An Assessment of Incentivising Community Engagement in Drinking Water Supply Management

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- Community Engagement in Drinking Water Supply Management: A Review (**WRC Report No. TT 583/13**).
- Design and Implementation of an ICT system for Community Engagement in Drinking Water Supply Management, including a CD containing the ICT system (**WRC Report No. TT 744-1-17**).
- Assessing the Adaptive Capacity of Rural Municipalities to Implement ICT interventions for Incentivising Community Engagement in Drinking Water Supply Management (**WRC Report No. TT 744-2-17**).

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EXECUTIVE SUMMARY

Background

During the past decade, the South African water sector has gone through substantial changes in addressing the disparity between access to drinking water and sanitation provision. Recent service delivery protest regarding water and service provision have, however, highlighted that communication between municipalities and communities is often unsatisfactory, which results in a lack of trust and constructive engagement. This study was based on the premise that community engagement is paramount to water supply management and sanitation provision. The research proposed an investigation into the use of information communication technologies (ICTs) to engage rural communities in water supply monitoring and the reporting of service faults.

Aims

The aims of the project were as follows:

1. To identify successes and failures of incentivising community engagement through a detailed literature study.
2. To develop a research methodology to analyse engagement between municipalities and communities.
3. To analyse and assess current practices of community engagement in field study sites.
4. To identify incentives for reporting supply problems in collaboration with the community and the municipality.
5. To design, develop, implement and evaluate an ICT tool as well as incentive structures, and observe the use of the system for six months.
6. To identify enablers and barriers to the use of ICTs and incentives based on the findings of the field study project scope and limitations.

Methodology

The project design was based on using action research in a case study setting with the intention of developing an ICT intervention. To design the ICT, a co-design approach was chosen, which required the community and the municipality becoming a resource in the research project and taking an active part in the design of the tool. Using several rurality criteria, two local municipalities in the Eastern Cape were identified as the case study location, namely, Kou-Kamma and Ndlambe. Both local municipalities are water service providers to their communities and exhibit the relevant criteria for being classified as ‘rural’. In each of the municipalities, three communities were identified as case study sites. Four different research methods were used to analyse the existing methods of engagement in detail to understand the local context and identify appropriate incentives.

The methodology for analysing the capacity of the municipality was twofold to evaluate the capacity on the one hand and the value of information on the other hand. The capacity assessment was done using the Adaptive Capacity Wheel developed by Gupta et al. (2010). The information value was assessed using the Information Value Chain method as described by Kaplinsky and Morris (2001). The methodology for analysing public engagement was done using the Social Goals Evaluation Framework as developed by Beierle (1998). This method allowed the researchers to analyse whether the public felt engaged with the municipality.

The methodology used to evaluate ICT system was the Technology Acceptance Model described by Davis (1989). Perceived usefulness and perceived ease of use were evaluated to understand how the system was used in the municipality. In order to analyse the impact of the ICT intervention, communities and municipalities were assessed using the above-mentioned methods prior to the implementation and again six months after the implementation to assess the impact. To fulfil the ethical requirements for

the study, the names of the municipalities were anonymised to Municipality A and Municipality B, while the communities within the municipalities were referred to as A1, A2, A3, and B1, B2, B3.

Results and discussion

The analysis of the municipalities prior to the ICT implementation showed that both municipalities had a negative capacity due to the limited financial and human resources, which resulted in their inability to respond to service delivery challenges. The municipalities did not engage productively with their communities and a lack of information was identified as a hindrance to inform citizens appropriately. The expectation of the ICT implementation for both municipalities was that it would improve internal communication and engagement with the communities by building trust. Communities experienced their engagement with the municipalities as limited prior to the ICT engagement. There was a certain amount of frustration with limited feedback being received and trust in existing communication and engagement structures, such as ward councillors, depended on the relationships within the community and their representative.

The ICT tool was designed using the feedback from communities and municipalities to respond to the identified needs. A toll-free line was established to allow a cost-free complaints registry and a please-call-me line allowed citizens to use their mobile phones to request a return call from the municipality. The system also responded to the requirement to provide feedback to citizens by agreeing with municipalities on a revised process when lodging complaints. The system was web-based with access given to the relevant stakeholders, which included councillors and community development workers.

In November 2014, the system was implemented in Kou-Kamma and Ndlambe using training workshops in each municipality. The communities were informed of the system through public meetings, focus group sessions and pamphlets. The ICT evaluation showed that there was a high experience of perceived usefulness and perceived ease of use for the municipal staff. Municipality A registered 429 complaints in the six-month period and adapted the use of the system by changing it to a database where complaints were stored subsequent to having resolved the matter. This was done as the municipality was not able to adapt to the revised process of logging complaints as and when they were raised. Contact numbers of complainants were not recorded, which resulted in the community members not receiving feedback. In Municipality B, 405 complaints were logged during the study period. Both municipalities were equally constrained by their resources in their use of the system but adapted it to their own needs. The municipalities did not remain committed to the original process change of providing feedback to the citizens.

The adaptive capacity assessment after the ICT implementation showed that the capacity for both Municipality A and Municipality B only marginally improved through the ICT system. The resource constraints of both municipalities were too substantial to use the system constructively to improve process and feedback to citizens. Municipality B performed better in providing feedback to citizens, which was ascribed to a complaints process being in existence prior to the system implementation. Municipality A resolved most of complaints and had few pending complaints. In both municipalities, the system was of greater benefit to the municipal staff than it was to the communities. The hope that information would be shared more easily between departments was not confirmed during the six-month period.

Conclusion and recommendations

This project showed that ICT systems can support complaint management in municipalities and can result in a measurable improvement of adaptive capacity. However, the impact and the improvement are arguably not enough to leave either the municipalities or the communities in a better position to adapt and respond effectively to the changes. This does not necessarily mean that an ICT is not useful to improve the municipal processes, but implementing any system in a rural resource-constrained environment should be done cautiously while focusing on the changes that can be achieved when

considering the resource limitations. An ICT is not a guaranteed solution to a difficult problem, but can compensate for resource limitations that result in water and sanitation issues not being addressed. The study highlighted the fact that the ICT system improved the overall knowledge and data tracking but that it could not improve the effectiveness with which citizen complaints were addressed.

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Municipality of	Ndlambe, Kou-Kamma and Kouga
District Municipality of	Cacadu

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LIST OF ABBREVIATIONS

ACW	Adaptive Capacity Wheel
ASU	Actual Systems Use
CDW	Community Development Worker
CoGTA	Department of Cooperative Governance and Traditional Affairs
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWQ	Drinking Water Quality
ICT	Information Communication Technologies
IDP	Integrated Development Plan
IT	Information Technology
IVC	Information Value Chain
PAR	Participatory Action Research
PCM	Please-Call-Me
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SABS	South African Bureau of Standards
SALGA	South African Local Government Association
SGEF	Social Goals Evaluation Framework
TAM	Technology Acceptance Model
UCT	University of Cape Town
WRC	Water Research Commission
WSA	Water Service Authority
WSP	Water Service Provider

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1 BACKGROUND

1.1 Introduction

Over the past decade, the South African water sector has gone through substantial change to address the disparity between access to potable water, the shortcomings in infrastructure development and the adherence to water quality standards. Despite an overall improvement of water service delivery countrywide, rural communities are still lagging behind. A number of reasons have been cited for this, ranging from resource and skill limitation to the geographical dispersion and physical distance between villages and towns (Rivett et al., 2013). An interesting phenomenon observed and cited in literature is that the reporting of water delivery faults is limited or non-existent in rural communities. Reasons are suggested to be ignorance of the complaint mechanisms available, a less empowered citizen structure and complex social relationships. Aspects such as citizens avoiding blaming or pointing out non-performances of government or municipal officials hinder the identification of service delivery problems (Rivett et al., 2013).

This study is based on the premise that community engagement is an important component of sustainable water supply management. Such engagement provides an avenue to establish the needs of communities on the one hand and, on the other hand, ensures the buy-in and trust in systems developed by government authorities to deliver services. Active community engagement relies on communities wanting to engage and contribute to the management and governance of services and on governance structures proactively seeking such engagement. One of the hindrances to reporting water supply faults by community members has been the limited understanding of the roles and responsibilities of local and district municipalities. Community members are unclear whom to contact and are disillusioned when there is no response to their complaints. Aspects such as reference numbers for follow-up of a logged call are rarely understood and are perceived as making the process of complaining difficult. Even in major metropolitan areas, there is a clear difference between the numbers of complaints logged in affluent areas compared to those in underresourced (Rivett et al., 2013).

Information communication technologies (ICTs) have been shown to offer new ways of engaging with the wider public on aspects such as governance. Over the past ten years, there has been an increase in literature suggesting such possibilities in the water, sanitation and hygiene sector (Champanis et al., 2013). The proliferation of mobile phones in developing countries and the rural areas of South Africa could result in ICTs contributing to overcoming the existing barriers of reporting water supply interruptions. This research project proposed an investigation into using ICTs to engage rural communities in water supply monitoring and reporting of faults. In order to assess whether and in which ways rural communities would use such tools and what the appropriate incentives for the usage would be, an ICT system was developed and implemented in two rural municipalities with six small towns. The system usage was observed for six months and data regarding engagement, system usage and response to complaints was monitored.

1.2 Project Aims

At the beginning of the study the research team identified the following aims:

1. To identify successes and failures of incentivising community engagement through a detailed literature study.
2. To develop a research methodology to analyse engagement between municipalities and communities.
3. To analyse and assess current practices of community engagement in field study sites.
4. To identify incentives for reporting supply problems in collaboration with the community and the municipality.

5. To design, develop, implement and evaluate an ICT tool as well as incentive structures, and observe the use of the system for six months.
6. To identify enablers and barriers to the use of ICTs and incentives based on the findings of the field study project scope and limitations.

Aim 1 identified the successes and failures of community engagement in rural governance, incentivising such engagement and the use of ICTs to facilitate engagement through a detailed literature study. A shortened version of the review is presented in Chapter 2. The detailed literature review can be found on the WRC website (www.wrc.org.za) with the Reference Number TT 583/13, "Community Engagement in Drinking Water Management: A Review".

Based on the findings of the literature study, a research methodology was defined as Aim 2, which is presented in Chapter 3.

For Aim 3 and Aim 4, three municipalities were identified as potential participants for the study. These participants were selected based on a set of criteria highlighted in the research methodology. A qualitative survey was conducted by interviewing community members, councillors from the selected rural municipalities and officials responsible for the delivery of water services. Incentive structures were developed in collaboration with the communities and municipalities. A number of research communities were reviewed, which resulted in two local municipalities and six research communities being identified. The results of this study are presented in Chapter 4.

After collating the data from Aim 3 and Aim 4, an ICT application was developed for community members to report problems with water supplies. Part of the design was to ensure that the intervention integrated the identified incentives. The application was monitored over six months to gain an understanding of use patterns, information received and the drop-off once the novelty of using such a tool had worn off. During this period, several workshops and interviews were held with the municipality to understand the reactions to the additional information that was received from communities.

The results of Aim 5 are presented in Chapter 5.

After the six-month period, final interviews were held with all participants to obtain additional data regarding their experiences. This survey was qualitative and engaged the same groups that had been used in the beginning of the study. The qualitative data was supported with the data received on the server through the ICT application. An analysis of the data and the findings are presented in Chapter 6.

1.3 Project Limitations

The project design was based on using an action research method in three research sites. Owing to budget constraints, it was important to identify a site that was close to the research teams to minimise travel costs. The district municipality of Cacadu in the Eastern Cape of South Africa was approached to identify sites since it fulfilled the requirements of a rural municipality as per the research method. The district municipality identified three local municipalities, namely, the Kouga Municipality, Kou-Kamma Municipality and Ndlambe Municipality. Both Kou-Kamma and Ndlambe municipalities became participants in the study and each identified three small towns where they requested the system to be tested. This resulted in the site selection changing from an intended three areas to six areas. In order to ensure that the local municipalities benefitted from the research, it was felt that a choice of sites had to be made in collaboration. The municipalities therefore had the benefit of assessing three areas each. The increased number of sites also resulted in an increased number of data, which was beneficial to the study.

Selecting participants in action studies is often difficult since engagement is a key requirement to collect rich data. While the research team endeavoured to interview the originally intended number of participants and keep the group similar, the realities of selecting members, identifying dates for meetings and the varying agendas often made this an impossible task. Within the analysis of data, the

shortcomings are discussed for each of the sites. During meetings with community members, the view was expressed that participation in studies such as these should be remunerated financially. The research team explained that participation was voluntary and that no financial reward would be paid. However, it has to be appreciated when entering communities with high unemployment that requests like this will occur and it requires collaboration with the relevant authorities to discuss these matters with the community. It is not possible to determine whether and in which ways the non-payment had an impact on the study.

The design of the ICT solution was affected by the co-design approach that had been chosen. While it had been the intention to design a mobile phone application, the engagement with communities and the municipality showed that this was of lesser importance than developing a simple but effective complaints system. In order to respond to local needs, the design of the system was changed ad hoc, which resulted in a very simple but effective system that was more applicable to the local context.

The municipal election in 2014 resulted in a delay of the project. The local municipalities advised avoiding interviewing communities in the run-up to the election since it could result in the research team being perceived as having a political agenda. The project was therefore extended by approximately three months, which resulted in a deviation from the original project plan.

1.4 General Approach

The project is grounded in a field study, where the researchers intend to understand context, but with the clear goal of intervention to improve existing practices. The research of the community and municipality is not a goal in itself – the intervention is a key component to achieve development. Based on this understanding, a participatory action research (PAR) paradigm was chosen. PAR requires that the researchers engage actively with the community and municipality under study (Denscombe, 2010). Often this results in research objectives changing throughout a study since the researcher adapts objectives based on the findings that were previously not identifiable. As highlighted in the project limitations, a flexible attitude is required throughout the project as the result is of greater benefit to all parties involved in the study.

The approach of the research team toward the study was also reflected in the design of the ICT system, which was based on a co-design method. This method accepts the user of the system to be an expert on local context and application purpose and therefore the researcher becomes a reflective listener rather than an advisor. The results of the study are proof of this.

The research team applied for ethical approval from the University of Cape Town (UCT) prior to engaging with municipalities and communities. Approval for the study was also received from both municipalities. The study was explained in detail to all participants with the help of translators where necessary. Consent was requested prior to any engagement. In the analysis and findings section of the report, the names of the municipalities and communities were anonymised to comply with the ethics requirements.

Municipalities and communities received feedback throughout the study and have been given access to this report.

2 LITERATURE REVIEW

The literature review presented here is an excerpt of a detailed and comprehensive review presented to the Water Research Commission (WRC) as a separate report with the title: “Community Engagement in Drinking Water Supply Management: A Review”. It can be downloaded from the WRC Knowledge Hub with reference TT 583/13.

2.1 Water Services Delivery in South Africa

The water sector in South Africa has been through a substantial restructuring process since 1994, which included updated water acts, developed water policies, and restructured water resource management resulting in significant institutional changes (Lindfors, 2011); (Hudgson & Manus, 2006).

In the White Paper of 1994, the goal of the Department of Water Affairs and Forestry (DWAF) was defined as ending the inequity in access to basic water supply and sanitation service (DWAF, 1994). The central concepts of social equity and the right to a healthy environment are entrenched in the Constitution, adopted in 1996 (RSA, 1996). The Constitution proclaims that *“… everyone has the right to have access to sufficient food and water*” [section 27(1)(b)], and requires the government to *“… take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights”* [section 27(2)], thus making the government responsible for putting arrangements in place to secure access to sufficient water to meet the domestic needs of all South Africans (McDonald & Pape, 2002); (RSA, 1996). Several laws and policies such as the National Water Act and the White Paper on National Water Policy support these concepts.

As Lindfors (2011) contends, the national Department of Water Affairs (DWA)[1] has the overall responsibility of water resource management and water service provision. As the leader of the water sector, its role is to support and strengthen the water service authorities (WSAs). This includes offering guidance toward effective management, monitoring performance and enabling capacity building. Moreover, the DWA has a central role in monitoring the sector’s performance and ensuring the effectiveness of its duties. If the WSA is incapacitated to meet these standards, the DWA has the responsibility to intervene (DWAF, 2003). The DWA is also responsible for updating legislation and developing standards and national water policies while the South African Bureau of Standards (SABS) defines the standards that water quality must meet (DWAF, 1994). Additionally, the DWA manages information to be used for supporting, monitoring, regulating and planning (DWAF, 2003).

In 2005, the Drinking Water Quality (DWQ) Regulation programme was initiated by the DWA. It required microbial and chemical water quality testing to be done based on the South African National Standard 241 [short SANS 241 (SABS, 2006)]. This programme, which was restructured and renamed in 2008 as the so-called Blue Drop System, had the objective of ensuring that tap water quality improved through the improved performance of WSAs (Souza et al., 2009). The intention of introducing the Blue Drop Certification programme in 2008 was to increase awareness of water quality standards and to hold municipalities responsible for service delivery. While monitoring has substantially increased, the public’s trust in water quality has not grown to the same level. By awarding WSAs with Blue Drop status if they are compliant with drinking water legislative and best practice requirements, it was hoped to increase transparency in DWQ management (DWA, 2010).

In 2011, the Blue Drop System increased its focus on engaging with the public by publishing water quality results. Municipalities were required to engage with the public, but it turned out that publishing these results was more complex than originally anticipated. Provinces such as the Eastern Cape,

[1] Prior to 2010, the Department of Water Affairs (DWA) was called the Department of Water Affairs and Forestry (DWAF). The terms DWAF and DWA are used throughout this report based on the timeline of the publication referenced. Any reference prior to 2010 is referred to as DWAF; after 2010 it is referenced as DWA.

Northern Cape and Mpumalanga showed the lowest level of engagement with the public, while the provinces with high urban density performed the best.

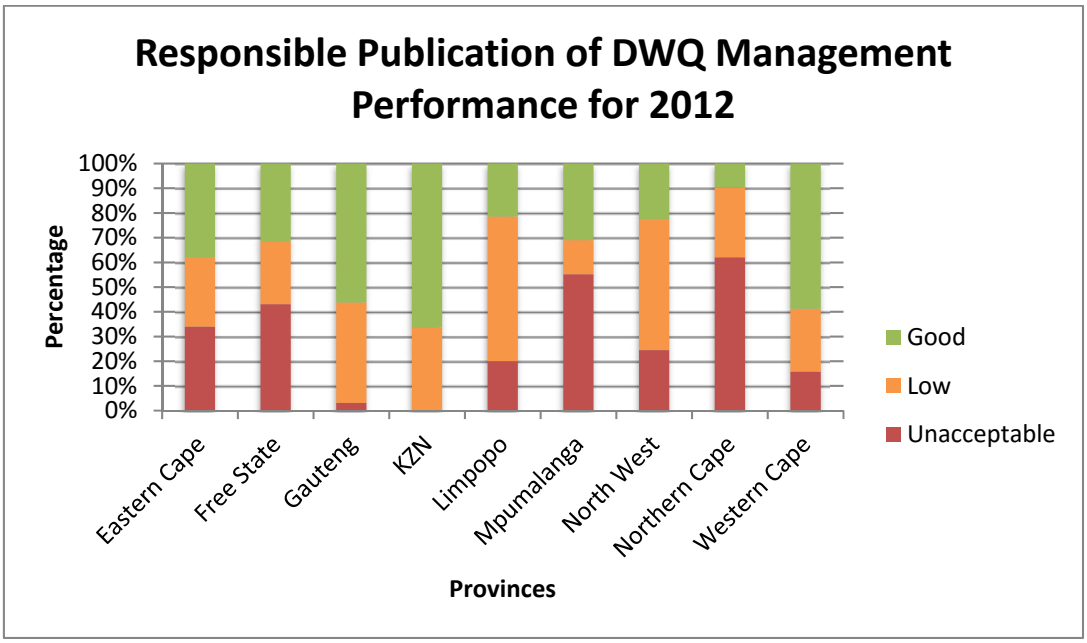


Figure 1: Publication of DWQ per province in 2012

2.2 Public Consultation and Service Delivery

In South Africa, public participation is not a privilege but a constitutional right. The constitutional provision places an obligation on government to establish public participation structures and systems. Tsatsire (2008) argues that public participation must be pursued – not only to comply with legislative prescriptions, but also to promote good corporate governance. In support of the 1996 Constitution, subsequent local government legislation and policy papers include 'local residents' under the definition of local government. Although public consultation and participation are part of the new developmental mandate assigned to local government, they remain a challenge that confront municipalities.

The transformation of local government in South Africa after 1994 has had several important implications. The first implication is that in terms of a variety of legislative prescriptions, the status of local government has changed. Municipalities have been assigned additional responsibilities, and structures have changed to suit these new functions. Planning must be integrated, and developmental and municipal performance must be measured and judged by the municipalities themselves, by residents and by the provincial and national governments. As part of their developmental role, municipalities are required to form partnerships with their communities.

2.2.1 Integrating development and public participation

Development is both a subjective and objective sustainable increase in the quality of life of an individual or a community (Cloete & Wissink, 2000). This view of development is based on that of Torado (1997) and implies that:

- Development is not an end product but a continuous process of improvement in living conditions.
- Development has both subjectively perceived and objectively determinable dimensions (a state of mind and a physical reality).
- Development should be durable, which implies that it must empower people to improve their own conditions themselves over a long period in a relatively independent way.

- Development needs a balanced or synchronised improvement in different policy sectors (social, cultural, economic, political, organisational and technological) and in the areas of basic life-sustaining and higher-order needs to be durable.

According to Cloete and Wissink (2000), the level of development in a community is determined by the initial starting conditions such as natural conditions or events caused by policy decisions and the influence of public participation.

A similar conceptualisation of development is adopted by Torado (1994), who holds the view that development must represent change through which an entire social system moves away from a condition of life widely perceived as unsatisfactory toward a condition of life regarded materially and spiritually as 'better'. In this regard, it is argued that at least three core values should serve as a conceptual basis and practical guideline in understanding the meaning of development, namely:

- To increase the availability and widen the distribution of basic life-sustaining goods and services such as food, water, shelter and protection.
- To raise levels of living, including higher incomes, the provision of jobs, improved education and greater attention to cultural values.
- To expand the range and economic choices available to individuals by liberating them from dependence and servitude resulting from alienating material conditions of life.

The above definition agrees with that of Meiring and Parsons (1994) who define development as the purposeful change of the environment to improve the well-being of the inhabitants, both quantitatively and qualitatively. To achieve this goal of promoting the general welfare of inhabitants, Meiring and Parsons (1994) are of the view that development must aim at:

- Eliminating poverty caused by a lack of the means to provide for food, clothing, housing and other material needs.
- Eliminating social problems.
- Empowering each citizen to attain a good and specific standard of living.

According to the World Development Report (1994), sustainable and meaningful development can be achieved if, among others, a strong voice and responsibility are given to the communities and stakeholders involved in the development. This highlights the imperativeness of public consultation and participation in development.

Community participation does not happen in a vacuum. Communities are motivated to participate by the prospect of bringing development to their areas – development that is sustainable and empowering. This type of development is focused on basic and essential human needs such as water, food, health, safety and the like. It also focuses on using indigenous knowledge to ensure that development is appropriate to local conditions and needs.

2.2.2 The challenge of public participation and service delivery

The national government has acknowledged that the problems facing local government structures are a result of internal and external factors over which municipalities often have limited control. The internal factors relate to issues such as quality of decision-making by local government councillors, the quality of appointments, transparency in the tender and procurement systems, and levels of financial management and accountability. The external factors relate to the revenue base and income generation potential, inappropriate legislation and regulation, demographic patterns and trends, macro- and microeconomic conditions, undue interference by political parties, weaknesses in national policy, oversight and intergovernmental relations (http://www.foundation-development-africa.org).

Schwella et al. (1996) highlight the problems of insufficient resources, problems of capacity building in many municipalities, problems of implementation, accountability, transparency, too much bureaucracy

as well as a lack of control, monitoring and evaluation measures by certain municipalities. Blake (2010) states that certain municipalities appear to be run in an authoritative management style by the ruling party, thus undermining participatory development management which is not in line with prescriptions contained in 'developmental' local government legislation. Taken further, certain government departments and municipalities have been accused of what Cloete (1996) and Blake (2010) describe as "*kleptocracy, lawlessness, patronage, payoffs, kick-backs, phony contracts and nepotism*".

