above instruments, as well as the Constitution; Strategic Framework for Water Services (SFWS) (2003) and the Free Basic Water Policy attempt to bridge the gap between liberal cost recovery measures and the need for the provision of water as a human right. They note that water is a basic right that should be provided regardless of ability to pay. The two pronged focus of these instruments have enabled South Africa to be one of the countries that have a hybrid water service provision system that incorporates both human right to water and cost recovery.

Citizen as User Participation Framework

In terms of policy implementation, and balancing rights with cost recovery through the installation of WMDs, both case study municipalities argued that they have an elaborate water user participation process in the installation of water management devices. Cape Town municipality engaged private service providers to seek buy in and installation of WMDs. On the other hand, eThekwini municipality used its Water Services Unit to roll out its devices. An analysis of both cases highlighted that the conceptualisation of the WMDs project was not done through the participation of citizens. While in Cape Town, users were compelled to have them installed on their property, it is set as a voluntary exercise in eThekwini. In all cases the 'Citizen as User' in relation to actual policy input and influence is weakly grounded in WMD policy implementation processes. Furthermore for both Cape Town municipality and eThekwini we observe the complex and the multiple forms of participation taking place but none of them exceeds or go beyond consultation.

The above conclusion is enforced when we review Arnstein's (1969) categorisation of the 'ladder' of participation:

i. *Manipulation and Therapy* – Both are non-participative. Public participation becomes nothing more than manipulation when participatory rhetoric is used, but the process is imposed on citizens to achieve an outcome that they have no influence over and which is not likely to serve their interests. Public participation is merely a form of therapy when citizens are involved in a "feel-good" exercise, which might allow them to reflect on their condition, but they have no influence over related decision-making processes that affect their lives. In the context of service delivery both manipulation and therapy amount to nothing more than public relations exercises by municipalities to drum up citizens' support.
ii. *Informing* – A most important first step to legitimate participation if practiced in water service delivery. But too frequently the emphasis is on a one way flow of information and there is no provision for channel for feedback.
iii. *Consultation* – Again a legitimate step – attitude surveys, neighbourhood meetings and public enquiries. For many analysts of participation, including Arnstein, consultation is the weakest form of participation and is often simply a window dressing ritual.
iv. *Placation* – For example, co-option of hand-picked 'worthies' onto committees. It allows citizens to advise or plan ad infinitum but retains for power holders the right to judge the legitimacy or feasibility of the advice.

v. *Partnership*. Power is in fact redistributed through negotiation between citizens and power holders. Planning and decision-making responsibilities are shared, e.g. through joint committees.

vi. *Delegated power*. Citizens hold a clear majority of seats on committees with delegated powers to make decisions. The general public has the power to assure accountability of the programme to them.

vii. *Citizen Control*. Have-nots handle the entire job of planning, policy making and managing a programme, e.g. neighbourhood corporation with no intermediaries between it and the source of funds.

The study affirms that consultation is the chief form of participatory strategy, and that what Arnstein refers to as manipulation, therapy and placation also occur. This is a key area in need of attention in terms of balancing cost recovery with rights, and ensuring that current legislation is adhered to. Although the study shows that the majority of WMD devices recipients welcomed the cost recovery aspects of the WMDs, the lack of participation and 'buy-in' could lead to problems down the line. As discussed earlier, the benefits of effective participation are:

- Public acceptance, commitment and support with regard to decisions and plans;
- Increasing public awareness of environmental issues;
- Increased quality of decisions by drawing on lay local knowledge;
- Social learning and developing a shared understanding of the problem dimensions;
- Less litigation, fewer misunderstandings, fewer delays and more effective implementation;
- Stronger democratic legitimacy of decisions by allowing the public to have a say in and/or an influence on the decisions at stake;
- Social goals such as the building of trust in institutions.

Litigation on the part of civil society organisations campaigning for the rights of the poor is a very real potential problem should WMD rollout policies be deeply flawed. The case studies here show that in the Cape Town WMD policy rollouts, forms of community inclusion have been particularly weak, with the potential for rights based protest based on promises made during consultation that have not been followed through, for example, the lack of debt write-offs in certain areas such as Saxonsea.