The primary aim of community engagement is to make municipalities more accountable and responsive by enhancing service delivery and improving governance (Buccus et al., 2007). However, there are some obstacles that need to be addressed. Municipal officials are often perceived by the community to be inaccessible owing to their associated high level of office (Green et al., 2005). This notion is maintained in a study conducted by Buccus et al. (2007) in which community members felt that community engagement made no difference to governance as they believed that it was used as a mechanism to legitimise decisions that had already been made at a higher level.

Political aspirations often interfere with fundamental processes where service delivery is used as a political tool to encourage re-election. Relationships between traditional leaders and elected officials are another challenge to engagement processes and structures where uncertainties in political motivations exist (Buccus et al., 2007). Lack of communication among municipal departments and political intervention also hamper the progress of service delivery as projects are not properly funded or prioritised. This breakdown in communication often leads to inefficiency and uninformed decisions (Smith & Green, 2005).

The key vehicle for public participation is the election process in which the public elects into office the government and representatives who uphold the values and policies that they wish to see implemented. Should the government of the day not honour the values and policies it propagated during the election process, it might not be returned to power at the next election. However, while elections are important, participation between elections is crucial. Public consultation and participation must be integral to the planning, implementation, monitoring and evaluation of the delivery of government programmes. These programmes have to be informed by the needs of communities, which are identified through ongoing community involvement and engagement. After implementation, monitoring and evaluation, communities should also be consulted to establish the impact of and their level of satisfaction with the programmes implemented. Public participation is a continuous cycle, which does not have a beginning or an end.

2.3 The Role of ICT in Governance

The World Bank report of 2012 on ICT for Development highlighted the importance of an increase in the use of mobile phones. It was pointed out that the mobile phone has become indispensable, as it is "*arguably the most ubiquitous technology*" worldwide (World Bank, 2012). In comparison to the developed world, developing countries are seen to be in the best position to exploit the benefits of mobile communications. The mobile industry has its largest share in the developing world. Studies carried out by the International Telecommunications Union at the end of 2006 show that 67% of mobile subscribers live in developing countries (Bhavnani, et al., 2008). According to the World Bank report of 2012 – 3.4 billion of 5.9 billion mobile subscriptions were in low- to middle-income economies (World Bank, 2012).

"*Evidence from selected studies carried out by the United Nations Conference on Trade and Development (UNCTAD) shows that mobile phones have become the most important mode of telecommunication in developing countries. For the vast majority of the low-income populations mobile telephony is the sole tool connecting them to the information society … The benefits of mobile phones might be proportionally greater in resource-constrained settings, e.g., the poor and rural populations*" (Patil, 2011: 317).

2.3.1 Mobile communication and development

Mobile communications have created a variety of opportunities for human development "… *from providing basic access to education or health information to making cash payments to stimulating citizen involvement in democratic processes*" (World Bank, 2012). Mobile phones provide opportunities in which individuals and groups may begin to transform the situations in which they find themselves, such as improving human and economic conditions. Applications for mobile phones have been developed to help rural farmers gain access to pricing information through text messages, mothers receiving medical reports on the stages of their pregnancy by phone, and migrant workers sending remittances without using the usual banks. Mobile phones have been used in election monitoring, and they are seen as the key tool to topple unpopular regimes (World Bank, 2012).

The use of mobile technology in the development discourse is at times conceptualised as a tool that may be used to enhance productivity in place of labour as a way to alter or enhance information processing; and as way to alter or enhance social relations (Donner, 2005). Research on this conceptualisation of mobile phones has looked at the role of mobile communication in political mobilisation and resistance (Rheingold, 2002, cited in Donner, 2005). In a survey of studies that have focused on the use of mobile technology in developing countries, Donner (2008) highlights studies that focus on the impact in development as *"… the mobile is an incredibly powerful tool for exchanging ideas at a distance, and for managing daily life … examples of impact studies come from the ICTD [ICT for development] perspective, where researchers are interested in whether mobiles promote or enable economic growth or broader well-being. Mobile phones have been appropriated to be used in ways that are determined in the context of where the users find themselves in, for example, the practice of intentionally leaving missed calls*" (Donner, 2008).

According to infoDev's 2012 report on the use of mobile phones in South Africa, the main tool of communication for the low-income population is the mobile phone, which allows the conclusion that mobile technology will likely be the preferred medium in providing value-added services (infoDev, 2012). The infoDev (2012) surveys reveal that South Africa's mobile coverage is about 90% of the land mass and over 75% of the population own a mobile phone. Of those who own a mobile phone, 98.5% have a prepaid SIM[2] card, and the remaining 1.5% own contract lines. Mobile phones are mainly used for making and receiving phone calls, missed calls or placing please-call-me (PCM) messages, sending and receiving text messages (SMS[3]) and organising day-to-day lives.

The distinction between rural users and urban users is important to bear in mind when looking at mobile technology and development. Focus groups revealed that low-income urban users are aware of available applications, use social media and browse the Internet for jobs and educational grants. Rural users of similar income levels use micro-browsing because of its convenience but are sceptical about the importance of mobile applications. Mobile users without Internet access rely on traditional media for information and voice or text messages for communication. However, 71% of the low-income users have a mobile device that can access the Internet. There is a high use of social media with 50% of mobile users having signed up for a social network. However, interaction with government is limited with 69% of low-income users with Internet access not having used their phones to get information from a governmental organisation (infoDev, 2012).

2.3.2 Governance, service delivery and ICTs

Hellström (2008) defines governance as the relationships between the state, market and civil society, and the coordination and decision-making according to set norms and rules. Good governance, the

[2] Subscriber identification module

[3] Short message service

form of governance that democratic states aim for, is seen as a "… *functioning democratic system where the freedom of expression and a sound juridical system are in place*" (Hellström, 2008). The term 'good governance' does not have a set definition but comprises participation, the rule of law, effectiveness and efficiency, transparency (built on the free flow of information), responsiveness, consensus orientation, equity, accountability, and strategic vision (UNDP, 1997 cited in Hellström, 2008).

Over the past decade, the notion of having access to mobile communication to influence governance is becoming more prevalent (Castells, 2012). The potential role of ICTs in governance has been identified as one that speaks to the participation from citizens in good governance. ICTs offer a space in which individuals can participate in discussion forums as well as contribute through social networking pages and blogs (World Bank, 2012). Several so-called 'm-government' (mobile government) systems have been developed and implemented in, for example, the Philippines. *"[A]bout half of Philippine government agencies offering e-services have incorporated SMS as a service delivery mechanism and in enhancing political participation"* with the main purposes being to *"provide information, to set-up feedback mechanisms for stakeholders either in form of complaints or suggestions, and to make service delivery faster and more convenient*" (Lallana, 2006, cited in Poblet, 2011).

In South Africa, a number of m-governance systems have been put in place. For example, in Cape Town, service faults can be reported by SMS and rates can be paid through a mobile phone billing system. An SMS system developed by the DWA provides information on the water quality at any location in the country (DWA, 2012). Another example is Lungisa – a community monitoring and reporting application (infoDev, 2012). The application allows people to report complaints about service delivery using their mobile phones. Through a monitoring platform, progress on the complaints made can be tracked (infoDev, 2012). The City of Johannesburg Municipality uses the social media platform Twitter for customers to get real-time updates about water saving and water service issues on @jhbwater (www.joburg.org.za). The municipality has described this as a way of improving service delivery and accessibility. Residents are encouraged to engage on the site with the Twitter account @jhbwater to alert the municipality of any issues. The Lwazi information system allows citizens to report service delivery issues in their preferred language of choice (CSIR, 2011). This service was created with the intention of targeting individuals located in remote rural areas but with access to mobile phones or landlines. The aim is to capture information that can be used to enhance service delivery.

Lack of communication and engagement between governments and citizens may be a key reason for protests and social movement resistance. Castells (2012) goes one step further and speaks about the "*networks of outrage and hope*" that represent the notion of communities not being heard and resisting the decision-making of governments. ICTs are seen as a potential avenue for opening up communication, making government accessible and empowering citizens to hold decision makers accountable. The mobile phone is experienced as a tool that individuals may use anonymously to participate in governance without fear of reprisal (Castells, 2012).

South Africa is familiar with the challenge of service delivery protests and the outrage of communities responding to failed implementations of infrastructure developments. ICTs have been identified as providing an opportunity to improve the communication between stakeholders and increase public participation in local decision-making. In 2012, the South African Local Government Association (SALGA) developed a municipal guide and roadmap to successful ICT governance for local municipalities to foster innovation and implementation of ICT projects. The SALGA is the combined representative of local municipalities that seeks, among other directives, to *"… transform local government to enable it to fulfil its developmental role … develop capacity within municipalities*" (www.salga.org.za).

The SALGA recognised the importance of aligning ICT and governance to improve the role of local municipalities, which is highlighted in its strategic plan of implementing ICTs in service delivery. The following aspects are highlighted in the SALGA ICT agenda (SALGA, 2012):

- Recognising that ICTs can be better leveraged to improve effective administration, service delivery and socio-economic development and that ICTs should therefore be integral to the functioning of any well-run municipality.
- Raising the political and actual profile of ICT within local authorities and communities.

ICT use is seen as having the potential for rapid and sustainable economic and social development when used appropriately within municipalities. The SALGA speaks directly to the vision of the Local Government Turnaround Strategy, which asserts that municipalities should have appropriate infrastructure and connectivity and that all municipalities should have ICT systems to speed up service delivery and improve efficiency and accountability (SALGA, 2012). The successful implementation of ICT within municipalities requires orientation, education and training of staff, which is a costly process but necessary for the successful use of ICT systems.

2.4 Incentivising Community Engagement

This study assesses the notion of incentivising rural communities to report drinking water supply issues using ICTs. In order to understand how public engagement can be fostered and increased, new avenues to engage with citizens need to be investigated and the possibility of incentivising change has to be analysed.

As shown in the previous sections, public participation and community engagement are crucial to good governance and are also a legal requirement in South Africa.

Active community engagement relies on communities wanting to engage and to contribute to the management and governance of services and on governance structures, proactively seeking such engagement. However, research has also shown that communities in rural areas are less inclined to engage in the formal structures of governance than their urban counterparts. Similarly, rural communities are less responsive and influenced by reports in the media (Gool, 2011). Some research even shows that despite negative reporting on water quality in rural areas, communities still felt that their water was safe (Gool, 2011). Mamdani (1996) suggests that this could be based on the notion that rural communities perceive themselves as subjects rather than citizens and might therefore experience services as a privilege rather than a right. People are often annoyed/angered by the inequalities between the services they receive and the level of service they desire (Zhuwakinyu, 2012). A study done by Smith and Green (2005) found that while households were dissatisfied with the service they received, they were apprehensive about demanding better services from municipalities since most felt that they had no rights to exercise such complaints based on the low levels of participation and non-payment of bills (Smith & Green, 2005).

Smith (2000) in Francey (2011) cites limited access to transport and communication links as barriers to engagement for the poor. Participation in governance requires knowledge of the existing structures and encourages only the "*usual people to respond*". (NCC, 2008, as quoted in Francey, 2011). As highlighted in previous sections, service delivery protests are an indicator of breakdown in communication and trust between municipalities and their communities. These protests also speak to the breakdown of public participation in the decision-making process. In order to re-establish good governance, communities must be given the opportunity to engage and current barriers have to be overcome.

One way to overcome such barriers of disengagement is to incentivise engagement. As the literature reveals, this is a rather complex process and over the past decade much has been learnt of the challenges of incentivising public engagement. The earliest discussions on incentivising public

engagement can be found in the legal domain, i.e. the reporting of a crime. Feldmann and Lobel (2009) refer to this kind of monitoring within society as 'social enforcement', which is the act of reporting illegal behaviour of a citizen by another citizen. Social enforcement has become a key feature of regulatory policy and statutes show an increase in relying on individuals to report misconduct. Francey (2011) highlights the need for incentivising participation of underresourced and poor citizens in a study on consumer involvement in the water service regulation sector: *"… incentives may well be required to ensure true representativeness and sustain consumer involvement at the partnership level, especially where consumer involvement is meant to be inclusive of the poor, who describe themselves as 'often uneducated, afraid of authorities, lacking time and money to voice opinions'"*.

Hohmann and Janssen (2012) show that individuals are more committed to co-operate if communication between stakeholders increases and if social feedback reinforces the cooperative nature of an individual. This is particularly relevant when using social networks to increase communication. The study by Hohmann and Janssen (2012) also found that social feedback tailored to individuals led to a significant increase of the contribution to the public good, while feedback on the consequences of an action was not necessarily an incentive to change behaviour or contribute. Sheth et al. (2010) observed that individuals could be incentivised to change behaviour if the feedback on a consequence came from a trusted source. The study investigated hygiene interventions in maternal health and showed that health care personnel were a trusted source of information and health facilities served as an effective venue to communicate behaviour change. Sheth et al. (2010) indicate that behaviour change strategies include mass media promotion, clinic-based education, government engagement through popular government representatives and interpersonal communication. While monetary rewards are often used as an incentive, Feldman and Lobel (2009) found that the offering of money to whistle-blowers led to less rather than more reporting of illegality. It was shown that if the informant had an ethical stake in the outcome, the appeal had to be to the informant's sense of duty. The financial incentive was counterproductive since it set off the internal motivation to report.

In 1997, Lado presented their findings in a study, namely, that financial incentives to save money in the water sector and to manage scarce water resources were far less effective in rural and poor environments and proved difficult to implement (Lado, 1997).

Feldman and Lobel (2009) suggest that most of the population perceive their own social enforcement actions as more ethically driven than those of their neighbours. A stigma can develop based on the incentive to report and if the levels of moral outrage are low, financial rewards are likely to be a decisive factor.

Sheth et al. (2010) showed that the key incentives in their study were:

- The advantage over the existing alternatives.
- Compatibility with existing needs.
- Low complexity.
- Trial-ability.
- Observability of results.

Franceys and Gerlach (2011) presented findings that indicate that poor communities are generally very interested and willing to be involved in improving access to water supply and that education and the understanding of water supply system can serve as an incentive. The participants in Franceys and Gerlach's study felt empowered through the education they had received. One of the findings indicated that the institutional form of customer involvement was less important than the activity of involving customers. "*Customer involvement makes only a marginal difference to the actual service input though an important difference to societal perception*" (Franceys & Gerlach, 2011). Another incentive to report service faults in the water sector was the experience of putting the report in the public domain, which would serve as a punitive incentive to the municipality to resolve the matter.

Abbot and Guijt (1998) show that there have to be clear incentives for a community to be interested in monitoring over a longer period. Their study shows that participatory monitoring is difficult and costly – not only for an organisation but also for the community. Abbot and Guijt (1998) refer to a study done by Irons and Walker in Australia in 1998, which highlighted economic factors that limit the potential of community-based monitoring:

1. "*Community groups rarely have access to sufficient resources to enable long-term monitoring;*
2. *There is no reason to believe that it is sufficient to motivate consistent, longer-term monitoring service in the community without proper remuneration*".

Burchell et al. (2009) show in their report on public culture as a professional science that there should be a greater institutionalised commitment to incentivise public engagement and citizenship. However, counter voices expressed concerns that such incentivising for public engagement might promote a cynical instrumentalism, manifesting as an effort to be seen to be engaged rather than engaging for its own sake.

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides an overview of the methods used to assess the possibilities of engaging communities in managing drinking water supplies in rural communities. As the literature review has shown, rural municipalities and their communities are more affected by water supply failure and unsatisfactory service delivery than their urban counterparts. Communities often do not engage proactively, and the study is investigating whether and how ICT systems may offer an alternative to current existing engagement practices. This chapter describes the research design and methodology of the study in the following sequence:

1. Methodological approach for the study.
2. Study site selection and description of each site.
3. Methodology used for the design, development and implementation of the ICT.
4. Methodology used for analysing the capacity of municipalities.
5. Methodology used for assessing public engagement.

3.2 Methodological Approach

Assessing the possibilities of engaging communities in managing drinking water supplies requires an investigation into several different aspects fundamental to the delivery of drinking water. Most municipalities and government structures assume that difficulties or failure of water supplies – be they smell, taste or interruptions to service – will be reported by the public through available channels, such as telephone, the media or other stakeholders. Municipalities may even rely on the public to report such problems. The literature review showed that despite clear evidence that rural water supplies fail more often than urban systems, reporting from rural communities is unusually low. The assumption is that there are barriers that hinder reporting, which may include the following:

- The financial ability to contact the municipality.
- The lack of knowledge of whom to contact.
- A general lack of motivation.

The study investigated whether the above-mentioned barriers can be mitigated through a system that provides the finances, the knowledge and the incentive to report water supply failure. To develop such a system and to assess the barriers, the following steps were followed in this project:

- Selecting study sites and assessing preparedness for participating.
- Investigating how communities can be incentivised to contribute to water supply monitoring.
- Designing, developing and implementing an ICT system that can be used for reporting water supply faults.
- Assessing the ICT system and how it can play a role in improving the current reporting by providing the knowledge and overcoming the cost of contacting the appropriate municipal offices.

The research adopted an intensive case study approach, which assessed how a process is established in a particular setting, what produces a change, and what participants or the intervention did to produce change. The study was exploratory in nature: respondents were given the opportunity to engage freely, reflect on their learning, assess changes – and, equally, the researchers built up their knowledge throughout the study (Mingers, 2004; Sayer, 2010).

The methodology of the study took the existing and possibly different structures in each of the study sites into account. The difference between the sites could obscure the findings and it was therefore important to assess the impact of contingent relationships. Attention was paid to social and political relationships within the study sites. This was particularly important in the context of engaging two often opposing groups of municipalities and communities, with the communities receiving services and

municipalities providing the service. Since a number of sites contributed to the artefact design, it was expected that the levels of diversity would be representative of the diversities found in communities and municipalities in South Africa.

3.3 Study Site Selection and Description

Since the focus of the study was on water service delivery in rural areas, the notion of rurality had to be defined prior to selecting the study sites. The term 'rural environment' is highly contested, particularly in South Africa, where the delineation of the country into different areas has resulted in an unequal distribution of resources. Even though the criteria for delineating settlements vary from country to country, the contrast between urban and rural areas is generally related to stereotypical differences associated with their populations.

In South Africa, the classification of settlement type is generically based on the dominant dwelling type and land use as well as a lack of resources available, which include access to water, sanitation, housing and education. To define rurality beyond population density, an extended set of criteria was developed using a number of parameters highlighted in recent studies (Everatt, 2009).

The criteria in Table 1 will be used as a proxy for rurality for all study sites:

Table 1: Criteria for assessing rurality of study sites

Indicator	Definition
Population density	Number of households per square km
Female-headed households	Proportion of households headed by women
Education level	Proportion of population (20+) who have completed matric
Rate of unemployment	Proportion of the economically active population who are unemployed
Social grant dependency	Proportion of households dependent on social grants
Dwelling type	Proportion of households classified as traditional
Water	Proportion of households without access to a basic drinking water supply
Sanitation	Proportion of households without access to basic sanitation

Community-based research faces many ethical dilemmas, which range from the power-intent relationship of the research team entering the community to the perceived benefits of being seen to work with universities and the hope that something will change once the research team leaves. This study relied heavily on the engagement between researchers, municipalities and communities. It was therefore paramount to establish the intentions from the researchers' side and the expectation of the community and municipality early on.

During the duration of the study, the community and the municipality perceived the researchers as a resource. This required ongoing management to avoid creating expectations that may not continue after finalising the study. The research team was aware of these challenges and the potential of these types of research project where information is extracted for self-advancement without giving anything in return. To minimise these challenges, a detailed process of engagement was entered prior to the study and each municipality was assessed regarding its preparedness for participating. The process of engagement prior to starting the study can be found in Appendix A.

3.3.1 Description of study sites

South Africa comprise nine provinces with an estimated population of 53 million (Stats SA, 2013). The rural areas as per the criteria in Table 1 can be identified within each of the provinces.

Figure 2: South Africa and its nine provinces[4]

Several constraints were considered prior to site selection. Owing to budget requirements, it was important that the sites did not require extensive travel. Additionally, it was felt that areas previously used as field sites should be avoided since a certain research fatigue has set in. This is particularly true for the former homelands of the Eastern Cape, which were therefore excluded from the study. Based on these constraints, it was decided that the rural areas of the Eastern Cape coastline would be appropriate.

Geographically, the Eastern Cape is the second-largest province covering an area of 168 966 km^2 (Stats SA, 2012) and is home to 6.62 million people (Stats SA, 2013). The Eastern Cape consists of two metropolitan municipalities (Nelson Mandela Bay and Buffalo City), six district municipalities (Alfred Nzo, Joe Gqabi, OR Tambo, Chris Hani, Amathole and Cacadu) and 37 local municipalities (Anon, 2011).

[4] Source: Wikipedia Online Encyclopedia, 2011. Retrieved from http://en.wikipedia.org/wiki/File:Map_of_South_Africa_with_English_labels.svg [Accessed: 24 February 2014].

Figure 3: Municipalities of the Eastern Cape

The rurality criteria per site are presented in Table 2.

Table 2: Rurality criteria per study site

Indicator and Definition		Kou-Kamma Municipality	Ndlambe Municipality
Population density	Number of households per square km	3.1	10.5
Female-headed households	Proportion of households headed by women	31.2%	42%
Education level	Percentage of population who have completed matric	17.6%	20.1%
Rate of unemployment	Proportion of the economically active population who are unemployed	15%	30.3%
Social grant dependency	Proportion of population between ages of 15 and 64 dependent on social grants	52.1%	54.3%
Dwelling type	Proportion of households classified as traditional	0.3%	3.8%
Water	Proportion of households without access to basic drinking water supply	35%	17%
Sanitation	Proportion of households without access to basic sanitation	20%	32%

The study sites selected were Kou-Kamma Local Municipality and Ndlambe Local Municipality, which are located in the Cacadu District (Figure 4). These sites were selected by applying the rurality criteria and following the process described in Appendix A to assess preparedness to participate.

The overall Blue Drop score for the Eastern Cape in 2012 was 82.1% with Cacadu District municipality achieving an average Blue Drop score of 40% (DWA, 2012a).

Figure 4: Map of Cacadu District[5]

3.3.2 Ndlambe Local Municipality

Ndlambe Local Municipality is bordered by the Makana Local Municipality in the north, Sundays River Valley in the west and Ngqushwa (Amathole District Municipality) in the east. It encompasses the towns Alexandria, Port Alfred, Bathurst, Boknesstrand, Cannon Rocks and Kenton-on-Sea. The Ndlambe Local Municipality serves a population of approximately 61 000 people, comprising 78% black people, 14% white people, 7% coloured people and less than 1% of people are of Indian or Asian descent. The dominant language spoken is Xhosa (77.7%), followed by English (12.2%) and Afrikaans (11.7%) (Stats SA, 2011a). The unemployment rate for the area is 30% with a large portion (about 42%) of female-headed households. Literacy rates are estimated to be 54%, which is below the provincial average of 60.2% (Ndlambe Local Municipality, 2013). Only 20.1% of the population residing within Ndlambe has completed matric and only 9.9% have some form of higher education (Stats SA, 2011a).

The Ndlambe Local Municipality is a WSA and water service provider (WSP) with the Amatola Water Board. In 2012, the municipality achieved an overall Blue Drop score of 42.37% and ranked 11th (out of 17 municipalities audited), which is an improvement on its 2011 score of 20.93% (DWA, 2012a). However, the 2012 Blue Drop score is *"… not a true reflection of the Ndlambe Local Municipality's drinking water quality management*" because "… *inspectors had great difficulty obtaining information from those responsible for the various functions*" (DWA, 2012a: 57).

A total of 83.2% of residents has access to municipal water (shown in Figure 5), but only 36.1% of the population has access to piped water inside a dwelling (Stats SA, 2011a). "*The Ndlambe Municipality defines low level access to water services as that of RDP*[6] *standards, being a tap supply within a 200 m radius of all urban consumers, while high level access is considered when water supply is available within households*" (Ndlambe Local Municipality, 2008: 28).

[5] Source: The Local Government Handbook Website. 2012. Retrieved from http://www.localgovernment.co.za/districts/view/3/cacadu-district-municipality# [Accessed: 24 February 2014].

[6] Reconstruction and Development Programme

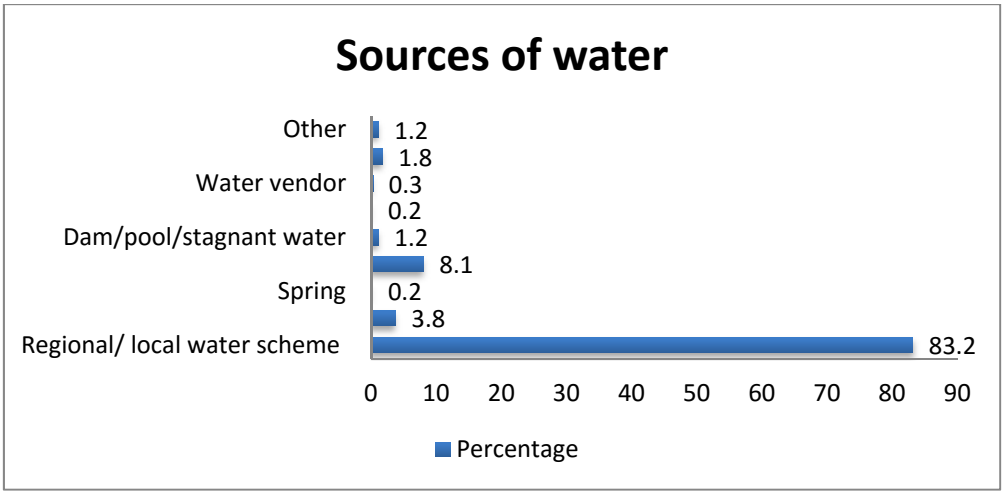


Figure 5: Water sources (Stats SA, 2011a)

The Ndlambe Municipality maintains and operates all sewerage systems within both its functions as WSA and WSP (Ndlambe Local Municipality, 2008). As shown in Figure 6, only 35.6% of households have access to a flush toilet connected to a sewerage system; 25.1% of households have access to a flush toilet connected to a septic tank; and 20.6% of households have access to a pit toilet without ventilation (Stats SA, 2001a).

According the Blue Drop Report of 2012, the municipality was not an easy audit case (DWA, 2012a). Obtaining information proved difficult for the auditors and none of the water treatment works were classified in terms of the legislative requirements. However, this municipality was said to perform satisfactorily in terms of the quality of tap water when compared to similarly sized municipalities. However, substantial improvements were required (DWA, 2012a). Because no results have been made available to the public beyond 2012, it is difficult to know whether the municipality is currently following constitutional laws in terms of water and sanitation.

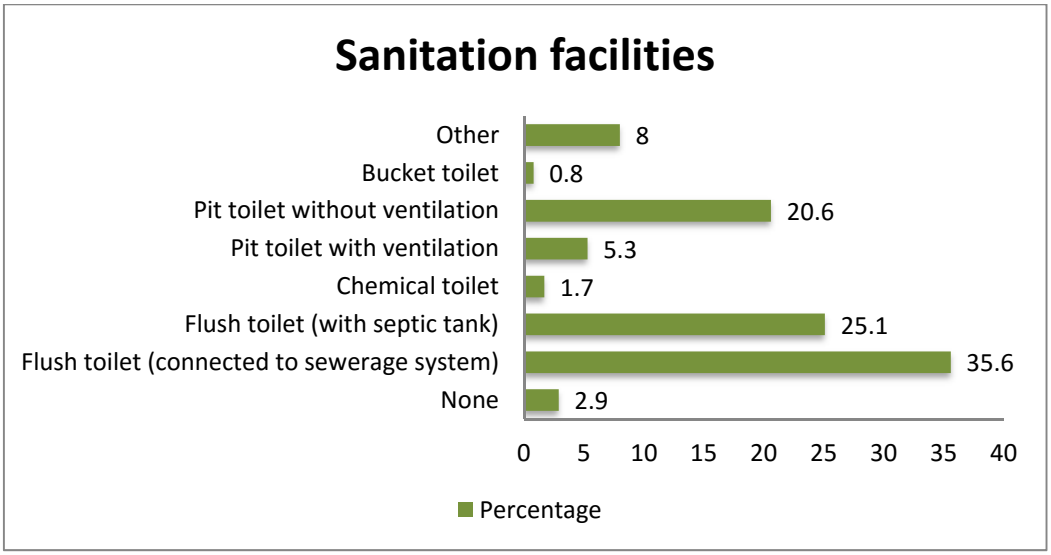


Figure 6: Sanitation facilities (Stats SA, 2011a)

Figure 7 shows that most people (about 12%) residing in Ndlambe access the Internet using mobile phones; 11% have access to the Internet at home; 3% from work; 4% from 'elsewhere' with 70% without any access (Stats SA, 2011a).

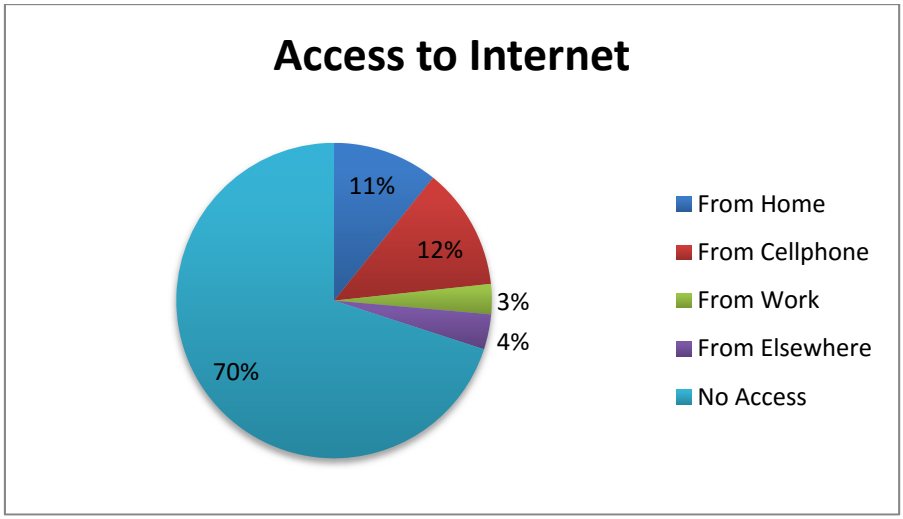


Figure 7: Access to Internet (Stats SA, 2011a)

3.3.3 Kou-Kamma Local Municipality

Three other local municipalities border Kou-Kamma Local Municipality, namely, Kouga to the east, Baviaans to the north, and Bitou (Western Cape) to the west. Kou-Kamma Municipality comprise the Langkloof area, which consists of the towns of Kareedouw, Joubertina and Louterwater, and the coastal belt, which comprise the Tsitsikamma area and includes Storms River, Coldstream and Clarkson (Kou-Kamma Municipality, 2011; Kou-Kamma Local Municipality, 2012).

Kou-Kamma covers an area of 12 570 km^2 (Kou-Kamma Local Municipality, 2006) and houses a population of approximately 41 000 people, which comprise 60% coloured people, 31% black people, 9% white people, and less than 1% people of Indian or Asian descent. About 1.1% of the population is classified as 'Other', which may partially be explained by the high level of migration labour from other countries (Stats SA, 2011b).

Afrikaans is the most commonly spoken language in the area with 74% of the population as Afrikaans primary language speakers, followed by Xhosa with 20% of the population as primary language speakers and only 2.5% of the population as English speakers (Stats SA, 2011b).

The unemployment rate for Kou-Kamma is 15%, which is the lowest in the province (Kou-Kamma Local Municipality, 2012). Only 17.6% of the population residing in Kou-Kamma has completed matric and only 3.9% has some form of higher education (Stats SA, 2011b). The education levels are considerably lower than those of Ndlambe and Kouga.

Kou-Kamma Local Municipality is both the WSA and WSP for its designated area. According to the Blue Drop Report, the municipality ranked 16th out of the 17 audited municipalities. It is regarded as the worst-performing municipality. Kou-Kamma's Blue Drop score for 2012 was 5.6%, which is a regressive score from 2011 when it scored 14.36%. Most of the water systems failed to score on the DWQ compliance, management of the water system and treatment processes (DWA, 2012a).

A total of 68.2% of Kou-Kamma households have access to water from within a dwelling and 64.7% of households receive their water from a municipal water scheme (refer to Figure 8). The second-largest source of water for 14.6% of households is boreholes; the third-largest source of water for 10.7% of households comes from dams/pools/stagnant water (Stats SA, 2011b).

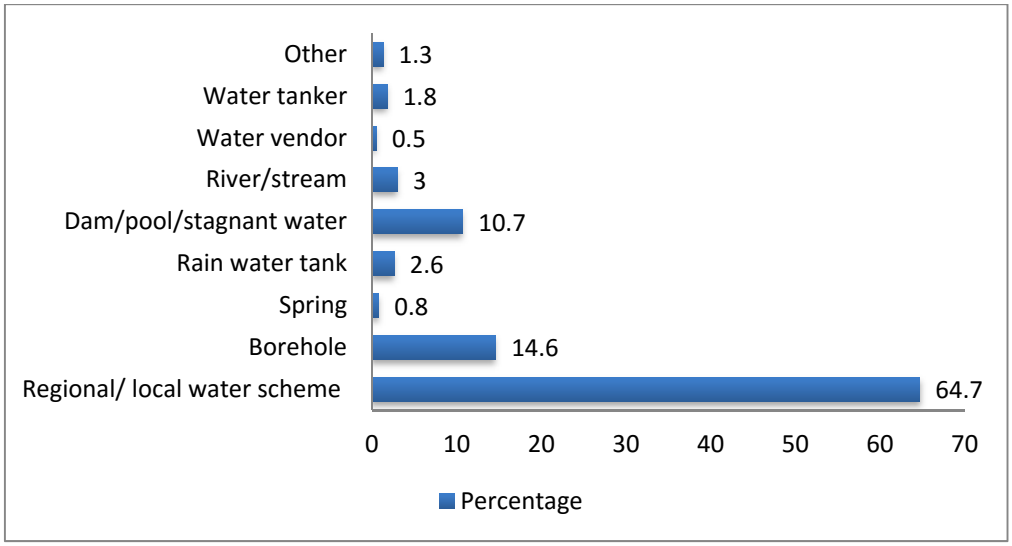


Figure 8: Water sources (Stats SA, 2011b)

Most households (68%) have access to a flush toilet connected to a sewerage system as shown in Figure 9 (Stats SA, 2011b). One of the major service delivery challenges that Kou-Kamma experiences is the vast geographical distances between settlements, which places a high demand on the limited resources needed for operation and maintenance (Kou-Kamma Local Municipality, 2012). "*Communities complain that they wait up to two weeks to have sewerage problems attended to and this poses health-related risks. Solutions should be found to deal with this problem. Part of the solution needs to consider community awareness regarding their own practices that result in blocked pipes*" (Kou-Kamma Local Municipality, 2012: 77).

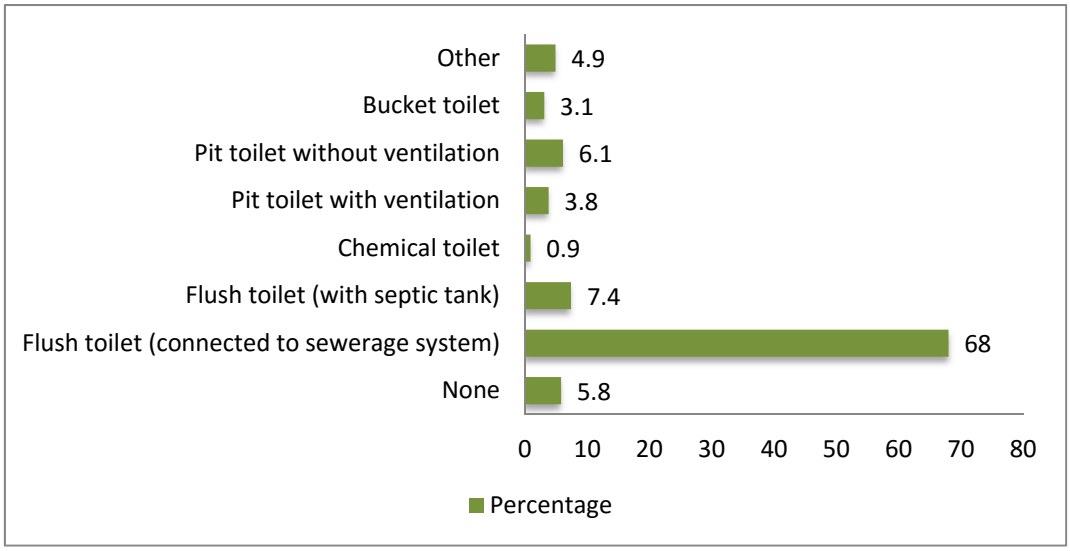


Figure 9: Sanitation facilities (Stats SA, 2011b)

According to the Blue Drop Report of 2012 (DWA, 2012a), Kou-Kamma Municipality has been facing several challenges regarding water quality management. The municipality's performance was marked as dismal during the audit. The report highlighted that there was little commitment to safeguarding citizens against the risks of poor water quality. The DWA had issued warnings to all residents and visitors of the Kou-Kamma area not to consume tap water without taking measures to improve its quality (DWA, 2012a). The 2012 Blue Drop results for the period of the report indicated that the municipality did not follow constitutional laws regarding water and sanitation. Unfortunately, no further data regarding water quality has been made public since 2012.

The analysis of the prevalence of ICTs in Kou-Kamma Municipality showed that most households (77%) do not have access to the Internet (Figure 10). Only a few households have access with 9% using mobile phones, 5% accessing from home, 3% accessing from work and 6% accessing from elsewhere (Stats SA, 2011b).

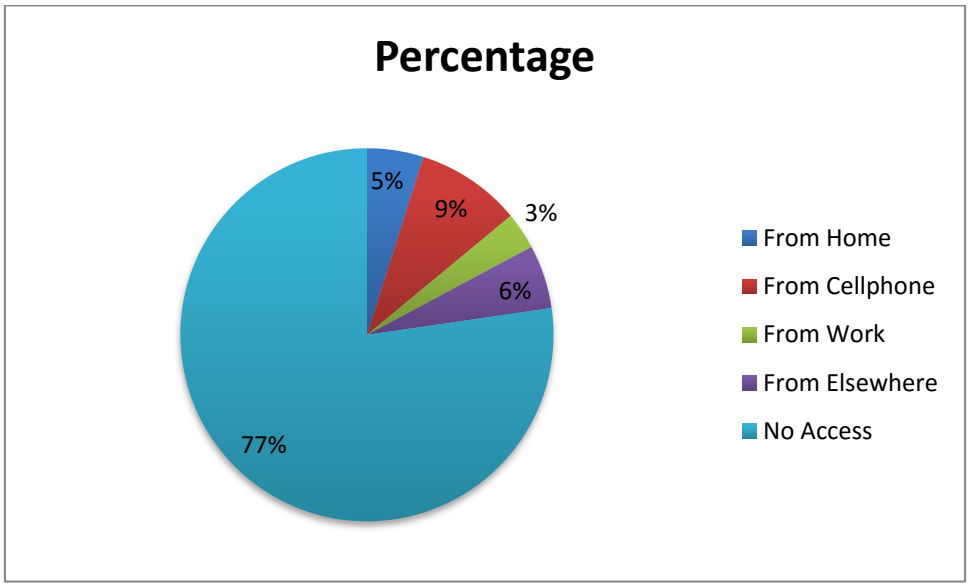


Figure 10: Access to Internet (Stats SA, 2011b)

3.4 Design, Development, Implementation and Evaluation of an ICT System

Different methodologies were used to design, develop, implement and evaluate the ICT system. This is to accommodate the difference between each of these steps. Designing and conceptualising a system requires different methods to implement and assess the impact and success of the system. Each of the methods is introduced in the sections below.

3.4.1 Design and development of the system

A co-design approach was used for the design of the ICT system. This approach relies on community and municipalities becoming co-designers together with the researchers and developers. The needs of each stakeholder were represented during the design process. Paternalistic notions of development were avoided by engaging the community and municipalities directly (Rivett et al., 2014b).

The engagement for the design process commenced with semi-structured interviews held with the municipalities between 30 March 2014 and 04 April 2014. Through these meetings, details regarding the municipal structure, current practices, workflow processes, community engagement practices and the overall enablers and barriers to implementing an ICT system were identified. To gain insight into the views held by citizens and to determine whether these views matched those of the municipality, meetings were also held with communities from both municipalities in May 2014. The communities of Bathurst, Port Alfred and Alexandria were interviewed in the Ndlambe Municipality. The communities of Storms River, Joubertina and Kareedouw were interviewed in the Kou-Kamma Municipality. For both sets of interviews (municipal and communal), five topics were covered: municipal structure, water and sanitation services, service delivery, customer relations, and existing information systems (Appendix B and Appendix C).

A WRC seminar was held in Port Elizabeth on 17 July 2014 to present the project and findings to a group of stakeholders from the municipalities and the research community. Presentations were given on what had been learnt on the project to date, the feedback from municipal and community surveys, and the first designs for the ICT system. Stakeholders provided further feedback, which was integrated into the final design of the system. It is described in Chapter 5.

3.4.2 Implementation of the system

The system was introduced to the municipalities and their respective communities between 27 October 2014 and 30 October 2014. Communities were informed of the new system and the revised process of engaging with the municipalities through meetings and pamphlets. Pamphlets (Appendix D) were distributed at central locations such as libraries, shops and post offices within each community, and given to community members who attended the meetings.

Municipalities and their satellite offices were given a test login early October 2014 to test the system prior to any training. This was to understand the level of self-evidence of the system. Training workshops for municipal staff were then held on 27 October 2014 and 30 October 2014. One of the requirements for the training was that the technical team be present to ensure that the complaint data and job allocation would be aligned. The analysis of the implementation process can be found in Chapter 5.3.

3.4.3 Evaluation of the ICT system

Analysis of the implemented ICT system was based on constructs adapted from the Technology Acceptance Model (TAM) proposed by Davis (1989). TAM provides a framework for analysing and accepting different types of information system and individual technology acceptance behaviour (Surendran, 2012).

For this study, three constructs of TAM were applied: Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Actual Systems Use (ASU). Davis (1989) defines PU as the prospective user's subjective probability that using a specific application system will enhance his/her job or life performance. PEOU can be defined as the degree to which the prospective user expects the target system to be free of effort. According to the TAM, PEOU and PU are the most important determinants of ASU (Shroff et al., 2011). PU and PEOU have an influence on ASU. This is based on the following assumptions:

- If municipality staff perceive the system as useful and easy to use, they might have a positive attitude toward using it.
- If municipality staff has a positive attitude toward the system, they might use the system purposefully and have better intentions toward it.

The ASU was measured through data logs from the server. To assess PU, PEOU and ASU, municipal users were interviewed before, during and after the system implementation timeframe of six months. The questionnaires can be found in Appendix E and Appendix F. The ICT system was monitored regularly from 01 November 2014 to 10 June 2015. Monitoring the system usage involved keeping track of the number of complaints recorded, the number of complaints resolved, and the number of complaints waiting for feedback.

A research team member logged into the system, checked for any newly recorded complaints and recorded their reference numbers, contact numbers and operational level in an Excel spreadsheet. If a mobile phone number was available, complainants received a feedback SMS (Figure 11).

The analysis of the system evaluation can be found in Chapter 5.4.

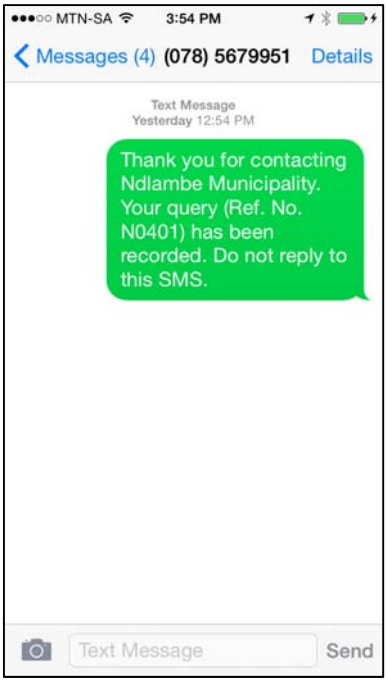


Figure 11: Example of feedback SMS

3.5 Analysing the Capacity of Municipalities

A combination of the Adaptive Capacity Wheel (ACW) and the Information Value Chain (IVC) was used to analyse the capacity of municipalities to implement a system and adapt to change.

3.5.1 The ACW method

The ACW was developed by Gupta et al. (2010) as a means of assessing and visually communicating an institution's adaptive capacity to show its strengths, weaknesses and opportunities for improvement in adapting and responding to climate and/or environmental changes. It is one of the methods developed and tested in the context of government capacity assessment. The ACW consists of six dimensions and 22 criteria.

To match the method to this study, the criteria were adjusted to better reflect the adaptive capacity for each municipality in the context of service delivery. The adaptive capacity was assessed, both before and after the implementation of the ICT complaints management system, which highlighted those aspects of each municipality that enable or inhibit their ability to adapt to change. A detailed overview of the specifics of the method is given in Appendix G.

ACW consists of five steps (Gupta et al., 2010):

- Preparing for research.
- Collecting data.
- Analysing data.
- Interpreting data.
- Presenting it.

Figure 12: The ACW (Klostermann et al., 2010)

Preparing for the research involved internalising and modifying the dimensions and criteria to establish their relevance to the study. Data was collected through semi-structured interviews. The data was analysed by scoring each criterion of the wheel and providing reasons for each scoring. The five scores with their colour-coding and explanations are shown Table 3.

Table 3: Scoring the criteria of the ACW (Klostermann et al., 2010)

Green	Lime	Light-yellow	Light-orange	Red
Institutional structure enhances adaptive capacity for adaptation	The structure exists, and could but is not (yet fully) applied to adaptation	Neutral score (positive nor negative effect expected)	Gap that needs to be filled to counteract negative effect on adaptive capacity	Institutional structure obstructs adaptive capacity for adaptation
Score 2	Score 1	Score 0	Score −1	Score −2

Once all criteria for a particular dimension have been scored, an aggregate for that dimension was calculated. This was done by adding the scores and dividing them by the number of criteria for that particular dimension. The aggregated scores for each dimension were scored according to the values in Table 4.

Table 4: Explanation of aggregated scores (Klostermann et al., 2010)

Effect on adaptive capacity	Score	Aggregated scores for dimensions and adaptive capacity
Positive effect	2	1.01 to 2.00
Slightly positive effect	1	0.01 to 1.00
Neutral or no effect	0	0
Slightly negative effect	−1	−0.01 to −1.00
Negative effect	−2	−1.01 to −2.00

The values in Table 4 were also the values used when scoring the overall adaptive capacity, which was aggregated from the scores of each dimension. The data was interpreted to present it in a way "*… that communicates the strengths and weaknesses of a specific institution or institutional context in terms of adaptive capacity*" (Gupta et al., 2010). As outlined by Gupta et al. (2010), this includes:

- Interpreting the scores to give them meaning in their context.
- Explaining (inter-) dependencies between dimensions and/or criteria and tensions between dimensions and/or criteria.
- Explaining which criterion appears to conflict with another criterion in a specific situation and why.
- Drawing conclusions on what the interpretations imply about the ability of a specific institution to promote adaptive capacity and what can be done to improve the adaptive capacity of the institution.

The results prior to the ICT implementation are presented in Chapter 4 and the analysis after the implementation is presented in Chapter 6.

3.5.2 IVC method

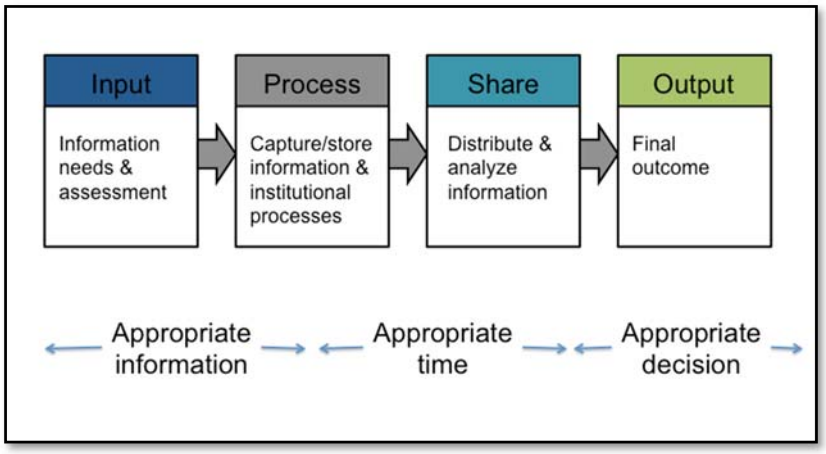


Figure 13: IVC (Kaplinsky & Morris, 2001)

The IVC is used frequently in the economics sector to model value-creating events and evaluate an organisation's competitive advantage (Kaplinsky & Morris, 2001). The IVC is an adaption of the value chain principles. It is defined as "*… an integrated framework that bridges the processes, organisations, technology necessary to manage, analyse and use information*" (Gresham & Andulis, 2002). The IVC approach was used in this study to understand the value of information, the information flow and the decision-making processes within rural municipalities.