The case studies in eThekwini show better communication, although of a weak rather than robust form or 'rung' of participation. The following types and structures of participation are used, but from our interviews it seems that most of these forms of participation were bypassed in the Umlazi and Umbululu case studies. However, it is a framework that could be built on and expanded to better balance rights and cost recovery in the future:

Models of Participation from eThekwini Municipality

Focus group discussions

According to eThekwini municipality, as a public participation structure, the focus group mechanism ensures that the public influences the service delivery standards and levels when it came to strategic decision-making processes in water and sanitation. According to the municipality, these groups ensure that there is an ongoing dialogue and interaction between the municipality and the public.

The Raising Citizens Voice – Rights and Responsibilities Programme

The Raising Citizens Voice programme (RCV) is intended to support a bottom up approach to water services regulation by actively involving the citizens in the local monitoring of water and sanitation services. The training targets councillors, ward Committees, Civil Society Organisations, Organs / individuals.

Customer Service Charter

The Customer Service Charter is a piece developed with an intention to guide both the city authorities and the public to promote efficient and effective service delivery. It spells out what the unit does and the unit's commitment to the public. In particular, the charter spells out that EWS seeks to provide all citizens within the eThekwini Municipality access to appropriate, acceptable, safe and affordable basic water supply and sanitation services.

Service Level Standards

eThekwini also has an elaborate framework of service level standards. These standards are meant to improve relations and understanding between the Municipality who provides the services and the customers who make use of the services. Availed both to municipal employees and the public, the standards outline is aimed at ensuring that public expectations of service delivery are matched by achievable and measurable performance standards.

Internal and External Communication.

The eThekwini Water and Sanitation Unit also uses various media ranging from print to electronic with the purpose of providing eThekwini citizens with information to enable easy access to water and sanitation services. These include: Suggestion Boxes; Electronic Media Programs; Road show; Education Awareness Centre; Internet website and Call Centre.

Citizen Report Cards

The Citizen Report Cards is a new initiative which the municipality has taken on board. It is aimed at identifying gaps in service delivery and also creating consciousness on the side of the members of the public so that the municipality can improve measures of trust, overall satisfaction, transparency, accountability, efficiency and effectiveness.

Summary of Perceptions of WMD devices on the part of users:

- WMD device policy implementation lacks meaningful participation in design and rollout;
- Participation is limited to consultation and information sharing;
- Many users felt they were not adequately consulted, some not at all, especially in the Cape Town case studies;
- WMD devices are seen overwhelmingly positively in terms of debt management by the majority of recipients;
- Negative feedback on WMD devices after installation centres around technical problems/failures, poor technical back-up from municipalities and the drawbacks of limited use of water on family hygiene and health;
- Positive feedback of users is largely limited to debt relief aspects.

The introduction of WMD`s for low income households is based on debt management and water scarcity (supply side) policy motivations. From a neoliberal perspective this is reasonable, but in policy terms our research findings show it is difficult to fully reconcile cost recovery with rights based approaches to water, especially if forms of inclusion in policy design and rollout are weak.

Obstacles to effectively addressing rights issues when cost recovery is pursued through WMDs are:

- Lack of meaningful consultation with affected communities, especially in the Cape Town case studies;

- Lack of monitoring and evaluation on the part of municipalities to gauge the effects and effectiveness of WMDs;
- The effects of WMDs on consumption patterns that can impact on household health;
- An apparent lack of holistic Water Demand Management Policies that are integrated and speak to Supply Side policies in ways that show how water scarcity is managed in broader supply and demand management terms, not just through targeting the poor.

Guidelines for balancing rights and cost recovery in Water Demand Management (WDM) policies including the rollout of WMD (Water Management Devices) devices

- At broader WDM level, clearly communicated policies on water demand management strategies at municipal level that clearly elucidate supply side constraints and the limits of supply side measures to meet water demand;
- Broader WDM policy information sessions should include participatory opportunities for inputs from all relevant stakeholders;
- WDM strategies need to clearly outline the measures that balance the cost recovery policies such WMD devices with other cost recovery and management strategies that target the broader spectrum of stakeholders so that WDM is seen as a balanced strategy that addresses consumption patterns of all;
- More detailed, effective participatory strategies need to be developed for the implementation of WMD devices that allow for participation of affected communities, as opposed to simply consultation, in all stages of policy design and implementation;
- Participatory strategies require better design as well as ongoing evaluation and adaptation to ensure they are not rubber stamping exercises;
- There is a need for the development of more effective monitoring and evaluation processes for WMD devices after installation, particularly in relation to user satisfaction and technical assistance issues.