IVC has four aspects, namely, input, process, share and output. All four chains are connected by transformation activities where information is transformed from an input to a final outcome.

- Input – considers what information is needed by the municipality to respond (outcome).
- Process – looks at how information is captured and stored and also considers the institutional process which follows, i.e. the workflow within the municipality.
- Share – municipalities are required to share information, issue warnings and keep the public informed of the municipality's general activities. This takes place through various forms such as publishing in media such as newspapers, radio, websites etc. or occurring in public meetings.
- Outcome – the final decision-making product and takes the form of a response or action.

Municipal staff were interviewed using topic guides including themes such as municipal structure, daily work functions and workflow, complaint mechanisms, community interaction with municipality, service delivery challenges and others. Community interviews and focus groups were structured in a similar way to garner information of citizen perceptions and expectations of the municipality as well as real

interactions. The IVC approach was used as an analytical tool by categorising information into phases (such as input, process, share and outputs), perspectives (such as information needs and assessments and institutional processes among others), objectives (such as appropriate information, time and decision). Each category had a list of features or questions that had to be satisfied. An overview of the topic guide can be found in Appendix H.

The analysis prior to the ICT implementation is shown in Chapter 4. The findings for each of the municipalities after the implementation are in Chapter 6.

3.6 Methodology for Assessing Public Engagement

To assess and evaluate mechanisms for public engagement, the Social Goals Evaluation Framework (SGEF) was used (Beierle, 1998). The SGEF is centred upon six social goals. These goals are intended to project the outcome of a participatory process, which goes beyond the immediate interest of any of the stakeholders involved in the process. The goals are defined as follows:

Goal 1 – Educating and informing the public

Goal 1 focuses on the importance of the public being educated through a process of public participation. The public requires knowledge to make informed decisions and constructive contributions, and to formulate alternatives with government representatives and experts. For this reason, public engagement has to be educational and build knowledge.

Goal 2 – Incorporating public values, assumptions, and preferences into decision-making

Goal 2 focuses on educating decision makers. The process of discussing differences in values, assumptions and preferences in a public decision requires all stakeholders to be included and heard.

Goal 3 – Improving the substantive quality of decisions

Goal 3 builds on Goal 2. Including public input in to the decision-making process has proven to result in designing technically rigorous solutions and satisfying a wider range of interests. The public should be viewed as a source of inputs and innovative alternatives. Additionally, the public also ensures sustainability of a solution by having previously been part of the decision-making.

Goal 4 – Increasing trust in institutions

Goal 4 is focused on building or regaining the trust of citizens. One of the most effective ways to achieve this is by involving and empowering the public in the decision-making process.

Goal 5 – Reducing conflict

Goal 5 is based on the suggestion that conflict between stakeholders will be reduced if the process of public participation is used to identify shared norms and values.

Goal 6 – Assuring cost-effective decision-making

To understand the cost of a decision, the five goals above are evaluated to balance the cost and the efficiency of the mechanism chosen. Goal 6 is not concerned with the cost efficiency of the decision made through the process, but with the mechanism chosen to engage. This goal accesses the efficiency in terms of time, money and to what level it helps achieve the first five goals.

The current methods of public participation in each municipality were assessed against these goals and then compared with the results of the assessment after the ICT complaints management system was implemented. Citizens' perspectives on different methods of public participation and engagement were identified and analysed. The survey instrument used was a questionnaire, which focused on the following six particular methods of public participation:

- Focus groups.
- Public comment (filling in questionnaire or telephone interview, survey).
- Public hearing/meeting.
- Public notice (notices, pamphlets, loud hailer, news media).
- Advisory groups (neighbourhood council, subcommittees, committee councils).
- ICT system.

For each of these methods, a set of questions was developed (Appendix I). The citizens' perspectives were assessed pre- and post-ICT complaints management system implementation. Table 5 shows a representation, designed by Beierle (1998), of the findings of the analysis. It aids to link the mechanisms to each goal in order to understand the success of the public participation method used in fulfilling the six goals. The table was adapted for this study and the matching between mechanisms and goals was done using a reductionist approach.

Table 5: Goals and mechanisms (Beierle, 1998)

	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
Mechanisms	education	information	public values	substantive quality	trust	reduced conflict	cost-effectiveness
Non-Deliberative Mechanisms for Obtaining Information From the Public							
Survey	○	○	●	●	○	○	●
Focus group	○	○	●	●	○	○	●
N &C Rulemaking	○	○	●	●	○	○	●
Non-deliberative Mechanisms for Providing Information to the Public							
Information provision	◗	●	○	○	●	○	●
Public Notice	○	◗	○	○	◗	○	
Public education	●	◗	○	○	●	○	●
Traditional Mechanisms							
Public hearing	○	●	●	●	◗	◗	●
Citizen Advisory Ctte.	●	◗	●	●	●	●	●
Public Deliberation							
Citizen Juries/Panels	●	◗	●	●	◗	◗	●
Consensus Conference	●	◗	●	●	○	◗	●
Alternative Dispute Resolution							
Mediation	○	○	●	●	◗	●	●
Regulatory Negotiation	○	○	◗	●	◗	●	●

○ = not applicable; ◗ = may be applicable; ● = applicable

The findings of the analysis prior to the implementation are shown in Chapter 4. The findings after the implementation of the ICT are shown in Chapter 6.

4 ANALYSIS OF COMMUNITY ENGAGEMENT PRE-ICT IMPLEMENTATION

4.1 Introduction

As highlighted in the literature review, a constructive relationship between municipalities and communities can serve as an incentive for positive engagement between both parties. Such engagement relies on understanding the capacity of the municipality for responding to community needs and the community's requirements for engagement with the municipality. This section describes the status quo of capacity, information flow and public engagement prior to the implementation of the ICT complaints management system. The results are presented per municipality.

4.2 Municipality A and its Communities

As highlighted in Chapter 3, municipality members and communities were interviewed at the outset of the study in order to understand critical challenges that affect current practices of engagement as well as challenges in service delivery.

4.2.1 Analysis of Municipality A's adaptive capacity

The analysis of the interview data to assess the adaptive capacity of Municipality A resulted in the wheel in Figure 14. Municipality A's adaptive capacity is −0.46, which shows a slightly negative ability to adapt and respond to change. The main dimensions contributing to this outcome were: *Resources* (−2), *Room for Autonomous Change* (−1.67) and *Fair Governance* (−1.25).

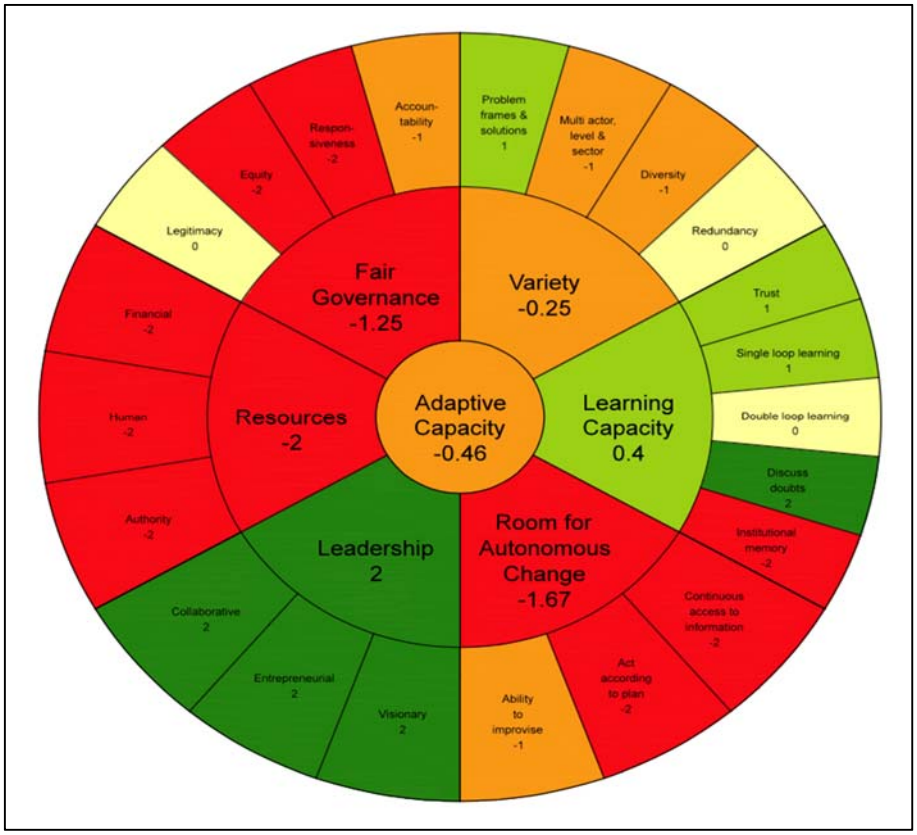


Figure 14: Municipality A: Pre-ICT implementation ACW

The dimension of negative resources was identified by all municipal interviewees during interviews. It was highlighted that the municipality often required the skills of external service providers to resolve water and sanitation issues. Skills in the workforce of the municipality were lacking and/or insufficient. Although water controllers had been trained properly, there were not enough water controllers to manage the current workload. There was a strong experience of the municipality being understaffed owing to a lack of funding. It was also suggested by some of the participants that the "*aging human resources needed to retire*" and be replaced by "*new energetic people*" (Municipal Staff Member, 2014). Some interviewees stated that their positions were not attractive and potential employees did not see room for growth. Staff indicated that there was an aspiration to work for metropolitan municipalities. As the score of −2 for *Financial Resources* shows, the municipality relies substantially on external funding and raises little of its own budget. External funding is not always readily available and thus access to resources is compromised. The lack of financial and human resources was highlighted as contributing substantially to the difficulty of the municipality to comply with the legal requirements for water and sanitation service provision.

The dimension of *Autonomous Change* depends on the ability to improvise, act according to a plan and have access to information. A lack of information was identified as a substantial hindrance for the municipality as well as citizens. The municipality communicated water quality information to the public via the municipal website. However, most citizens only have access to the Internet via the municipal library. More locally relevant methods, such as making hard copies available in community centres, were not employed. Citizens were informed of issues in the municipality through formal structures such as ward councillors and ward committee members.

Loud hailers were a popular method used for making public announcements. Notice boards, community radio stations and local newspapers did exist but were underutilised. Most of these methods required the citizen to engage to be kept informed. This made it difficult for citizens to be involved in resolving issues of water and sanitation. Although some information systems were in place in the municipality, keeping these updated remained a problem owing to the lack of human resources. A lack of access to information left both the municipality and its citizens in a position where improvisation is a near impossible feat. It was also stated that citizens were generally unaware of what to do during a water and sanitation emergency. Room for *Autonomous Change* is hence low.

The conditions were not conducive for the municipality to be in a position where it was able to effectively respond to the community it serves. Certain geographical areas of the municipality experienced more challenges; the municipality distributed its resources to provide a "*greater part of that slice*" to these areas (Municipal Staff Member, 2014). It was highlighted that some citizens perceived that preferential treatment occurred based on their experience of not receiving feedback on lodged complaints. Citizens had the opportunity to raise their concerns and engage with the municipality as part of the Integrated Development Plan (IDP) consultation process. It was, however, unclear how many citizens used this opportunity. The municipality had not experienced protest action in the recent past, which could be interpreted as support for the decisions made by the municipality. There was no evidence of the municipality being held accountable or suffering consequences when failures relating to water and sanitation delivery occurred. However, without access to information and institutional memory, it remained difficult for the municipality to know whether they comply with regulations and policy.

There was no identifiable lack of trust and mutual respect between municipal staff members and different departments. The leadership had the support of the staff, and departments were able to rely on one another when resolving issues of water and sanitation. It was recognised that the existing complaints process made it difficult for citizens to lodge complaints, which affected the ability of the municipality to respond. A method of 'job cards' was used but no record of the number of complaints was kept and hence institutional memory was low or non-existent. Feedback on citizen complaints was a substantial challenge with no process in place. The failure to provide feedback had the serious consequence of a perception of preferential treatment occurring. This hampered the mutual respect and

trust between the municipality and its citizens. The municipality staff was openly discussing and acknowledging challenges and shortcomings, which highlighted the ability to share issues without concern in the municipality.

In summary, the lack of resources greatly affected the municipality's variety and room for autonomous change. Even with a capacity to learn and good leadership in place, fair governance was still affected (whether directly or indirectly) by the lack of resources. Municipality A's characteristics and dimensions were interlinked and affected each other both positively and/or negatively. The linkages determine the impact the municipality had on its own ability to adapt and respond to change. The expectation of the ICT intervention was to bring about changes in the characteristics and dimensions of the municipality. This would result in improving the impact the municipality has on its own adaptive capacity.

4.2.2 Analysis of Municipality A's IVC

The analysis of interview data evaluating the value of information in Municipality A is shown in Figure 15.

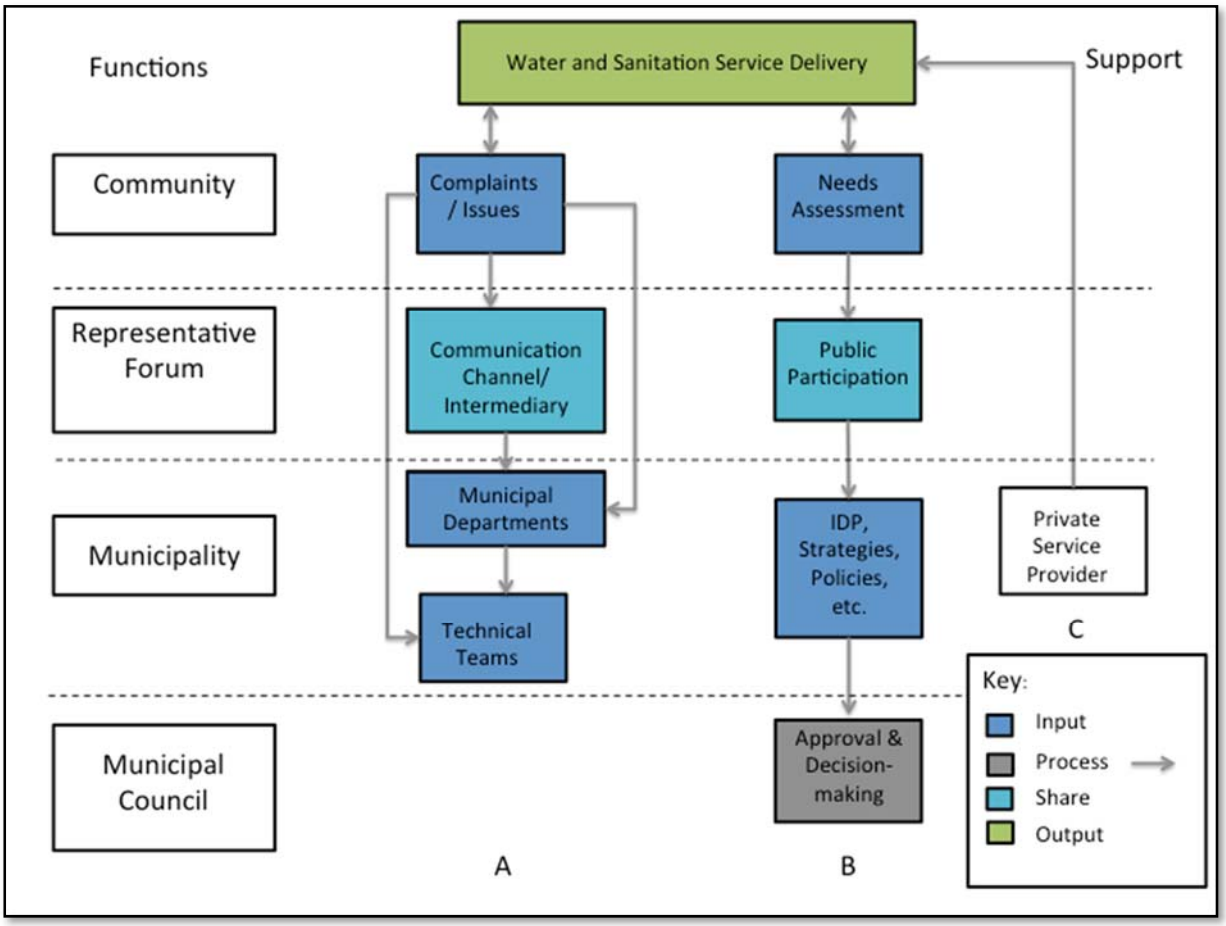


Figure 15: Municipality A: IVC map

Input (dark blue)

Input refers to the information needed by the municipality to respond to any service issues. Chain A represents the workflow of response to issues raised by the community in Municipality A. There are numerous methods of engagement and channels of communication. Communities might raise issues by either addressing the municipality directly, or going through ward councillors, community development workers (CDWs) and other field staff. These become intermediaries as they liaise between the community and municipality, and share information. Differing methods of engagement were observed in different social classes. Ward councillors seemed to be more utilised in low-income areas, while affluent areas communicated through resident associations or other independent bodies. Affluent residents were experienced to gain access to the municipality using a variety of methods, such as the Internet, email and telephone. The low-income demographic relied on traditional communication channels that were considered to be the most economical and convenient such as interacting with the elected representative or a technical team working in their area (this required longer waiting times) or as a last resort, calling the municipality or personally visiting the municipal offices (Forlee & Rivett, 2015).

Process and share

Process looks at how information is captured, and this is represented in grey in Figure 15. Prior to the ICT implementation, some information regarding complaints was captured by the municipality using existing ICT-based platforms. However, since most of the population had no access to Internet facilities, the decision makers such as the municipal council did not always receive information that was valuable for decision-making. The constraint of access to digital media also limited the municipalities' ability to share information. Owing to high levels of illiteracy, information sharing still relied heavily on public meetings and loud hailers.

Output

The IVC output appears in Table 6 and Table 7, which outline the enablers and barriers to an improved information value contribution for the Municipality A prior to the ICT implementation.

Table 6: Municipality A: Enablers for improved value contribution

General Enablers	
Enabler	**Description**
Social media and communication strategies	Municipality A has a Facebook page and the use of social media was identified as a potential communication channel, especially to engage with young people. On a follow-up visit, the municipality presented the research team with a communication strategy that incorporated various communication channels, such as social media, radio, and newspapers.
Satellite offices	These offices are an alternative and convenient form of interaction with community members, especially the elderly who prefer personal contact. Ensuring effective communication between these offices and the municipality is very beneficial for information transfer and flow.
Willingness to co-operate	Developing a communication strategy shows a willingness to participate and improve.
Information sources	Utilising multiple sources of information allows citizens to choose a preferred method of communication. Although organising and gathering data are complicated, once the different sources are collated, it would make information and workflow easier.

Table 7: Municipality A: Barriers to improved value contribution

General barriers	
Barrier	**Description**
Information technology (IT) skills	Substantial lack of IT skills.
Customer service	Customers and municipality have recognised that staff are unable to assist (owing to a lack of technical knowledge) and are occasionally unfriendly.
Roles of staff	There is a need to identify staff to manage complaints system.
Unsure of who to contact	Most customers use the emergency number because they are unsure of whom to contact directly.
Contact number	Numbers are not toll-free.
Multiple sources of information	Information is reported telephonically, email, formal letters, word of mouth via CDWs or ward councillors, walk-ins, etc. Need to integrate all these sources into a central register.
Tracking mechanisms	Tracking mechanisms do not exist.
Municipal capacity	Municipality is concerned about its capacity to respond to complaints.
Outsourcing	IT systems are outsourced.

4.2.3 Analysis of Municipality A's community engagement process

The community engagement process of Municipality A was analysed through interviews with communities in the towns of A1, A2 and A3. General challenges for community members were identified as high unemployment, housing shortage, water shortage and poor water quality. An analysis of the existing water and sanitation infrastructure showed that several different sanitation systems are used, and that water is provided through on-site taps, JoJo tanks and municipal tankers. Table 8 to Table 10 are drawn from Beierle's framework and represent each town's analysis of the various participatory mechanisms and link them to six the public participation goals.

Table 8: A1: Analysis of participation mechanisms

	A1						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
NON-DELIBERATIVE MECHANISMS FOR OBTAINING INFORMATION FROM THE PUBLIC							
Survey /questionnaire							
Focus group	●	●	◐	◐	◐	◐	◐
NON-DELIBERATIVE MECHANISMS FOR PROVIDING INFORMATION TO THE PUBLIC							
Public notice							
Posters							
Pamphlets							
Loud Hailer	●	●	○	○	○	○	○
News Media							
TRADITIONAL MECHANISMS							
Public hearing/meeting							
Advisory Committees (Ward Committee, Committee Councillors)							

● applicable ◐ possibly applicable ○ not applicable

Table 9: A2: Analysis of participation mechanisms

	A2						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
NON-DELIBERATIVE MECHANISMS FOR OBTAINING INFORMATION FROM THE PUBLIC							
Survey /questionnaire							
Focus group	●	●	●	●	●	◐	●
NON-DELIBERATIVE MECHANISMS FOR PROVIDING INFORMATION TO THE PUBLIC							
Public Notice	.						
Posters							
Loud Hailer	●	●	○	○	●	○	●
Pamphlets	●	●	○	○	◐	○	●
Newspaper							
News Media							
TRADITIONAL MECHANISMS							
Public hearing/meeting	●	●	◐	●	●	◐	●
Advisory Committees (Ward Committee, Committee Councillors)	●	●	●	●	●	●	●

● applicable ◐ possibly applicable ○ not applicable

Table 10: A3: Analysis of participation mechanisms

	A3						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
NON -DELIBERATIVE MECHANISMS FOR OBTAINING INFORMATION FROM THE PUBLIC							
Survey /questionnaire							
Focus group	●	●	●	●	●	●	●
NON-DELIBERATIVE MECHANISMS FOR PROVIDING INFORMATION TO THE PUBLIC							
Public Notice	.						
Posters							
Loud Hailer	●	●	○	○	○	○	●
Pamphlets	●	●	●	●	◐	◐	●
News Media							
Traditional Mechanisms							
Public hearing/meeting	●	●	●	●	●	●	●
Advisory Committees (Ward Committee, Committee Councillors)	●	●	◐	◐	●	●	●

● applicable ◐ possibly applicable ○ not applicable

As the interviews showed, Municipality A engaged with its community via public meetings, loud hailers and ward committee communication. Participants highlighted the shortcomings of loud hailers with only one of the towns identifying them as being effective. Loud hailers appeared to only serve to inform and educate (Goal 1) but did not allow the opportunity to engage. While it was recognised as one of the most cost-effective methods of communication, it was not perceived to be an effective method for engagement. Public meetings, on the other hand, were considered as a mechanism that not only informs the public (Goal 1) but also gives the public an opportunity to be involved in the decision-making process; therefore, achieving Goal 2 and Goal 3. As a result, community members felt public meetings build trust (Goal 4) between experts and the community. The introduction of focus group meetings through this study resulted in an overall appreciation of this method of engagement. There was an experience of trust, but also a feeling of true knowledge exchange due to the direct engagement with the researchers. Goal 5 was reached by developing consensus on shared values and addressing differences.

As for ward committees and ward councillors, the scale in which participants experienced the engagement as effective method for participation differed between towns. In two of the towns, participants believed ward committee and councillors play an essential role in informing the community as they liaise between the municipality and the community. Participants who identified themselves as having a closer relationship with community leaders viewed them as able to achieve true participation. Some of the community members felt they could trust their leaders and acknowledged them for attending to their needs and voicing their concerns to the municipality. Unfortunately, the participants of the towns indicated that they were not even aware who their leaders were, and therefore could not comment on this communication mechanism.

4.3 Municipality B and its Communities

Municipality B members and the communities were interviewed at the same time as those of Municipality A to understand the critical challenges that affect the local practices of engagement and service delivery.

4.3.1 Analysis of Municipality B's adaptive capacity

Similar to Municipality A, Municipality B had a slightly negative capacity of −0.42 to adapt and respond to change. *Resources* with −1.67 and *Room for Autonomous Change* with −2 were the main dimensions contributing to this, with *Fair Governance* having less of an impact than in Municipality A.

The negative resource factor regarding human resources was classified as −2 owing to the challenges experienced with the qualifications of technical staff. Some of the staff were not trained or qualified as per the requirements of the legislation. Additionally, there was a high turnover of mid-level employees. No external or internal facilities for training of municipal staff members existed. The municipality rated itself as 'low' in relation to skills levels with participants highlighting the fact that skills shortage was not identified as a priority in the municipality. Financial resourcing was repeatedly brought up as the major challenge facing the municipality.

Participants identified interdepartmental communication breakdown as the reason for communities receiving little or no information on issues of water and sanitation delivery. While the municipality had several platforms (such as Facebook, website, radio, notice boards) available for information sharing, these were not used for direct communication purposes. It was highlighted that communities were not always informed immediately of water quality failure. Citizens were not necessarily aware of what to do in an emergency situation, and/or had little or no ability to improvise when faced with issues of water and sanitation delivery. There was no evidence of the municipality being held accountable or suffering consequences when failures relating to water and sanitation occurred.

Figure 16: Municipality B: Pre-ICT implementation ACW

As with Municipality A, the existing conditions did not leave Municipality B in a position where it was able to respond effectively to all voices of society. Although the needs of the communities were included in the formulation of the IDP, the municipality decided on prioritising and implementing IDP goals. Citizens living in urban environments (such as the main towns) were identified as having better access to information and therefore as being “easier to deal with” (Municipal Staff Member, 2014). The municipality stated that urban communities were given preference in water and sanitation service provision. Citizens echoed these sentiments, stating they felt that the existing reporting system was not equitable and preferential treatment occurred. It is important to highlight that similar to Municipality A, Municipality B received a +2 for *Leadership*. The staff highlighted the positive engagement with management. There was clearly visionary leadership that had the support of the staff and the community.

In summary, the lack of resources affected the municipality’s room for autonomous change. Additionally, an impact on its learning capacity was observed. Learning capacity is affected by variety, and variety affects the room for autonomous change. Both variety and the room for autonomous change affected the municipality’s fair governance. Municipality B had characteristics and dimensions that were interlinked and affected each other both positively and/or negatively.

As with Municipality A, the implementation of the ICT intervention was intended to bring about changes in the characteristics and dimensions to change the linkages and improve the municipality’s adaptive capacity. It was also hoped that the ICT system would support the municipality in interdepartmental communication in order to provide information to communities.

4.3.2 Analysis of Municipality B's IVC

The IVC map for Municipality B (Figure 17) had unsurprisingly great similarities to that of Municipality A (Figure 15).

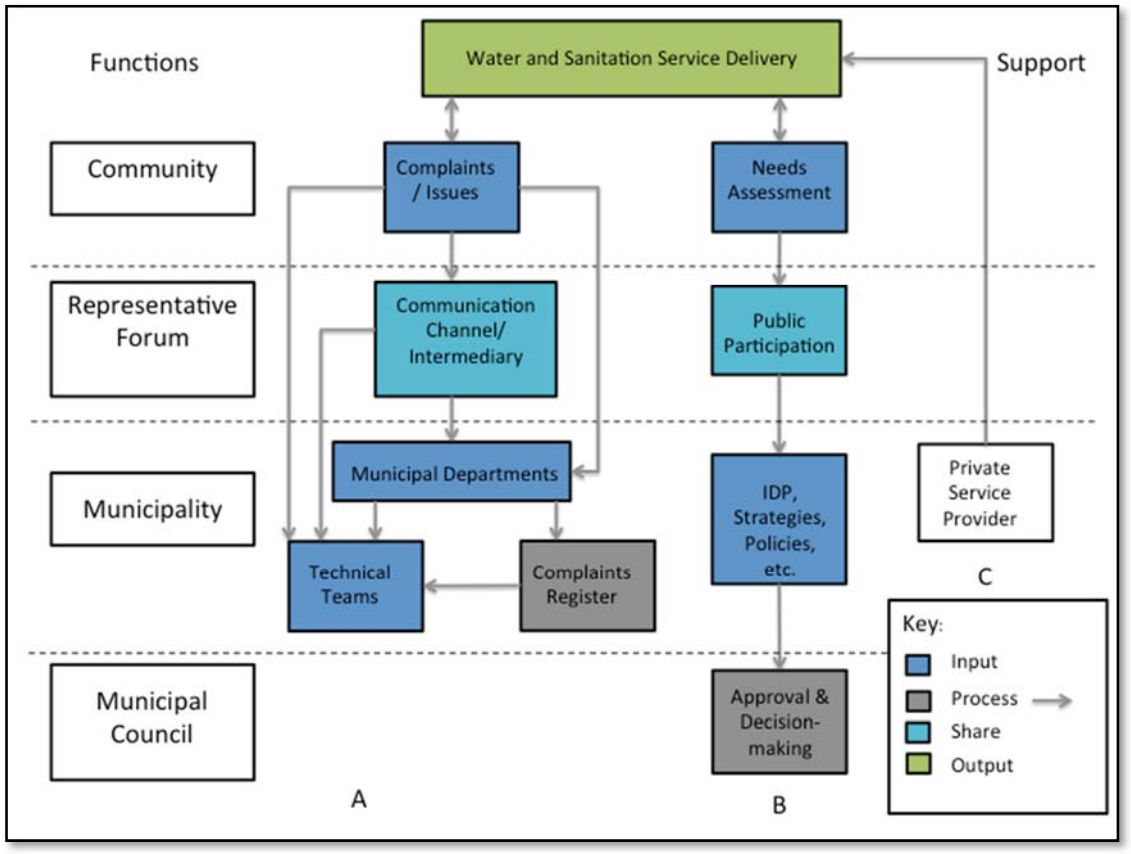


Figure 17: Municipality B: IVC map

As Figure 17 highlights, Municipality B relied, as in the case of Municipality A, on outsourcing certain services and insourcing skills and capacity, shown in Chain C. Chain A is slightly more complex in Municipality B, providing evidence of different forms of engagement. A key difference between the municipalities was that a formal complaints registry existed in Municipality B, which adds to the process function of the municipality.

Input

The input for the IVC stems from previous needs assessments studies that had been conducted during Chain B as part of the strategies for development (e.g. IDP), the record of complaints (i.e. complaints register), institutional memory and various communication channels (e.g. walk-ins, email, telephone and website).

Process

Municipality B had limited resource capacity. However, there was a dedicated person who captured all queries from the public onto an Excel spreadsheet, created job cards based on the queries, and assigned the job to the necessary technical team or department. However, the lack of tracking mechanisms affected the workflow as not all departments were able to access the spreadsheet. Consequently, there were multiple versions of the spreadsheet and information was scattered across various departments. ICT-based platforms existed within the municipality, but similar to the case of Municipality A, a large percentage of the population lacked access to the Internet or was constrained by illiteracy.

Share

Municipality B reported a satisfactory relationship with its community, which was represented by engagement processes with community members. However, the municipality did acknowledge that feedback does not always happen, and that this aspect is frustrating for community members. During the community interviews, some community members admitted that they felt there was no point in reporting to the municipality because they felt that nothing would be done. Information was shared and distributed through various means, namely loud hailing, satellite offices, public notice boards and posters, as well as official structures such as newspapers, the municipal website, and public meetings, among others.

Output

The barriers can be addressed to improve the services rendered to the community and enablers can further be enhanced to ensure effective participation and information flow.

Table 11: Municipality B: Enablers to improved value contribution

General enablers	
Enabler	**Description**
Dedicated staff member to manage complaints register	The proposed ICT system could result in a higher workload for this staff member, but it also means that there is one person to manage and capture all information and collate data.
Satellite offices	Satellite offices offer an alternative and convenient form of interaction to community members, especially the elderly who prefer personal contact. Ensuring effective communication between these offices and the municipality is very beneficial for information transfer and flow.
Willingness to co-operate	Including the research as part of the communication strategy shows a willingness to participate and improve.
Information sources	Utilising multiple sources of information allows citizens to choose a preferred method of communication. Although organising and gathering data is complicated, once the different sources are collated, it would make information and workflow easier.
IT department	There is capacity in the IT department with an efficient IT system to help support the proposed ICT system.

Table 12: Municipality B: Barriers to improved value contribution

General barriers	
Barrier	**Description**
IT skills	Substantial lack of IT skills.
Customer service	Customers and municipality have recognised that staff are unable to assist (owing to a lack of technical knowledge) and are occasionally unfriendly.
Contact number	Numbers are not toll-free.
Multiple sources of information	Information is reported telephonically, by email, formal letters, word of mouth via CDWs or ward councillors, and walk-ins, among others. There is a need to integrate all these sources into a central register.
Tracking mechanisms	Tracking mechanisms do not exist.
Municipal capacity	Municipality is concerned about its capacity to respond to complaints.

4.3.3 Analysis of Municipality B's community engagement process

Table 13 to Table 15 show the Beierle framework results for each town.

Table 13: B1: Analysis of participation mechanisms

	B1						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
Non–Deliberative Mechanisms for Obtaining Information From the Public							
Survey /questionnaire							
Focus group	●	●	●	●	●	●	●
Non-Deliberative Mechanisms for Providing Information To the Public							
Public Notice	-						
Posters							
Pamphlets	●	●	○	○	●	○	●
Loud Hailer	●	●	○	○	○	○	●
Newspaper							
News Media							
Traditional Mechanisms							
Public hearing/meeting	●	●	●	●	●	○	●
Advisory Committees (Ward Committee, Committee Councillors)	○	○	○	○	○	○	○

● applicable ◐ possibly applicable ○ not applicable

Table 14: B2: Analysis of participation mechanisms

	B2						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
Non-Deliberative Mechanism for Obtaining Information From the Public							
Survey /questionnaire							
Focus group	●	●	●	●	●	●	●
Non-Deliberative Mechanism for Providing Information To the Public							
Public Comment	-						
Posters							
Pamphlets	●	●	●	○	●	○	●
Loud Hailer	●	●	○	○	○	○	●
Newspaper							
News Media							
Traditional Mechanisms							
Public hearing/meeting	●	●	◐	●	●	●	●
Advisory Committees (Ward Committee Councillors)	○	○	○	○	○	○	○

● applicable ◐ possibly applicable ○ not applicable

Table 15: B3: Analysis of participation mechanisms

	B3						
	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
Non-Deliberative Mechanisms for Obtaining Information From the Public							
Survey /questionnaire							
Focus group	●	●	◐	◐	◐	◐	○
Non-Deliberative Mechanisms for Providing Information To the Public							
Public notice							
Posters							
Pamphlets	●	●	○	○	●	◐	●
Loud Hailer	●	●	○	○	○	○	●
Newspaper	◐	◐	◐	◐	◐	◐	◐
News Media							
Traditional Mechanisms							
Public hearing/meeting	●	●	◐	●	◐	◐	●
Advisory Committees (Ward Committee, Committee Councillors)	○	○	○	○	○	○	○

● applicable ◐possibly applicable ○ not applicable

The main methods of engagement between the Municipality And the public prior to the ICT implementation were similar to Municipality A: public meetings, loud hailer and ward committees (advisory groups). Additionally, B3 used newspapers in the main town area to communicate with the public. Overall, the introduction of focus groups through this study showed to be the most favourable mechanism. It provided all stakeholders with the opportunity to devise possible solutions or alternatives, which was experienced as promoting a sense of cohesion (Goal 2). In two of the towns, community members felt focus groups managed to achieve all the goals of public participation and even felt strongly that focus groups are "*a proper way to officialise decisions*", as expressed by one of the participants.

The participants in B1 had a higher regard for public meetings than those in the other towns. While the communities of B2 and B3 valued public meetings, they also had suggestions how these meetings could improve. Participants identified that public meetings provided the community with an opportunity to give input (Goal 2 and Goal 3) and identify mistakes (Goal 3). Participants highlighted that meetings were not well organised. There was a sense that the limited distribution of agendas prior to meetings resulted in communities not being aware or prepared. Additionally, it was highlighted that too few meetings resulted in the community being disengaged and excluded from decision-making processes.

The ward committee, councillor engagement and newspaper were viewed as least valued methods of engagement from the participants' perspective. Newspapers were neither affordable nor accessible in the rural communities. Owing to illiteracy, they were also not perceived as being inclusive methods of knowledge distribution. Ward committee and counsellor engagement were not experienced as being effective as communities did not necessarily feel represented by the committees and feedback through committees was too limited. Loud hailers were also identified as a weak mechanism despite having been the most predominant of the existing methods: it only achieved two goals (Goal 1 and Goal 6).

5 ICT SYSTEM DESIGN, DEVELOPMENT AND EVALUATION

As described in the research methodology (Chapter 3.4), the design, development and evaluation of the ICT system were divided into three parts, which will be presented here. The analysis of Chapter 4 provided an insight into the current structures of engagement and the key challenges municipalities face in managing water and sanitation delivery issues. Community members and the municipality staff had also been interviewed on the existing ICT infrastructure and the use of ICTs in the community. The findings from these interviews are presented below.

5.1 ICT System Design

ICT systems are implemented in a context. Literature shows that the sustainability and success of a system implementation depends strongly on the design of the system responding to such a context and being relevant in the local setting (Chapter 2.3). To develop a context-relevant system, the study had to understand these existing practices to enhance the enablers to communication and minimise the barriers. Additionally, a detailed analysis of the existing workflow processes for water and sanitation service delivery was done for each municipality in order for the system to integrate into these processes.

5.1.1 ICT context analysis

In April 2014, semi-structured interviews were held with the municipalities to establish details on the municipal structure, the internal workflow, community engagement practices and the overall challenges and progress. Common challenges within municipalities were the following:

- Lack of IT skills.
- Unsatisfactory customer service approach.
- Unclear roles and responsibilities of staff.
- The process of complaint being cumbersome and sometimes costly to the resident.
- Information in the municipality not being streamlined and coming from multiple sources.
- Lack of tracking mechanisms for progress on complaints.
- Municipal capacity.

Municipality B highlighted the concern of high staff turnover as well as the number of staff who had multiple portfolios. As shown in Chapter 4.3.2, Municipality B had an established complaints process, and a functional website that was updated and used regularly. Additionally, there was an established internal IT infrastructure. The most common methods of laying complaints used by the public were walk-ins, calling in and, in certain instances, email. However, phone calls and emails incurred a financial cost to citizens. Complaints were written on a piece of paper before being entered into a logbook (or Excel spreadsheet). They were then handed over to the responsible person either via phone or in person, but no tracking mechanisms were used. Complaints were attended to on a first-come-first-served basis (depending on the complexity of the problem and availability of resources). No turnaround time for resolving issues was set. On weekends and public holidays, calls were diverted to the municipality's Fire Department, who had a standby technical team available to respond to issues that occurred during these time periods.

Municipality A highlighted a lack of a formal complaints register and the costs residents incurred to lodge a service delivery problem. There was no toll-free line as has been established in most urban environments. The municipality did, however, have a 24-hour telephone line to lodge problems. The community reported service problems in an ad hoc manner without following established processes. Citizens would contact the municipality's offices, municipal workers, the mayor, satellite offices and ward councillors. Walk-ins were the most common method of laying complaints, although no tracking mechanisms for complaints were used. Complaints were prioritised by assessing the impact to the community as a whole. Job cards for each complaint were created and given to the responsible persons. The water resource manager was tasked to resolve water and sanitation complaints.

The ICT analysis showed that all community members either had access to a mobile phone or owned a mobile phone. Additionally, all communities had access to a computer through libraries. Some households had personal computers.

Most phones available in the communities were used for SMS and MMS[7]. Some people used Twitter, WhatsApp and Facebook on a regular basis. The airtime usage varied greatly from community to community.

The field visits and interviews identified the following common barriers both municipalities and their respective communities faced:

- Both municipalities suffered from a lack of funding and resources as well as aging infrastructure.
- Vast distances existed between the main and satellite offices of each municipality.
- Some citizens did not know to whom to report and ended up reporting to the wrong departments and/or municipal staff members.
- Some citizens were deterred by the financial costs associated with reporting a complaint.
- Citizens expressed a lack of feedback from municipalities.
- Citizens felt that preferential treatment existed in the management of complaints.

Enablers identified to implementing an ICT system were the following:

- Both municipalities have existing IT infrastructures in place.
- Technical teams, dedicated to resolving issues of water and sanitation, are available.
- Both municipalities displayed a strong willingness to be a part of the research project and there was a definite interest in taking ownership of the system.

Using the ICT system design considerations and stakeholder inputs, a conceptual design of the system was developed. Although off-the-shelf systems could have been used, e.g. automated call centre applications or fully fledged off-the-shelf mobile applications, they were deemed unsuitable due to the following two main reasons:

- They either required substantial customisation and a high level of technical skill; or
- They were too expensive.

It was felt that the requirement of a high level of technical skill would result in the system not being sustainable. It was therefore felt that a low-cost and low-maintenance system design would be the most appropriate.

5.1.2 ICT system layout

The conceptualised ICT system structure can be described as follows (see Figure 18 for the diagrammatic system design):

1. Citizens were able to use either a PCM system, a toll-free call or alternatively walk to the office to register their complaint. This ensured that there was no cost to the citizen when lodging a complaint or registering a concern regarding service delivery.
2. The local office (which could also be a satellite office) would receive the problem and register the problem and the complainant's contact details. This information was then recorded on the database.
3. The technical team would log into the database daily to review new problems. The team would then schedule a date for the problem to be addressed, and the system created a unique reference number to be sent by SMS to the citizen.
4. The technical team would see to the problem and update the record on the database.

[7] Multimedia messaging service

5. If the problem was still outstanding within three working days, the local office would review the problem, investigate the delays and communicate with the client.
6. Local councillors or CDWs were given a login to the database to review records.

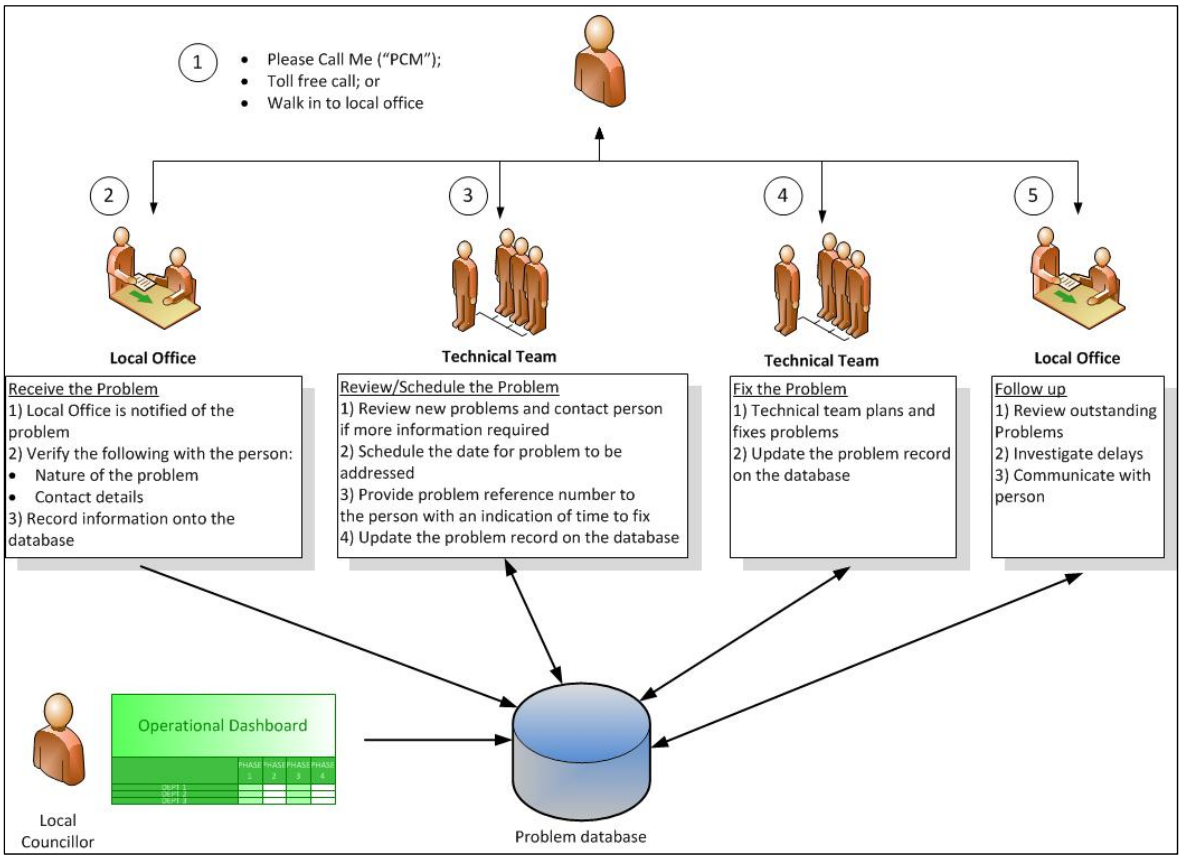


Figure 18: ICT system layout

The architecture of the ICT system was developed to secure appropriate data storage and retrieval. The main function was the data entry module, which ensured that water complaints reported from the community were logged. Figure 19 shows the system architecture with its components.

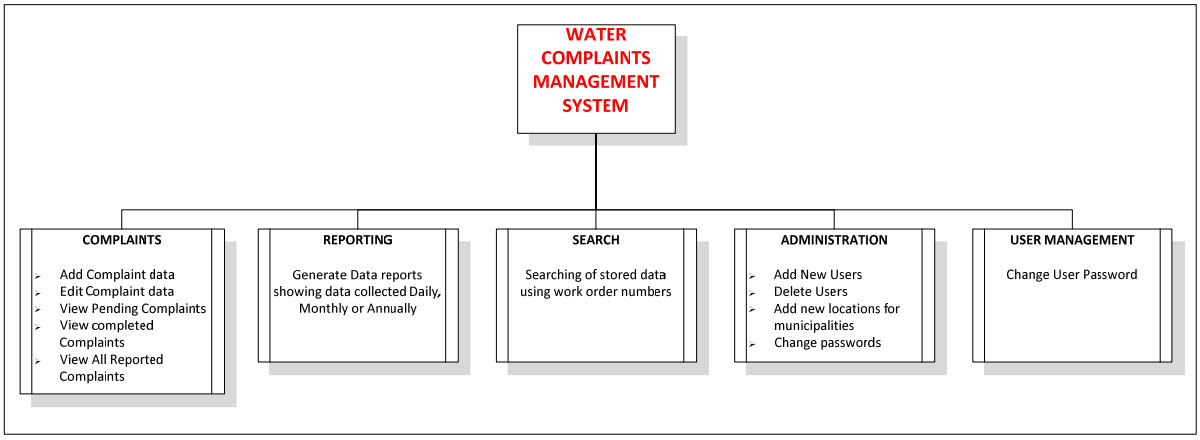


Figure 19: Components of the ICT system

5.2 ICT System Development

The ICT system was developed using the Microsoft.NET Framework (Microsoft Visual Studio 2012) and DevExpress (Developer Express) for the front end of the application. The database was developed using the MySQL Database Management System (client version 5.1.11). MySQL Visual Studio

Connector/NET (version 6.6.5) was used to interconnect between MySQL and Visual Studio 2012 while Crystal Reports Software (version 13.0.5) was embedded within Visual Studio to generate and export reports to PDF, Microsoft Word and Microsoft Excel format.

User interfaces for the ICT system were designed to be simplistic and easy to use (Appendix J). A central database with user logins were created for each municipality, which was hosted centrally on servers located at UCT with the URL: amanzi.uct.ac.za. The servers were supported 24 hours around the clock, which ensured that there was no database failure for the duration of the research project. Regular database backups ensured that recovery of system data was possible even when the system failed. The system had authentication and authorisation mechanisms before any user could access it. The online system security was managed through a firewall security system on the server.

The system design was simple, easy to use, low cost and web-based. Scalability was ensured through it being a web-based system and by supporting several hardware, i.e. computers, tablets and smartphones. Figure 20 shows the accessibility of the software.