Recommendations for Future Research

Recommendation 1: One critical area for further research is to find out the overarching supply and demand strategies adopted by the municipalities to conserve water that includes all groups as users and potential conservers of water. The research outcomes presented here show that in the main, while users have accepted and even welcomed WDMs as a way of assisting with household

consumption management and debt write-off, the lack of a larger framing of water demand management can be argued as a form of discrimination against the poor who are the first targets when adopting conservation measures that curtail household consumption of water.

Recommendation 2: Due to the scope of this research, the extent to which this study could investigate South African water legislation's ability to address the tension between cost recovery and water as a human right has been limited. Our preliminary conclusions indicate that more research is necessary in order to iron out local government public participation policy flaws that undermine broader social justice commitments. It will be imperative to pursue this line of investigation in detail particularly as it relates to formulation of participatory processes as well as forms and styles of participation and participatory spaces. The preliminary research presented here shows that a central weakness of the social justice aspect of WMDs centres on weak participatory processes.

Recommendation 3: While low income users have argued that they have indeed reduced water consumption, one area for further research could be to find out the precise water savings arising from the utilisation of WMDs and how this is built into overall Water Demand Management cost recovery, i.e. operations that are independent of water and infrastructure expansion, as well as how this links to projected supply side initiatives to overcome water scarcity. A central question is what are the linkages at municipal level between supply side and demand side cost balancing with regard to managing water scarcity?

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APPENDIX 1: QUESTIONNAIRE

RESPONDENT NO. **[Office use only]**	

Interviewer Name	
Area	**Umbumbulu**
Subarea	

Household Interview schedule

INTRODUCTION
Good day. My name is _____. I am part of a research team from the University of the Western Cape. I do not represent the government or any political party. We are doing this research to find out the impact of water management devices in..... Your household has been randomly selected and I would like to discuss these issues with yourself, or a member of your household. Your answers will be confidential. They will be put together with over 250 other people I am talking to, to get an overall picture. It will be impossible to pick you out from what you say, so please feel free to tell me what you think.
Are you willing to participate?

At the start I would like to ask you questions about the people who live in this property.

1. What is the sex of the head of household? (*circle correct answer*)	Female	1
	Male	2

2. What does the head of the household do for a living? (*circle correct answer*)					
Unemployed	Student	Pensioner	Seasonal worker	Employed Part-time	Employed Full-time
1	2	3	4	5	6

3. What is the highest level of education of the head of household? (*circle correct answer*)						
No formal education	Primary education	Secondary education	Completed Matric	Tertiary with no matric	Post Matric Tertiary	University or Technikon
1	2	3	4	5	6	7

4. How many people are in your household? *[interviewer: record number]*	

5. Are there backyard flats or *Wendy-houses* or rooms in your property that are occupied by other households?(*circle correct answer*)	No	1
	Yes	2

If no skip question 6 and move to question 7

6. How many other people live in backyard flats or *Wendy-houses* or rooms in your property	

Let's me turn to water services and flow limiters

7. How would you describe your level of satisfaction with water services provided by the eThekwini Municipality? **(Interviewer: READ OPTIONS)** (*circle correct answer*)				
Very unsatisfied	Unsatisfied	Neither satisfied nor unsatisfied	Satisfied	Very satisfied
1	2	3	4	5

In the last question you said_____ with water services provided by the eThekwini Municipality. Briefly explain what makes you say so.

_____

_____

_____

_____

8. eThekwini Municipality started rolling out flow limiters in your area. Compared to the conventional meter system, how do you rate the new system of flow limiters?*(Interviewer: READ OPTIONS)* (*circle correct answer*)				
Much worse	Worse	Similar/ not different	Better	Much better
1	**2**	**3**	**4**	**5**

Briefly explain why you provided the rating in **question 8** above

_____
_____
_____
_____
_____

9. Were you informed and consulted about flow limiters project before installation on your property?(*circle correct answer*) *(Interviewer: If no move to question 11)*	No	1
	Yes	2

10. How would you describe the information *(READ OPTIONS?)*			
Very uninformative/misleading	Uninformative	Informative	Very informative
1	**2**	**3**	**4**

What type of information was this and shall you describe for me the content of this information?_____
_____
_____
_____
_____

11. How do you describe the extent of citizens' power in determining the plan of installing flow limiters in your area? (READ OPTIONS) (*circle correct answer*)			
Very low	Low	High	Very high
1	2	3	4

In your answer above you described the extent of citizens' power in determining the plan of installing WMDs in your area as _____. What makes you describe it that way?