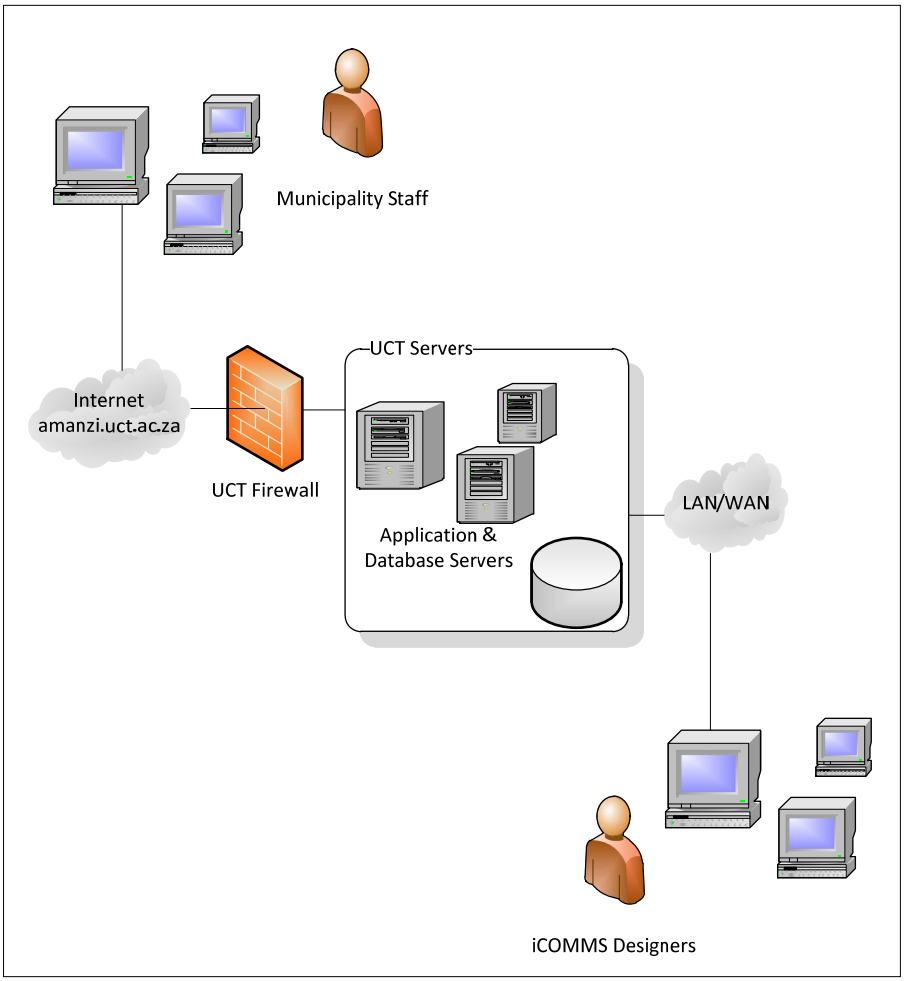


Figure 20: Access to amanzi.uct.ac.za

5.3 Implementing the ICT System

The system was implemented as described in Chapter 3.4.2 in both Municipality A and Municipality B. The system was presented to participants in order to obtain buy-in for the design. The toll-free lines were installed one month prior to the training workshop. A mobile phone was provided for each site to receive the PCM messages from citizens. Pamphlets were designed and translated into each language for distribution in the municipality and at strategic points, such as libraries. Details and findings from the municipal workshops and community focus group meetings are given below.

5.3.1 Implementation: Municipality A

The Municipality A workshop was successful with involved and responsive participants. Only one run-through of the online database was required for everyone to understand. Repetition was not necessary. The responsible persons from the A1, A3 and A2 offices were present. The A3 satellite office indicated that there was no access to a computer. The communications officer assured the staff member that she had informed the IT department about this and that a computer with an Internet connection was to be organised shortly. To address the need for job cards that could be given to the technical team, the system was amended to allow exporting of such job cards.

There was a concern that citizens may abuse the PCM system and that the main office may suddenly receive an influx of calls from outlying towns. The responsible persons from the outlying towns were concerned that people would call the toll-free line and no longer walk into the satellite offices to lay their complaints. The research team agreed with the staff that this would be monitored throughout the project.

5.3.2 Implementation: Municipality A communities

In Municipality A, the communities of A1, A2 and A3 were trained on the system. The meetings had been organised by the community liaison person of Municipality A and a senior staff member from the municipal offices.

In A1, about 20 people came to the briefing session and 15 people took part in the focus interviews. Community members were very engaging and supportive of the project. Frustrations regarding the turnaround time for receiving feedback on delivery issues from the municipalities were raised. Pamphlets were left with the main municipal office and at the library.

In A2, about 25 people took part in the briefing session and 18 people took part in the focus interviews. Community members were enthusiastic, understood the pamphlets and offered to inform others in their community. Pamphlets were left with the information centre.

In A3, the meeting was well organised with 13 people taking part in the focus group interviews. Over 30 people attended the briefing session in the community hall. The group was enthusiastic about the project and pamphlets were left at the post office and at the local pharmacy.

5.3.3 Implementation: Municipality B

The training workshop for the Municipality B staff members was very successful. All representatives and responsible persons from the B1, B2 and B3 offices were present. In addition, a person from another satellite office who had heard about the project attended the workshop. The satellite office was subsequently added to the system as a satellite office despite not having been included formally in the research project.

During the training, it became apparent that the technical team would not be able to log into the database daily. Therefore, it was decided that for the satellite offices (B2, B3 and the additional satellite office), the technical team would be informed of new complaints by the staff responding to the call and logging the complaint. The responsible persons would then also update the database once complaints were completed. While this was a change to the originally intended workflow process, it responded to the local need.

A concern raised was that of calls coming in on weekends and public holidays. Prior to the ICT implementation, calls coming into the B1 office had been diverted to the Fire Department, which was on 24-hour standby. The Fire Department would then contact the technical team and inform them of the details of the incident. The municipality stated that they are satisfied with their back-up plan for weekends and public holidays and the toll-free line was diverted to the Fire Department during this time.

5.3.4 Implementation Municipality B: communities

The system was introduced to each community in B1, B2 and B3. The communication officer of Municipality B arranged the meetings. The system was explained in the local language and it was highlighted to the community that they could use the toll-free line and the PCM system in order to have cost-free access to the municipality. In addition to the face-to-face meetings with the community, focus groups meetings and walkabouts were also held in the area. Pamphlets were distributed at central locations.

In B1, 20 people were present at the arranged meeting and 15 people took part in the subsequent focus group discussions. Findings from the interviews showed that none of the participants knew the public participation officer or community liaison person. General frustration with the municipality was expressed. However, all participants understood how to use the system. This was confirmed by database entries, which showed that the system was used immediately and extensively. Pamphlets were distributed to the general public and some were left at the main municipal office.

In B2, only seven people were present at the community hall meeting and it very quickly became clear that the meetings had not been organised in advance. However, the meeting continued and pamphlets were distributed afterwards at the clinic, school and to private households. The research team also engaged with the public and informed them in informal discussions and by distributing the pamphlets.

In B3, 15 participants were present for the arranged meeting and all participants took part in the focus group interviews. All participants understood the purpose of the study and how to report complaints. Frustration regarding the lack of feedback from the municipality was raised. Similar to the other communities, pamphlets were distributed to households, the library, two shops and the post office.

5.4 Evaluation of the ICT System

Using the methodology described in Chapter 3.4.3, the ICT system was analysed using the TAM. Analysis of data showed that the ASU was influenced by the PU and PEOU of the system. The TAM analysis consisted of seven items (Table 16) that measured the PU (three items) and PEOU (five items). The results presented in Table 16 are based on the questionnaire distributed immediately after the training.

Table 16: Evaluation of ICT system after implementation

Factor	Results (%)
PU	Eight users (90%) suggested that the system would make a meaningful contribution to the municipality.
	Seven users (78%) said that they would recommend the system to another municipality.
	Six users (67%) said that the system would help complaints data management. Three users stated additionally that the system would help with easy report generation.
PEOU	Six users (67%) stated that the system was easy to use while one user (11%) stated that it is very easy to use.
	Five users (56%) stated the system functioned at an average speed, one user stated the speed was good, and another user stated that it was very good. One user stated that the system was slow.
	Four users (44%) stated that they would have been able to use the application without training while two users (22%) said they could not have used it without training.
	Four users (44%) stated that it was their perception that it would take them 30 minutes to understand the application while one user (11%) stated one hour and another user (11%) stated two hours.

The results showed that there was an overall experience of a high PU and PEOU. This had an impact on the users' attitude regarding the ASU. The number of users in the municipality may seem low; however, it has to be clarified that no more than one person is usually responsible for recording complaints. The system implementation resulted in staff being included in the complaints process more formally. The system changed the workflow environment of the municipality; its use was a reflection of the PU, PEOU and the subsequent ASU. Despite there only being a few system users in the municipality, they were an actual representation of the entire municipality based on their job function.

An assessment of the system usage using the login data and reports was done for each municipality from 1 November 2014 to 10 June 2015.

5.4.1 Municipality A

Municipality A logged a total of 429 complaints (Figure 21). After the first month of usage, the number of complaints dropped substantially in December 2014 and January 2015. It was confirmed with the municipality that this was mainly due to the December–January holiday season, which resulted in the system not being used with staff being on leave. It cannot necessarily be concluded that the actual number of complaints dropped during that time. There was no other record of complaints available. The municipality indicated that owing to citizens going on holiday, the number of complaints usually drops over the holiday period. The research team was not able to confirm this either way. The number of recorded complaints increased again in February 2015 after the research team enquired why no new complaints had been recorded since the end of January. The number of complaints remained relatively constant for March, April and May 2015. The last report was created from the system on 10 June 2015, at which stage 14 complaints had been registered for June 2015. The system continues to be used.

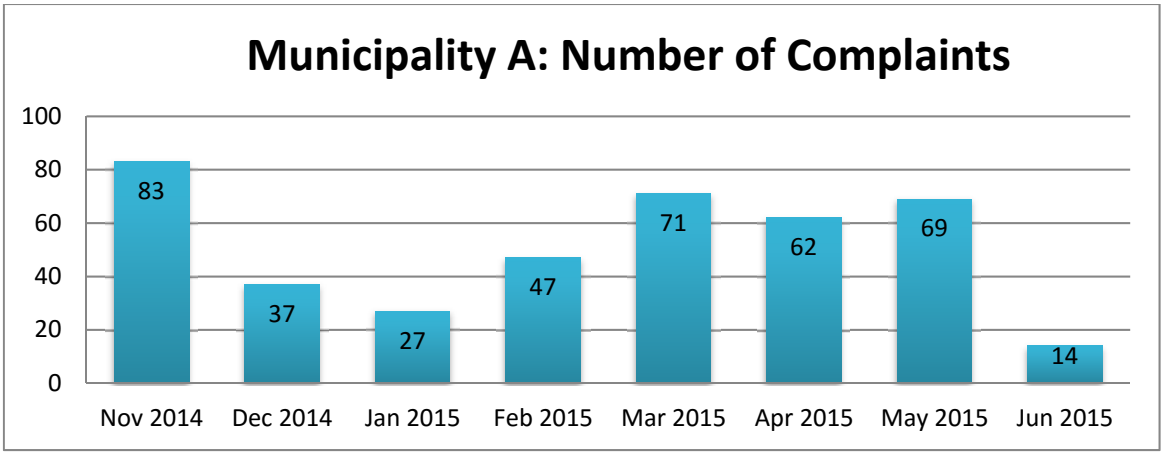


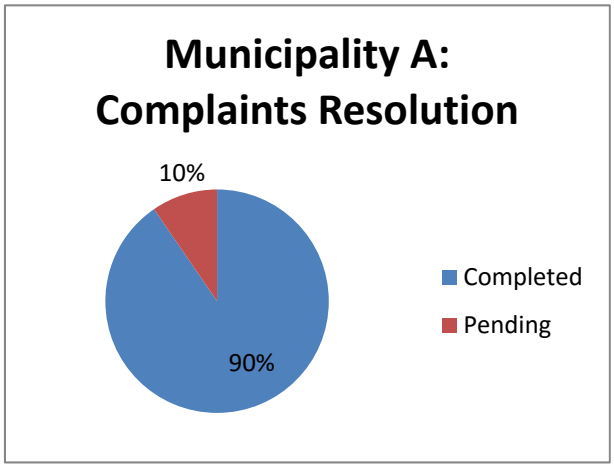
Figure 21: Municipality A: Number of complaints recorded

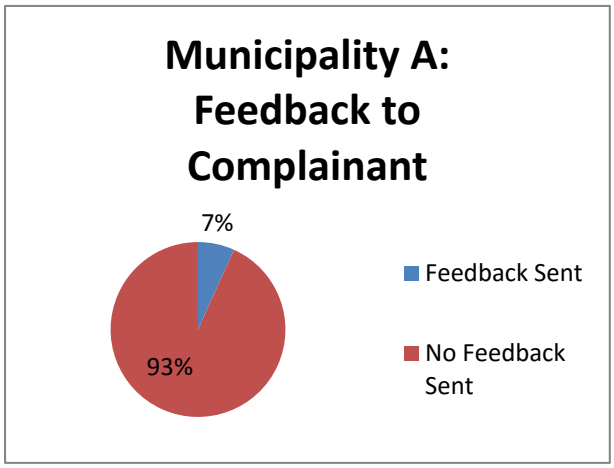
When Municipality A started using the system, it was noted that many of the complaints did not have a full set of contact details entered into the complaint details. The main missing data set was the contact number for the complainant. An interesting finding was that the complaints where a contact number had been uploaded, were the ones that had been resolved. This defeated one of the key purposes of the system of providing citizens with feedback and a reference number, which they could use for follow-up. To establish the reason for the changed use of the system, an investigation with the municipality and users showed that the system usage had changed owing to a process change in the municipality. This process change was developed after the implementation in order to use the system in the most efficient way within the municipality. Complaints were not uploaded when a citizen raised the issue, but rather when the issue had been resolved. This resulted in a 'batch-upload' to the online system every Monday morning. The technical teams were out in the field resolving complaints during the week based on information given to them by the various offices. The teams did not return to the main office between

complaints and did not keep the main office informed of progress. Therefore, complaints were only uploaded post-completion.

This was confirmed by the low percentage (7%) of feedback sent to citizens (Figure 22). That said, the municipality recorded 90% of its complaints as completed. The system purpose had been adapted post-design to suit the municipality's need of becoming a database or storage system rather than a complaints management system that would provide feedback to citizens. While the municipality has adopted the system, it has also adapted it to suit its own need – potentially ignoring the need of the citizen to receive feedback. However, the engagement with the municipality also showed that the human resource for complaint management was so limited that it often had to be dealt with in an ad hoc modus.

Figure 22: Municipality A: Complaint resolution and feedback





5.4.2 Municipality B

In Municipality B, 405 complaints were logged during the study period. As with Municipality A, enthusiasm for the system was high and therefore a relatively high number of complaints were recorded in November 2014. During December 2014 and January 2015, usage and recording of complaints dropped, despite Municipality B being a holiday destination, which results in an increase of citizens. The municipality had indicated during the design phase that in previous years, the number of complaints had increased during the holiday season owing to holidaymakers lodging complaints. It cannot be confirmed whether the number of complaints was higher than usual since there is no additional record of complaints besides the system record. One potential explanation is that owing to staff being on leave, there is a perception of complaints increasing since the limited staff number results in greater pressure on the municipality.

The number of recorded complaints increased in February 2015 when the full staff complement had returned from leave, remained constant for March 2015 and dipped slightly in April and May 2015. Five complaints had been recorded for June 2015 at the time of creating the last report on the system.

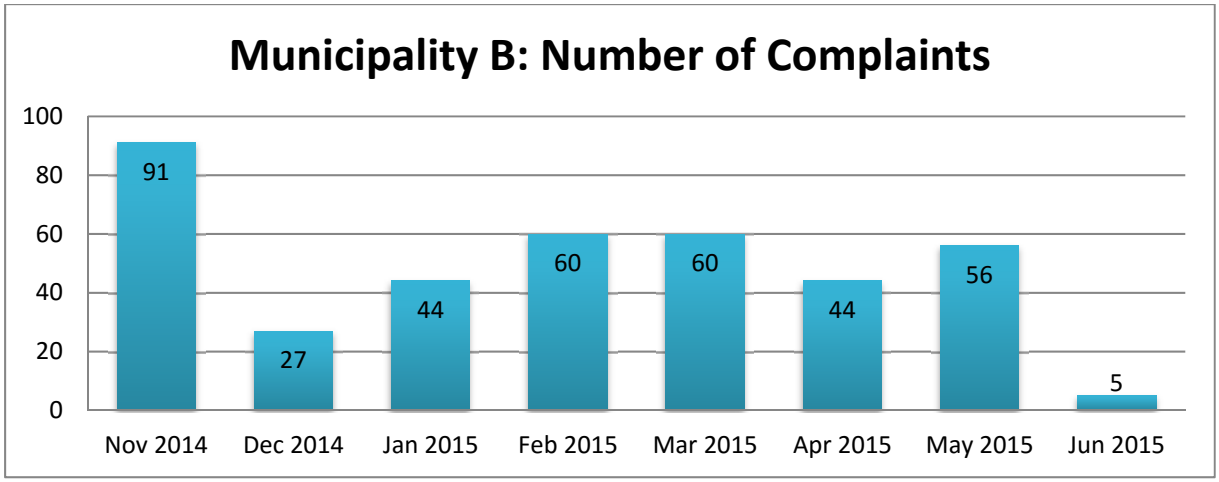
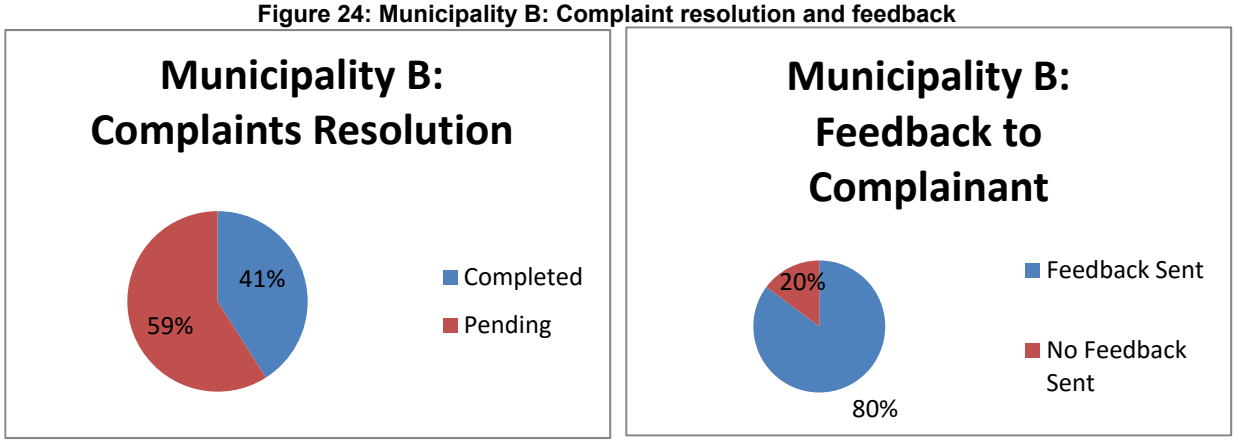


Figure 23: Municipality B: Number of complaints recorded

Municipality B adopted the system more closely to its original intention as a complaints management system. For most complaints recorded, feedback and a reference number were sent via SMS to the complainant. Citizens who did not receive feedback had either not provided a contact number or the number entered was a landline, which had not been accommodated as a feedback line for the SMS. Municipality B had more complaints recorded as 'pending' rather than 'complete' (Figure 24). The municipality attributed this to neglecting to update the status of complaints on the system rather than the complaints not having been resolved. The assessment of the usage of the system showed that Municipality B was able to adopt the system in a more coherent way owing to having a single person responsible for complaints registration and management as part of the customer relations portfolio in the municipality.

Figure 24: Municipality B: Complaint resolution and feedback



5.5 Conclusion

The ICT system design, implementation and evaluation showed that the co-design approach supported the development of a context-based system for which the workflow process was clear at the outset of the usage. Users influenced the uptake and use of the system. Municipal management recognised aspects of the system that had been developed based on their requests. The co-design approach also ensured that the system responded to the low-cost and low-maintenance requirements and was designed according to the needs and abilities of each municipality and the community.

While the use of the co-design approach ensured that all stakeholders were included in the design and uptake of the system, the design process had its own challenges, such as the logistics of organising meetings with all stakeholders and identifying representative groups. The introduction of the toll-free line and the PCM as a method to ensure 'free-at-the-point-of-use' was crucial for the implementation and buy-in from both the municipality and community.

The change of system usage after the implementation in Municipality A showed that the users and the municipality were not able to express a detailed workflow prior to the implementation. Constraints on using the system as per the original conception only became apparent when the system had been implemented and was used on a daily basis. While the municipalities were motivated to use the system, they were equally constrained by their own resources. The holiday periods showed that municipalities were not always able to replace system users and responded to workflow challenges with previously established methods, such as the batch uploads. Overall, the system usage dropped after the first months of use. However, it was not abandoned by the municipality and is still being used.

6 EVALUATING CAPACITY AND ENGAGEMENT POST-ICT IMPLEMENTATION

This study set out to understand whether communities could be incentivised to engage with municipalities to manage water supply challenges. As the previous chapters showed, one aspect of incentivising such engagement depended on establishing mechanisms to report challenges in an easy and accessible way that did not result in additional cost to a person. Other findings were that communities needed to be assured that no preferential treatment existed, that communities were kept informed and included in the decision-making processes and that appropriate feedback mechanisms were established. The interviews with the municipalities allowed an analysis of the capacity to respond to community needs and identified ways to improve communication and feedback. The ICT system was intended to facilitate the improved engagement that would maintain a strong relationship with the community and support the municipality in delivering appropriate services.

This chapter presents an analysis of the changes that occurred for each municipality and its communities after the ICT implementation and use for six months.

6.1 Municipality A

Interviews were held with Municipality A and its communities after the system had been used for six months. The data was then analysed using the same methods as used prior to the implementation. The results are shown below.

6.1.1 Analysis of Municipality A's capacity post-ICT implementation

With reference to Figure 14, Figure 25 shows that the implementation of the ICT intervention only slightly improved the municipality's ability to adapt and respond to change. While the *Resource* factor improved from −2 to −1.67, it remained the main dimension contributing to the municipality having a slightly negative effect of −0.13 on its adaptive capacity.

Room for Autonomous Change and *Fair Governance* both improved, but remained negative values, which contributed to the overall adaptive capacity. *Variety* experienced an improvement due to *Multi-actor Level* and *Sector Engagement* as well as *Diversity* becoming positive scores. The municipality's *Learning Capacity* and *Leadership* remained the same overall. Although the conditions post-ICT implementation did not leave the municipality in a position where it was able to respond effectively to all voices of society, the municipality stated that the intervention had helped them to implement a first-come-first-serve policy more effectively (this excludes any water and sanitation incidences that were classified as emergencies). It also increased their institutional memory in keeping records of complaints.

Citizens interviewed after the ICT implementation were appreciative of the intervention's design taking their concerns into consideration but were sceptical as to whether it would actually "*… change the fact that currently their problems are not being attended to*" by the municipality. Citizens reported that they still had to call "*three or four times*" to follow up on their problem and an explanation for the delay was not always given. The interviews with the community showed that not all citizens were aware of the new system. Although the ICT system introduced a variety of methods (PCM, face-to-face and toll-free line) to promote context-relevant and diverse methods of logging a complaint, making phone calls was identified as a challenge for elderly citizens. It became apparent that they preferred face-to-face engagement and traditional methods of speaking to people.

Figure 25: Municipality A: Adaptive capacity post-ICT implementation

Since Municipality A used the ICT system as a database for uploading complaints after resolving them, all complaints were recorded using the traditional job card system. The cards are created by a community liaison person in the municipality and given to the relevant technical teams. Only once the issue has been resolved and a supervisor has signed off the job card, the details are recorded on the online complaints database. This means that a reference number can only be sent via SMS after an issue has already been resolved, and then only if a contact number was recorded on the original job card. Despite changing the system usage in this way, the municipality stated that mutual respect and trust had improved between municipal staff members and that information was often shared between the Finance Department, communications officer and the Department of Water and Sanitation when resolving issues. Citizens felt that communication with the municipality had improved and that responses to issues seemed quicker than before.

In summary, although the ICT intervention improved the municipality's *Variety* and certain aspects of its *Learning Capacity* and *Fair Governance*, it could not compensate for the *Lack of Resources*. The financial and human resource challenges facing the municipality still affected its *Room for Autonomous Change*, *Variety* and *Learning Capacity* in a negative manner. Despite the existence of *Good Leadership*, Municipality A remained in a position where it has a negative effect on its own ability to adapt and respond to change. The negative adaptive capacity pre-ICT implementation had an impact on the usage of the ICT system and how it was accepted and used.

6.1.2 Analysis of Municipality A's IVC post-ICT implementation

Figure 26 maps the IVC chain for Municipality A post-ICT implementation. As indicated in the system design, the workflow and processes remained the same, except the addition in Chain A, where the orange process highlights the ICT intervention.

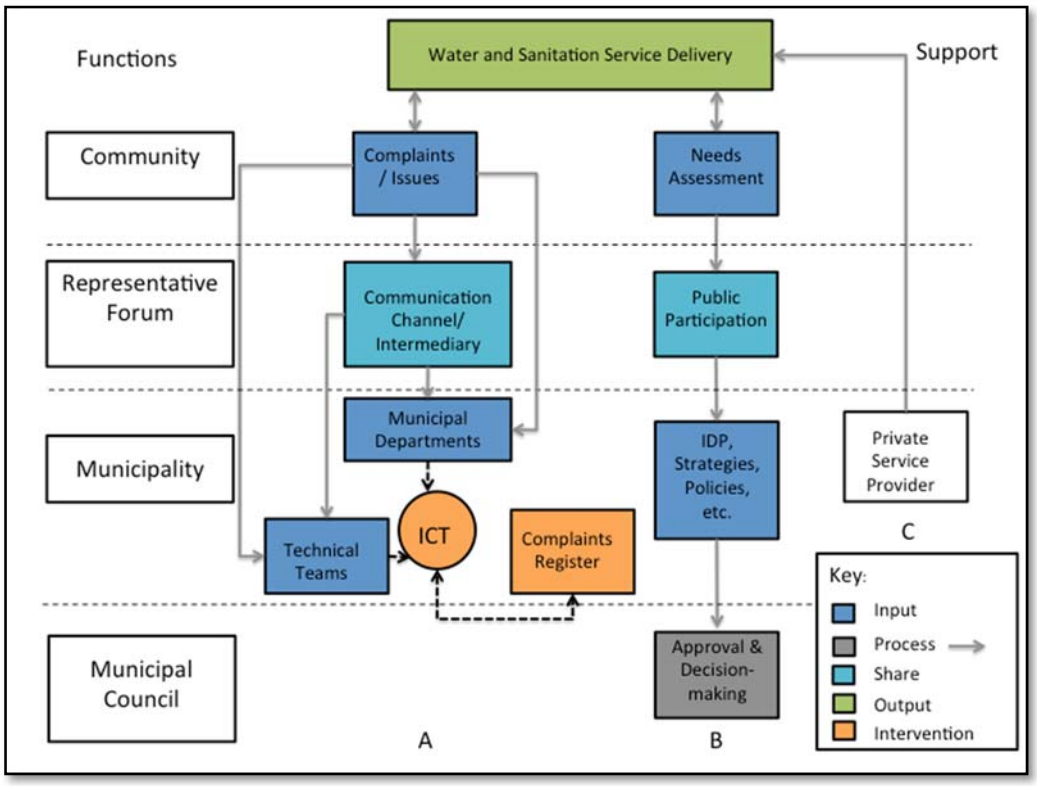


Figure 26: Municipality A: IVC map post-ICT implementation

Input

The toll-free line and PCM system contributed to information inputs. They also added value to the engagement methods previously used in the municipality. By increasing the input methods, information input was improved.

Processes

While the day-to-day workflow processes did not change, the addition of the online database and complaints register affected water and sanitation delivery processes slightly. Municipality A acknowledged that the online database helped them to schedule jobs more effectively and increased institutional memory as record-keeping improved. However, since the municipality did not use the system as per design, the process was only partially integrated (this is represented by the dotted arrows in Figure 26) and the municipality reverted to the established workflow prior to the system implementation.

Share

Municipality A did not use the ICT system for the share of information with the community. Community members indicated that information sharing had not improved with the implementation of the ICT system. While the municipality reported that it shared information with other departments, the ICT data usage analysis did not reflect this as such.

Output

The municipality indicated that it benefitted with valuable outputs, such as improved communication among the different departments and increased trust from the community. Table 17 shows the barriers before the ICT interventions and provides an overview of how these barriers were addressed.

Table 17: Municipality A: Analysis of barriers post-ICT implementation

Addressing the Barriers		
Barrier	**Description**	**Post-ICT Implementation**
IT skills	Substantial lack of IT skills.	Staff members were trained to use the database and familiarise themselves with the procedures to record queries/ issue. This contributed to IT skills development.
Customer service	Customers and municipality have recognised the fact that staff are unable to assist (owing to a lack of technical knowledge) and are occasionally unfriendly.	Both the community and municipality felt that communication and trust had improved. The SMS notifications helped customers feel acknowledged when they made inquiries.
Roles of staff	There is a need to identify staff to manage complaints system.	Using the intervention highlighted the need for dedicated personnel to properly manage the system.
Unsure of who to contact	Most customers use the emergency number because they are unsure of whom to contact directly.	The customers felt that providing a direct line made it easier to identify municipal staff who could help them.
Contact number	Numbers are not toll-free.	Customers felt that the PCM system and toll-free line addressed their concerns with cost and made complaining easier and more convenient.
Multiple sources of information	Information is reported telephonically, via email, formal letters, word of mouth via CDWs or ward councillors, walk-ins, etc. There is a need to integrate all these sources into a central register.	The database allowed all forms of queries to be captured in one place. The municipality had evidence of the number of queries that came in daily, when captured.
Tracking mechanisms	Tracking mechanisms do not exist.	Tracking mechanisms were included in the database and issued to the customer once the query had been captured.
Municipal capacity	Municipality is concerned about its capacity to respond to complaints.	Municipal capacity of resources is still a limitation, but the new workflow has highlighted the need for more staff and efficient processes.
Outsourcing	IT systems are outsourced.	The outsourced systems had little to no effect on the ICT intervention.

The intervention helped to address the barriers identified pre-implementation and highlighted areas that needed further attention. Municipal capacity has been a challenge due to the limited resources available; however, skills development did support staff in performing their roles more confidently and effectively. The SMS notifications with the tracking number helped customers feel acknowledged and improved their perception of the municipality. Some community members commented on the improved response times when they reported an incident and felt that communication had also improved.

6.1.3 Analysis of Municipality A's community engagement post-ICT implementation

The analysis of surveys after the ICT implementation showed that most of the community continued to use traditional means of reporting faults such as walking to the office and calling the municipality. Final interviews revealed that a number of community members were still unclear on how the project related to complaints management and how it interfaced with the municipality. Some participants felt that the system should have been publicised more. Those who experienced the system by receiving, for example, feedback SMSs, felt that it had made a significant difference to the municipality's response compared to pre-existing methods. Secondly, it was felt that a main reason for keeping the system was that it was cost-free (Goal 6), which had been a major concern with previous methods. In all three towns, participants felt that their concerns and values had been incorporated in the design of the system and that it improved engagement compared to methods such as pamphlets and loud hailers. Participants in A2 were more supportive of the system than participants in A1 and A3.

Table 18: Municipality A: Analysis of the community engagement ICT tool

	GOAL 1		GOAL 2	GOAL 3	GOAL 4	GOAL 5	GOAL 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
A3							
ICT TOOL	●	●	●	◐	◐	○	◐
A2							
ICT TOOL	●	●	●	●	●	◐	●
A1							
ICT TOOL	○	○	●	○	○	◐	◐

●applicable ◐possible applicable ○ not applicable

In A2 and A3, people felt educated and informed (Goal 1). There was an experience that the system may improve communication. One of the community leaders in A3 felt it gave the community an opportunity to "*grow as they were exposed to new things*". The members in A2 who used the system went on to state that the project itself had enlightened some of the community members and changed their attitude toward the municipality, therefore reducing conflict (Goal 5). Community members felt heard, and that something was being done about their problems.

Most of the participants were unsure whether the system did help building trust. Two participants in A2 highlighted that *"… providing a direct line and feedback via a reference number would increase the chances of trust being built and give the community a sense that their problem has been noted*". One of criticisms raised was that it excluded illiterate people who were mostly elderly community members as they could not read the pamphlets and were not familiar with phone usage.

The second challenge with implementing the system was that the success of the system seemed to depend on the effort made by the ward councillors and the quality of the relationship they had with the community. This was confirmed by the fact that there was greater knowledge of the system in areas where community members had spoken of a good relationship with the community leader. In areas where the leaders did not engage with the community, people neither used the system nor were they made aware of it other than through the research team's efforts. An interesting finding was that participants who had agreed to distribute pamphlets, did not do so and often forgot them at home. It was found and confirmed by the community that very few participants were motivated to educate others.

6.2 Municipality B

As in Municipality A, interviews were held with Municipality B and its communities after the system had been used for six months. The data was then analysed using the same methods as were used prior to the implementation. The results follow.

6.2.1 Analysis of Municipality B's capacity post-ICT implementation

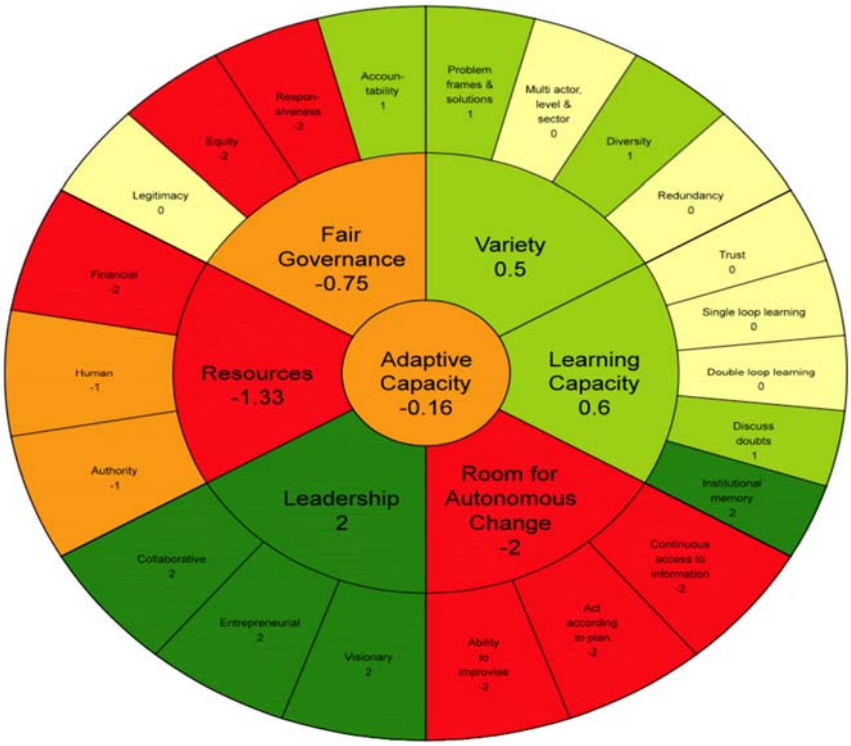


Figure 27: Municipality B: Post-ICT implementation ACW

With reference to Figure 16, Figure 27 shows that implementing the ICT intervention only slightly affected the adaptive capacity overall by improving it from −0.42 to −0.16. Similar to Municipality A, *Room for Autonomous Change* and *Resources* remained the main dimensions contributing to the municipality having a slightly negative effect on its adaptive capacity. *Room for Autonomous Change* did not change from −2, with *Ability to Improvise*, *Act According to a Plan* and *Continuous Access to Information* remaining low.

Fair Governance improved from −1 to −0.75 but remained the second-largest contributor. *Variety* and *Learning Capacity* both experienced an improvement after the ICT intervention's implementation, whereas *Leadership* remained the same overall.

The municipality felt that although their technical staff managed to complete jobs and resolve issues, they required improvement in terms of their skills and needed to learn new things. However, the severe financial constraints affect their ability to do so. It was stated that there was still no information given to citizens regarding issues of water and sanitation. Only if citizens enquired did they receive feedback or information. This did not change with the implementation of the ICT system, despite it having been agreed to as a step in the new process.

The Department of Cooperative Governance and Traditional Affairs (CoGTA) (2013) and other groups have audited the municipality in terms of water services, waste removal and public participation. Treasury had retracted the municipality's portion of the equitable share (R7 million) because the municipality, as one staff member put it, "*did not do things correctly*". This was an example of the

municipality being held accountable by provincial and national government. The conditions post-implementation still did not leave the municipality in a position where it was able to respond effectively to all voices of society. As before, citizens living in more urban environments had better access to information. As described by one of the municipal staff members, this makes them "*easier to deal with*". The municipality stated that these communities are given preference when issues are raised. Citizens also stated they felt that the current reporting system was not equitable and preferential treatment continued to occur. The municipality had also received no comments on the new system. Many citizens had not used it and were not sure of what it would change. However, they felt their local knowledge had been valued and incorporated in the design of the system. Whether there was overall general support for the system was unclear.

Similar to Municipality A, citizens lodged their complaints mainly in the traditional way by using a phone or walking to the nearest office. The PCM system was hardly used, which might have been due to the number not being known. When a complaint was received, the details were first recorded onto a job card. It was then entered into the online complaints database that provided the reference number. The job cards were also kept in storage. The reference number was added to the job card before being handed to the technical teams. If a contact number was recorded, the reference number was sent to the citizen via an SMS. Feedback to community members did increase. It was reported that complaints were seen to on a first-come-first-serve basis unless there was an emergency. At times, departments relied on each other for information when resolving issues. Because of this, turnaround times varied from one complaint to the next and were affected by the municipality's lack of resources. This was in contradiction to the information that preferential treatment existed when addressing complaints. It was also identified that councillors did not distribute the telephone numbers for the ICT system willingly but preferred for complaints to be lodged directly with them rather than with the main office. It was not possible to determine whether that was due to councillors being gatekeepers or their wanting to be kept informed of the challenges in their community.

The mayor, municipal manager and municipality were said to engage with the citizens regularly on various issues. It was observed that community meetings were being held to explain the problems being experienced with the supply of water. However, in the satellite towns a feeling remained that the "*problems of the municipality were not openly discussed*". Financial resources may affect the municipality's ability to visit and engage with satellite towns in the same manner as in the main town, which added to the experience of preferential treatment. Linked to this was the experience of trust and mutual respect between citizens and the municipality. Citizens could not comment whether the system built trust, and were unsure of potential changes through the system. The municipality, on the other hand, felt that the feedback provided via SMS gave citizens hope that their problem was being seen to and that this should strengthen their respect and trust. The municipality also felt that it achieved its goals, values and mission. It was highlighted by the municipality that the reason for not experiencing service delivery protests was based on the municipality's "*managing them*" (referring to the community).

In summary, although the ICT intervention improved the municipality's *Variety* and certain aspects of its *Learning Capacity* and *Fair Governance*, it could not compensate for the *Lack of Resources* and *Room for Autonomous Change*. The financial and human resource challenges facing the municipality affected its *Variety* and *Learning Capacity* in a negative manner. This in turn affected its ability for *Fair Governance*. The lack of *Room for Autonomous Change* is affected by *Variety, Fair Governance* and hence, indirectly, the *Lack of Resources*. Despite the existence of *Good Leadership*, Municipality B remains in a position where it has a negative effect on its own ability to adapt and respond to change. Similar to Municipality A, the pre-ICT implementation status quo had an impact on the success with which the ICT intervention was taken on and used.

6.2.2 Analysis of Municipality B's IVC post-ICT implementation

Figure 28 shows the analysis of the IVC post-implementation. As can be seen from the figure, the ICT system was integrated as part of the existing complaints process.

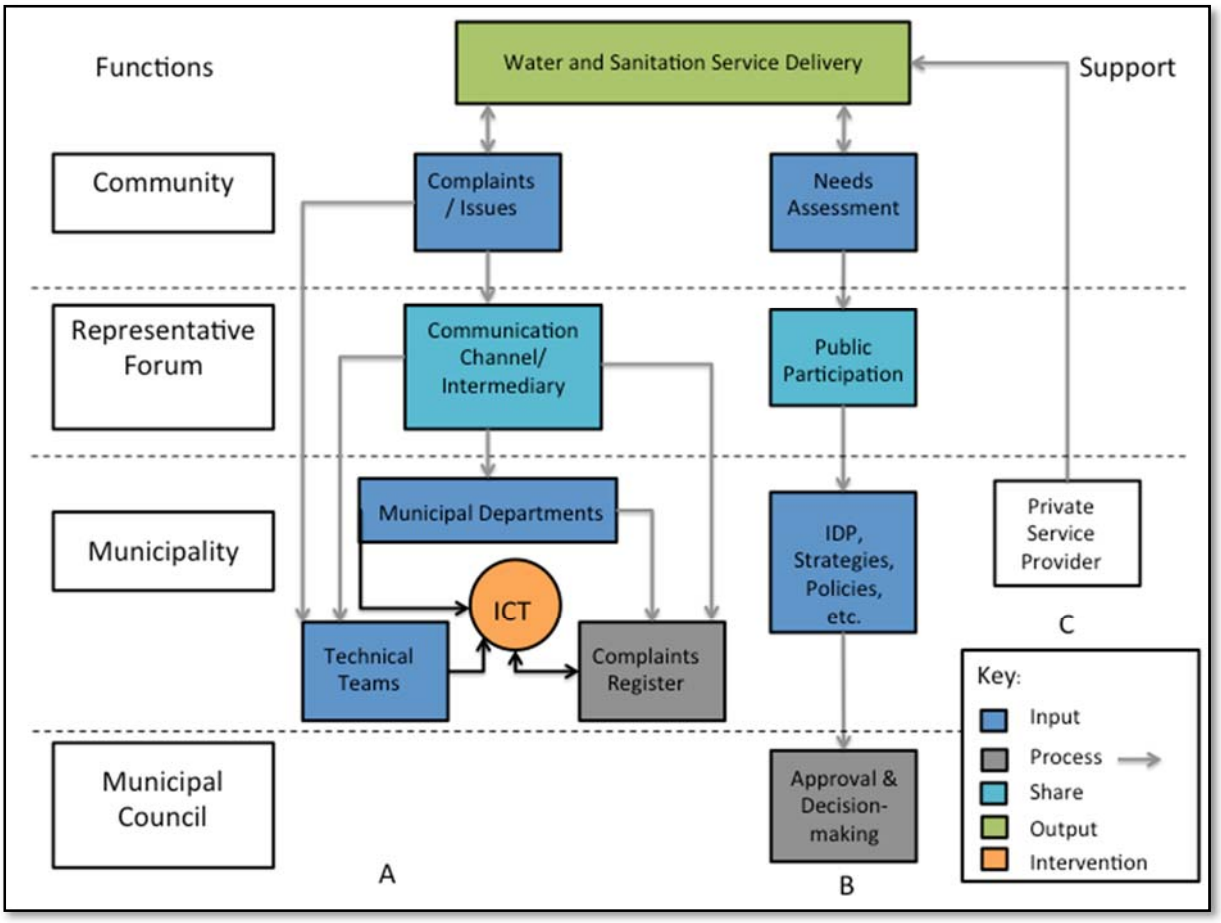


Figure 28: Municipality B: IVC post-ICT implementation

Input

The new information inputs were the toll-free line and PCM system. However, the PCM system was used seldom and residents still preferred the usual methods of engagement such as personal interaction at the municipality or satellite office and traditional phone calls.

Process

Very little changed in the day-to-day processes of Municipality B, except for the online database that functioned as a complaints register and the addition of reference numbers as tracking mechanisms. The designated person still managed the system and included reference numbers on job cards, which he issued to the necessary departments. He was also responsible for sending out the reference numbers via text message to complainants. The staff still felt incapacitated to respond to queries even with the intervention in place.

Share

The municipality acknowledged that they were understaffed and could not always respond to all issues and information was not openly shared, unless requested.

Output

Most of the community members who were interviewed felt less confident using the telephone or mobile devices and thus preferred personal interaction with municipal staff and they continued to utilise the conventional methods of reporting. Younger community members were more supportive of the ICT intervention as they recognised the benefits of convenience at no cost to report. The barriers and post-ICT evaluation are given in Table 19.

Table 19: Municipality B: Analysis of barriers post-ICT implementation

Addressing the Barriers		
Barrier	**Description**	**Post-ICT Implementation**
IT skills	Substantial lack of IT skills.	Staff members were trained to use the database and familiarise themselves with the procedures to record queries/issues. This contributed to IT skills development.
Customer service	Customers and municipality have recognised the fact that staff are unable to assist (owing to a lack of technical knowledge) and are occasionally unfriendly.	The few customers who did use the system seemed satisfied. Most community members still preferred personal interaction with the municipality and were unsure of any improvements.
Contact number	Numbers are not toll-free.	Younger customers were supportive of the toll-free line and PCM system and recognised the benefits of reporting in a cost-free and convenient manner. The older customers preferred the traditional methods of personal interaction.
Multiple sources of information	Information is reported telephonically, via email, formal letters, word of mouth via CDWs or ward councillors, walk-ins, etc. There is a need to integrate all these sources into a central register.	The database allowed all forms of queries to be captured in one place. The municipality had evidence of the number of queries that came in daily, when captured. Satellite offices would have been utilised more to accommodate the elderly.
Tracking mechanisms	Tracking mechanisms do not exist.	Tracking mechanisms were included and issued to the customer once the query had been captured.
Municipal capacity	Municipality is concerned about its capacity to respond to complaints.	Municipal capacity of resources is still a limitation, but Municipality B has benefitted with dedicated staff to manage the complaints register.

6.2.3 Analysis of Municipality B's community engagement post-ICT implementation

Interestingly, similar to Municipality A, the participants remained in favour of traditional methods such as reporting directly to the ward councillor, the satellite office and using a phone call. Based on the participants' responses, it became apparent that a hindrance to the full use and acceptance of the ICT system was that the communities did not experience the system to aid in building trust (Goal 4). There was little experience of a change in relationship between the community and the municipality after the ICT implementation. Owing to the lack of trust, the ICT system did not assist in reducing the conflict either (Goal 5). A factor contributing to this experience may have been that in B2, for example, very few community members had been informed of the system. While some experienced it as easy to understand, others felt it had excluded illiterate people (see Table 20). The quality of relationship between the community leaders and the community seemed to affect the efficiency of the system. For instance, many of the participants did not seem to know about the project or had not received the toll-free number. It became apparent in one of the meetings that the ward councillors were not willing to distribute the toll-free number to community members and stopped the research team from distributing it. Community members who had received the pamphlets did not necessarily distribute them.

Despite these critiques, participants felt that the system would attract the younger population. It was commented that the system did respond to the community's desire for a cost-free method of reporting and a means of receiving feedback, therefore achieving Goal 6 (cost-effectiveness) and Goal 2 (public values). In all three towns, participants felt that the engagement for the design of the system and the subsequent engagement with the community had resulted in the participants feeling part of the decision-making process (Goal 2) as compared to other participatory mechanisms. Participants in B1 and B3 strongly felt educated and informed (Goal 1) to report faults and communicate with the municipality. Participants in B3 who had used the system were pleased with the outcome and appreciated the process.

To sum up, the findings reveal that while the ICT system is seen as an efficient to tool in addressing some of the issues such as cost-effective ways of reporting faults; the participants are sceptical about its ability to resolve their core concerns of trust and reduction of conflict between community members and the municipality. It became apparent that the effectiveness of the ICT system is linked to addressing these concerns.

Table 20: Municipality B: Analysis of community engagement post-ICT implementation

	Goal 1		Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
MECHANISMS	Education	Information	Public Values	Substantive Quality	Trust	Reduced Conflict	Cost-effectiveness
B1							
ICT TOOL	●	●	◐	○	○	○	●
B2							
ICT TOOL	○	○	●	○	○	○	●
B3							
ICT TOOL	●	●	●	●	●	○	●

● applicable ◐ possibly applicable ○ not applicable

7 DISCUSSION OF FINDINGS

This chapter provides a discussion on the findings and highlights the lessons learnt.

The study set out to assess whether communities can be incentivised to play an active role in the management of water supply delivery by reporting interruptions or problems to the relevant municipality. The literature review had indicated that incentivisation does not necessarily require being monetary, but those aspects such as the experience of being a citizen and part of the governance structure may result in a greater engagement. Recognising the social structures in rural communities, the resource constraints of rural municipalities and the geographically challenging environment, it was hypothesised that the use of an ICT system may allow an increase of engagement in order to motivate citizens to contribute and provide municipalities with the relevant information. The research was of particular importance in South Africa where service delivery protest actions have resulted in social unrest, vandalism and a breakdown of relationships between communities and municipalities.

The ICT system design was based on a co-design approach, which was of great benefit for all stakeholders, including the research team. While co-design requires ongoing engagement that can be administratively difficult, it proved to be a well-suited method. Participants felt that their views were taken seriously and were integrated in the system. The research team was made aware of challenges by recognising local staff and community members as experts. The system design turned out to be technically simpler than originally intended, but this confirmed the notion of co-design since the municipalities were able to use the system and maintain it. The concerns that municipalities had highlighted of the system being abused was not confirmed during the six-month assessment period. The overall costs for the toll-free line remained at approximately R400 per month per municipality.