_____
_____
_____
_____
_____

12. On average how much water do you use per day **(Interviewer ask for bill and check daily average)**				
<300 litres	**<350 <450 litres**		**>450**	**Don't know**
1	**2**	**3**	**4**	**9**

If the respondent avails the bill record the following information

Debt: record balance brought forward from last month	**R**
Total property value	**R**
Daily average consumption	
Indigent Status: yes/no	

13.	No	1
	Yes	2

If interviewee answered NO above move to question 16

14.				
<R1000	R1001-5000	R5001-10 000	R10 001-15 000	R15 000 +
1	2	3	4	5

15.	No	1
	Yes	2

16. Have you experienced technical problems with the flow limiters? (*circle correct answer*)	No	1
	Yes	2

If NO move to question 18

17. How often? (Read Out Options) (*circle correct answer*)				
Never	seldom	A few times a month	A few times a week	Everyday
1	2	3	4	5

If you had technical problems what kind was it?

_____
_____
_____
_____
_____

18. How has the flow limiter assisted you to manage your water use?

_____
_____
_____
_____
_____

19. Did the eThekwini Municipality hold meetings with residents before the flow limiters? (*circle correct answer*)	No	1
	Yes	2
	Don't Know	9

Are there any good things about flow limiters compared to the conventional meters? (*circle correct answer*)	No	1
	Yes	2
	Don't Know	9

20. If yes, please list 3 most important advantages of flow limiters **(DO NOT PROMPT, RECORD UP TO 3 RESPONSES)**
    i. _____
    ii. _____
    iii. _____

21. If no, list 3 disadvantages of flow limiters compared to conventional meters **(DO NOT PROMPT RECORD RESPONSES)**
    i. _____
    ii. _____
    iii. _____

22. Have you ever run out of the allocated water? (*circle correct answer*)	No	1
	Yes	2
	Don't Know	9

If NO move to skip questions 23, 25 and 26

23. How long does your daily allocation last? (*circle correct answer*)				
0-8 hours	9-16 hours	16 >24 hours	Whole day	Don't Know
1	2	3	4	9

24. If you have backyard dwellers or tenants, what arrangement do you have in place for sharing the daily allocation equitably?
    _____
    _____
    _____
    _____
    _____
    _____

25. If you run out of your daily allocation and you are desperate for water where do you get it from? (*circle correct answer*)				
Neighbours	Friends	Relatives	Others	Wait till next morning
1	2	3	4	5

26. If sometimes you go without water, what is the longest period you have been without it? (*circle correct answer*)			
1-8 hours	9-16 hours	17>24 hours	More than a day
1	2	3	4

27. Have you ever applied for more water above the free basic that you receive every month? (*circle correct answer*)	No	1
	Yes	2
	Don't Know	9

28.	No	1
	Yes	2

29.	No	1
	Yes	2

30.	No	1
	Yes	2

If no, can you give reasons?

_____
_____
_____
_____

31. Has the installation of the flow limiter affected relationship dynamics in the household? (*circle correct answer*)	No	1
	Yes	2
	Don't know	9

32. If yes, can you explain how?

_____
_____
_____
_____
_____
_____

33. What is the approximate total monthly income of your household? (*circle correct answer*)					
No income	0>1500	R1500> 3000	3000>5000	5000>10 000	>10 000
1	2	3	4	5	6

THANK VERY MUCH

Interviewer should complete the following questions after the conclusion of the interview

34. Respondents Gender(*circle correct answer*)	Female	1
	Male	2
	Don't Know	9

35. Respondents Race(*circle correct answer*)	Black	1
	Coloured	2
	Indian	3
	White	4

36. Any comments about the interview (*circle correct answer*)	No	1
	Yes	2

37. Type of dwelling (*circle correct answer*)	Zinc/Wooden House	1
	Traditional huts	4
	Brick House	3

38. If yes please write your comments below