As the analysis of the municipalities showed, the implementation of the ICT intervention brought about changes to certain the characteristics and dimensions of each municipality. For Municipality A, the ICT intervention improved its *Variety* and certain aspects of its *Learning Capacity*, as well as *Fair Governance*. The *Learning Capacity* improved through the ability to discuss doubts more openly and increase the institutional memory. *Fair Governance* improved through the ability to stick more rigidly to a first-come-first-serve prioritisation and hence to treat citizens with more equity. That said, the system could not compensate for the lack of *Resources*. The financial and human resource challenges facing the municipality still affected its *Room for Autonomous Change*, *Variety* and *Learning Capacity* in a negative manner. Municipality A has positive *Leadership* but owing to the resource constraints, its ability to change, to adapt and to respond to change remains negative.

Similar to Municipality A, Municipality B saw an improvement in *Variety* and certain aspects of its *Learning Capacity* and *Fair Governance* such as the ability to discuss doubts more openly and having an increased institutional memory and accountability. It could not, however, as with Municipality A, compensate for the lack of *Resources* and *Room for Autonomous Change*. The financial and human resource challenges were too substantial to overcome the negative values on *Variety* and *Learning Capacity*. The link between the various aspects did not change or become more independent. Low resources impacted on every aspect of the municipality's ability to change, to adapt to change or to respond to it appropriately.

The experience of community members varied in each of the study sites. This confirmed the view that participation and governance are locality specific and should be designed to respond to local needs. In order to increase the ability of municipalities to engage productively and incentivise communities to resolve water and sanitation issues, it is of the utmost importance to adopt methods that are specific or deemed more favourable to each town. While this is a time-consuming task, it was shown that the combination of a variety of methods may be more productive than a single method approach. The methods used should consider vulnerable population groups who might not be able to physically attend meetings, the older generation, and working people who might only be able to attend meetings in the

evening or weekends. Methods such as loud hailers and public meetings are useful if they are implemented appropriately. The reliance on community members informing each other is less successful than often assumed.

Despite the differences in views on the various community engagement methods, there were similarities, such as the participants' preference of traditional engagement methods despite the indicated low level of satisfaction with these methods. This highlights the relevance of culture norms of a society, and the value and need for face-to-face interaction. It became apparent that community members feel more certain that their problem has been heard when they have the opportunity to speak to a person face-to-face and are able to identify that person as the one accountable for resolving the complaint. This was most obvious in the towns that had a plumber or ward councillor residing within the community who was viewed as accessible and responsible to all. A number of participants preferred to use the toll-free line rather than to send an SMS for similar reasons as to the face-to-face engagement. It was felt that talking to someone directly provided a sense that the problem has been noted.

The participatory mechanisms that most participants felt achieved most of the public participation goals were focus groups and public meetings. Mechanisms that promoted two-way communication and self-representation were most preferred in the study sites. Such mechanisms tend to have a higher chance of building trust, giving the participants an opportunity to express themselves, engage with the municipality and discuss conflicting matters.

The effectiveness of any participatory mechanism is affected by the quality of the management of the process. It is essential that those facilitating the engagement recognise the crucial need for information and feedback to the community. Secondly, awareness of the power struggle between the community and municipality, and between the ward councillors and community is important to understand the impact an intervention may have. Interviews showed that participants in some study sites were more open to disclose information about their experience when the ward councillor or public liaison person was not present. Whichever participatory mechanism is used, it needs to be conducted in a manner that enables all parties to express their view in the decision-making process.

Ward councillors and ward committees played a pivotal role in public participation as they were either enablers of, or barriers to positive engagement. The quality of the relationship between ward councillors and communities had an impact on the engagement of the public. Where there was an open and trustful relationship with the councillors and leaders, there was a higher degree of satisfaction with the engagement processes. As a result, the mechanism (ward committees and councillors) seemed to achieve more goals.

Despite pamphlets being distributed relating to the public meetings and focus groups being held in the study sites to announce the initiation of the project, there still seemed to be a breakdown in communication and a lack of initiative from both the community and the municipality. Most community members said they did not hear about the implementation of the ICT and those who did, forgot to spread the news to others. While the municipality staff was aware of the new reporting system, some of the community leaders had not been informed. As a result, not enough was done to ensure that key members in each community knew about the project in order to pass on information to other community members. Despite a reasonable number of staff from the municipality being involved, system implementations require ongoing engagement with both municipalities and communities, which results in high costs being incurred.

8 CONCLUSIONS AND RECOMMENDATIONS

The aims for this study were set out as follows:

1. Identify success and failures of incentivising community engagement through a detailed literature study.
2. Develop a detailed research methodology based on the findings of the literature study.
3. Analyse and assess current community engagement of drinking water supply of three research communities.
4. Identify incentives for reporting supply problems in collaboration with the community and the municipality.
5. Develop and implement a mobile phone tool as well as incentive structures and observe use for six months.
6. Identify enablers and barriers to the use of ICTs and incentives based on the findings of the field study.

The findings for each aim will be discussed below.

8.1 Aim 1: Successes and Failures of Incentivising Community Engagement

The literature review set out by outlining water service delivery in South Africa. It was shown that while the sector had gone through substantial changes since 1994, there was still a backlog of delivery in rural areas. Public engagement was highlighted as an area of legislative requirements which has been a challenge in the underresourced provinces of South Africa.

Since the project's aim was to increase public engagement, the literature review continued with an analysis of public consultation within the context of service delivery and development. It was shown that public consultation is part of the legislature for local governance and a constitutional right of citizens in South Africa. An analysis of the literature regarding the challenges of public participation in service delivery indicated that aspects such as insufficient resources, process implementation and accountability result in the public participation process being only partially implemented.

The role of ICTs was analysed with a particular focus on assessing the use of mobile phones and development, as well as understanding the overly positive attitude that ICTs will provide a new avenue for public engagement processes. It was highlighted that ICTs and mobile phones can play a major role in increasing access to information and improving certain aspects of governance, such as service offerings like payment of bills. It was also highlighted that the SALGA has recognised the need for an ICT governance policy that highlights the challenges that ICTs can bring when implemented without the necessary resources.

Incentivising community engagement has been a topic in literature in varying fields for several years. In the legal domain, incentivisation is often needed to allow social enforcement of illegal behaviour. It was highlighted that commitment to co-operate was higher when the public perceived they were part of the governance structure and if communication between stakeholders increased. It was identified that monetary incentives are not necessarily required if an informant has an ethical stake in the outcome, for example, the case of whistle-blowing. Franceys and Gerlach (2011) highlighted the fact that poor communities were interested in improving access to water supply and that education and engagement could serve as an incentive in this environment.

The full literature review was published as an independent report by the WRC with the title: "Community Engagement in Drinking Water Supply Management: A Review". It can be downloaded from the WRC Knowledge Hub with the WRC number: TT 583/13.

8.2 Aim 2: Research Methodology

The methodological approach of the study was an intensive case study with an intervention in order to explore potential change. Since the study entailed several aspects ranging from community engagement to ICT system design and municipal capacity assessment, it was decided to use different methodologies for each of these aspects.

Two rural municipalities in the Eastern Cape were selected based on a set of rurality criteria. During the first discussion, the research team assured itself that the municipalities were in a position to support the research without impact on their limited resources. Six field study sites for the communities were chosen based on the requirements of the municipalities. While these were three more than originally anticipated, it was felt that this would be of benefit to the municipality. An analysis of the field sites showed that there were substantial challenges in water and sanitation service delivery.

The methodology for the design, development, implementation and evaluation of the ICT system were based on a co-design approach. This approach relies on municipalities and communities becoming designers in collaboration with the research team. The implementation for the system was done through training sessions in each of the municipalities and the relevant communities. The evaluation of the ICT system was done using the TAM described by Davis (1989). PU and PEOU were evaluated to understand how the system was used in the municipality.

The methodology for analysing the capacity of the municipality was twofold to evaluate the capacity on the one hand, and the value of information on the other hand. The capacity assessment was done using the ACW developed by Gupta et al. (2010), while the information value was assessed using the IVC method as described by Kaplinsky and Morris (2001).

The methodology for analysing public engagement was done using the SGEF as developed by Beierle (1998). This method allowed the researchers to analyse whether the public felt engaged with the municipality.

In order to analyse the impact of the ICT intervention, communities and municipalities were assessed using the above-mentioned methods prior to the implementation and again six months after the implementation in order to assess the impact.

8.3 Aim 3: Analysis of Community Engagement

The study was focused on two local municipalities and three research communities. As described above, this was changed after engaging with the municipalities who had indicated that they require assistance with the identified communities. Therefore, the study was extended to include an additional community per municipality.

The municipalities and community members were interviewed at the outset of the study to understand challenges that impacted the practices of engagement and the challenges in service delivery.

The *Adaptive Capacity* of Municipality A showed to be negative at −0.46 with a strong positive experience in *Leadership*, a slightly positive effect in *Learning Capacity* and strong negative effects in *Fair Governance, Resources* and *Room for Autonomous Change*. The municipality highlighted the fact that limited financial and human resources resulted in its inability to respond timeously to service delivery challenges. Municipality A relied on external service providers to support lacking internal skills. *Lacking Information* was identified as a hindrance for the municipality and citizens. The municipality had the expectation that the ICT intervention would bring the necessary change to improve the adaptive capacity.

The IVC analysis of Municipality A showed that several enablers for the implementation of an ICT system existed that could potentially increase the information value even further. Social media and communication strategies were available, willingness to co-operate was high and the satellite offices

functioned as information hubs. Barriers to the implementation were the substantial lack of IT skills, the limited customer service experience and the limited human resources. The community engagement processes in Municipality A were done in the three towns named A1, A2 and A3. The main method of engagement between the municipality and its community was via public meetings and loud hailers. The communities perceived loud hailers to be ineffective since they were a one-way engagement that did not allow feedback from citizens. The engagement with ward councillors differed between the towns and clearly depended on the positive nature of the relationship between councillor and community.

Municipality B was interviewed at the same time as Municipality A and meetings were organised with the communities of B1, B2 and B3. The *Adaptive Capacity* of Municipality B showed a value of −0.42, with *Resources* being at −1.67 and *Room for Autonomous Change* being at −2. The municipality identified interdepartmental communication breakdown as the main reason for communities not receiving notifications on water- and sanitation-related matters. It was hoped that the ICT intervention would support the municipality in improving this aspect. The analysis of the IVC showed that Municipality B had a substantial benefit in having an established complaints management process and a dedicated staff member to manage these complaints.

Barriers to a system implementation were similar to those in Municipality A, namely, the lack of IT skills and a low level of customer service experience. The analysis of the community engagement method showed that loud hailers and public meetings were used to communicate with the community. Participants in B1 felt positive about public meetings, while participants in the other towns highlighted the fact that the meetings required better organisation. Ward committee meetings and engagement with councillors were the least valued methods. Community members also highlighted the fact that there was not enough opportunity to provide feedback in the established methods of engagement.

8.4 Aim 4: Incentive Structures

Aim 4 focused on identifying incentive structures that would encourage the communities to engage proactively with the municipality. This was done in collaboration with the community and municipality. As part of the Beierle Framework analysis in Aim 3 and through the community surveys, key incentives for the communities were identified as the following:

- The logging of complaints had to be free of cost to the citizens.
- Feedback on complaints should be received within 24 hours.
- A variety of methods of laying a complaint should be possible.
- Engagement with the municipality should be two-way rather than one-way of pushing information only.

These aspects were integrated into the design of the ICT system as described as follows:

8.5 Aim 5: Development and Implementation of ICT

Aim 5 was addressed to develop and implement a mobile phone tool and an incentive structure, and to observe the use for six months. The engagement with the municipalities and the communities highlighted that a mobile phone tool was of less value than a generic ICT tool that allowed a coherent collection of complaints laid. Action research that is based on developing interventions has been shown to deviate from originally intended designs. It was felt that it was more important to recognise the local needs than to develop a system that had been perceived by the research team as potentially relevant. While the change to an ICT system was a deviation from the original project plan, it was not experienced as such a substantial deviation that should result in discontinuing with the project. The ICT tool was developed in collaboration with the communities and municipalities and responded to the identified needs. A toll-free line was established to allow a cost-free complaints registry and a PCM line allowed citizens to use their mobile phones to request a return call. The system also responded to the requirement to provide feedback to citizens by agreeing with municipalities on a revised process when

lodging complaints. The system was web-based with access given to the relevant stakeholders, including councillors and CDWs. The database was housed at the UCT to ensure ongoing maintenance. The system was implemented at Municipality A and Municipality B using training workshops in each municipality. The communities were informed of the system through public meetings, focus group sessions and pamphlets.

The ICT evaluation showed that there was a high experience of PU and PEOU for the municipal staff. Municipality A registered 429 complaints in the six-month period with a substantial drop in recording complaints in the December and January period which was ascribed to staff being on leave. Municipality A adapted the use of the system by changing it to a database where complaints were stored subsequent to having resolved the matter. This was done because the municipalities were not able to adapt to the revised process of logging complaints as and when they were raised. Contact numbers of complainants were not recorded, which resulted in the community members not receiving feedback.

In Municipality B, 405 complaints were logged during the study period. Similar to Municipality A, the recording of complaints dropped substantially in the December and January period despite Municipality B being a holiday destination. The municipality had indicated that during this period, a higher number of complaints were usually received, but this was not confirmed on the system. A potential explanation could be that the complaints were not recorded formally owing to staff being on leave. Both municipalities were equally constrained by their resources of using the system but adapted it to their own needs. The municipalities did not remain committed to the original process change of providing feedback to the citizens but have continued using the system beyond the study period.

8.6 Aim 6: Enablers and Barriers to ICT

Aim 6 of the study focused on identifying enablers and barriers to using ICTs and incentives based on the findings of the field study. Using the methods of the ACW, the IVC and Beierle's social framework, the experiences of the municipality and the communities in Municipality A and Municipality B were assessed to understand whether the ICT did improve the challenges that had been highlighted prior to the design. The adaptive capacity assessment showed that the municipal capacity for both Municipality A and Municipality B improved only marginally through the ICT system. The resource constraints of both municipalities were too substantial to use the system constructively to improve process and feedback to citizens. Municipality B performed better in providing feedback to citizens, which was ascribed to a complaints process being in existence prior to the system implementation. Municipality A resolved most complaints and had few 'pending' complaints.

In both municipalities, the system was of greater benefit to the municipal staff than it was to the communities. The hope that information would be shared easier between departments was not confirmed during the six-month period. Councillors were identified as potential gatekeepers who avoid handing out the toll-free numbers in order to remain informed of the challenges in their wards. Community members continued using the traditional methods of complaints, i.e. telephone calls and face-to-face engagement in municipal offices. It became apparent that municipalities did not advertise the system as they had originally committed, and community members remained uninformed.

8.7 Concluding Remarks and Recommendations

This project showed that ICT systems can support complaints management in municipalities and that such systems can result in a measurable improvement of adaptive capacity. However, the impact and the improvement are arguably not enough to leave either municipalities or the communities in a better position to adapt and respond effectively to the changes. This does not necessarily mean that an ICT is not useful in order to improve the municipal processes, but implementing any system in a rural resource-constrained environment should be done cautiously, focusing on the changes that can be achieved when considering the resource limitations. An ICT is not a guaranteed solution that can compensate for resource limitations, which result in water and sanitation issues not being addressed.

The study highlighted the fact that the ICT system improved the overall knowledge and data tracking, but that it could not improve the effectiveness with which complaints raised by citizens were resolved. Additionally, it was highlighted that even with the agreement of all stakeholders to change processes during the design phase of the system, this might prove to be unrealistic when the system is actually implemented.

Overall, the system was of greater benefit to the municipality than to the community. It allowed the municipality to track the number of complaints and, as the final interviews showed, all municipality staff appreciated the graphs and visual representation of workload, issues resolved and feedback sent. For both municipalities, the system allowed an overview of actual number of complaints for the first time, rather than anecdotal evidence from individual staff members. This resulted in both municipalities staying committed to using the system beyond the end of the project.

The greatest benefit for the communities was the toll-free line, which allowed complaints to be lodged without incurring costs. This is an important finding, since it is a simple tool that can be implemented at relatively low costs and that sends a clear signal to the community that there is a commitment from the municipality to hear citizen complaints. The concern that had been raised by municipalities that such a toll-free line would be abused, was not confirmed in the study.

Assessing conclusively whether the ICT tool resulted in incentivising communities to report and engage with the municipality has not been possible for either of the municipalities. In Municipality B, a greater number of citizens felt heard, while in Municipality A there was still an experience of certain areas receiving preferential treatment, and trust not having been established to an extent where it could indeed foster improved engagement.

Both municipalities have continued using the system beyond the study period and the database will remain open for their purpose (use?) for the foreseeable future. The municipalities have been made aware that the research team will provide support to move the database to local premises if required. It has also been clarified that the toll-free line will be discontinued should municipalities decide not to take over the monthly cost.

For future projects it is important to highlight that action research is complicated when requiring communities to engage proactively with a system. In certain towns, community members expressed the view that they felt they should be paid for contributing to the study. This is a reasonable request when considering that there is an expectation on the side of the researchers to receive feedback and take time from the community. While it had been made clear from the outset of the project that there would be no remuneration for participation, it should be kept in mind for future projects that aspects like this have to be negotiated upfront.

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APPENDICES

Appendix A. Process Description of Municipal and Community Engagement

The process of initiating engagement with district municipalities, local municipalities and communities was as follows:

1. Identify rural district municipalities and assess current water supply challenges through Blue Drop and Green Drop status. Analyse media reports for the study area.
2. Contact district municipalities explaining the study and request a meeting.
3. Meet with district municipality to discuss details of the project:
    1. Explain study in detail.
    2. Highlight expectations of research team.
    3. Highlight possible benefits to communities, local municipality and district municipality.
    4. Explain process of engagement with local municipalities and communities.
    5. Provide details on the expected resource requirements (mainly time of staff and ability to respond to community concerns).
    6. Assess together with the district municipality whether local municipalities and district municipality as well as communities will be able and willing to participate in the study.
    7. Request subsequent meeting with local municipalities.
    8. Request information on the process of receiving formal acceptance of the study in the district municipality as well as requirements for ethical approval.
    9. Request for the district municipality to identify relevant stakeholders who have to be informed throughout the study (e.g. provincial departments and mayoral committees).
4. Meet with local municipalities to discuss details of the project:
    1. Explain study in detail.
    2. Highlight expectations of the research team.
    3. Highlight possible benefits to communities, local municipality and district municipality.
    4. Explain process of engagement with municipal employees and communities.
    5. Provide details on the expected resource requirements (mainly time of staff and ability to respond to community concerns).
    6. Assess together with the local municipalities whether the municipal offices and the communities will be able and willing to participate in the study.
    7. Request for local municipality to facilitate meetings with the community representatives and other appropriate stakeholders to outline project.
    8. Request information on the process of receiving formal acceptance of the study in the local municipality as well as requirements for ethical approval.
    9. Request for the district municipality to identify relevant stakeholders who have to be informed throughout the study (e.g. technical departments and mayoral committees).
5. Meet with community representative and other identified stakeholders:
    1. Explain study in detail.
    2. Highlight expectations of the research team.
    3. Highlight possible benefits to communities, local municipality and district municipality.
    4. Explain process of engagement with communities, community leaders and municipal employees.
    5. Provide details on the expected resource requirements (mainly time of community members and willingness to participate in reporting water supply challenges).
    6. Assess together with stakeholders' willingness of the community to participate and analyse possible ethical or operational difficulties.
    7. Request for community representatives to guide the process and facilitate meetings with the community.
    8. Request information on the process of receiving formal acceptance of the study from the community as well as requirements for ethical approval.

Request for community representatives to identify relevant stakeholders who have to be informed throughout the study and the appropriate means to keep community members informed.

Appendix B. Municipality Questionnaire 2014

Topic Guides WRC K5/2214: Municipal Visits between 31 March 2014 and 04 April 2014

The objectives of the visit to the municipality are as follows:

- An assessment of the current municipal structure and the work/information flow of addressing service delivery issues (includes aspects of governance and policy).
- An assessment of the relationship and communication strategies between the municipality and the people.
- An assessment of existing technologies (ICTs) in the municipality.
- Assessment of current challenges and possible solution identified by the municipality.

In order to respond to the objectives, we would like to interview the relevant stakeholders in the municipality.

A more detailed breakdown of the topics that will guide the interviews is as follows:

1. *Municipal Structure (interviewer Mr Carl Jacobs)*

   In this section we would like to get to know the municipality to gain insight and context. Aspects of this would entail understanding the administrative structure in the municipality, the flow of responsibility, resources and staffing (organogram) and the overall vision, strategy and culture.

2. *Water and Sanitation (interviewer Ms Bianca Forlee)*

   In this section we would like to meet with the relevant departments responsible for delivering water and sanitation services, which could include stakeholders from the technical teams, environmental health officers, the director of water and sanitation services, etc. We would like to understand how the departments interact as well as how obligations and feedback to provincial and national government are currently managed. We would also like to discuss the Blue and Green Drop Reports.

3. *Service Delivery (interviewer Mr Carl Jacobs)*

   In this section we would like to understand the experience of the municipality regarding service delivery expectations of the community. We would also like to assess how communities currently engage with the municipality in order to report faults, and the overall performance and assessment of service delivery in the municipality.

4. *Customer Relations (Ms Bianca Forlee)*

   Customer relation management is a very important aspect of this research and in this section, we would like to understand the process of engagement with the community. This would involve understanding the local context (e.g. the number of meetings, the platforms for engagement, the distribution of information). We would also like to gain insight into the municipality's perception of the current engagement with the community and the possible incentives for communities to contribute.

5. *Current Information Systems (Prof. Ulrike Rivett)*

   In this section we would like to understand which technologies or information systems are currently being used in the municipality. We would like to understand how information is being distributed, the level of local IT staffing and skills, as well as possible IT solutions the municipality has considered in the past.

Appendix C. Community Questionnaire May 2014

Individual Questions		
Municipal Structure		
1. Do you know who your Mayor is?	Yes	No
2. Do you know who your Municipal Manager is?	Yes	No
3. Do you know who your Public Participation Officer is?	Yes	No
4. Do you know about the Municipality's IDP? If Yes, have you read it? Did you know that you can contribute toward the drafting of the IDP?	Yes Yes Yes	No No No
Water and Sanitation		
1. What type of toilet do you use? Chemical toilet Bucket system VIP latrine Pit latrine Urine-Diversion toilet Flushing toilet Communal toilet		
2. Do you consider a VIP toilet to be a decent sanitation system?		
3. Is your toilet properly maintained?		
4. Have you or anyone in your community suffered from the following waterborne diseases? Malaria Cholera Dysentery Diarrhoea Bilharzia		
5. How do you access water in your household?		
Customer Relations		
1. How often do you attend public meetings? Why?		
2. Are the meetings held in a language you understand? Which language? Xhosa Afrikaans English	Yes	No

3. Are the meetings held at a convenient time and is it easy for you to travel to the meetings?	Yes	No
4. Do you read the municipality notice boards?	Yes	No
5. Have you reported a fault before? If Yes, what type of fault? Pipe burst Leaks No water flow Dirty water Low pressure Pipe blockage Other…	Yes	No
6. How did you report the fault? Telephone Mobile phone Email SMS Other…		
7. Was the problem resolved as a result of reporting the fault? If Yes, how long did it take for the problem to be fixed?	Yes	No
Current Information Systems		
1. Do you have a mobile phone? If Yes, what type of mobile phone do you use? How long have you been using the phone? If No, do you know someone who has a mobile phone and lets you use it (in an emergency situation, for example)?	Yes Yes	No No
2. How much airtime do you use per month?		
3. Do you use SMSs?	Yes	No
4. How do you access the Internet? Mobile phone Home Work Neighbour/Friend Internet café		

5. Which social media do you use? Facebook Twitter Instagram WhatsApp MXit None		
6. How often do you use social media?		
7. Do you access Social Media through your mobile phone or computer?	Mobile phone	Computer
8. Do you know what the municipality's contact number is or whom to contact when there is a water and/or sanitation problem in your community?	Yes	No

Group Questions

Questions		
Municipal Structure		
1. How do you get feedback on the water and/or sanitation issues that you have reported?		
2. How long do you think it should take for a problem to be fixed? 1 week 2 weeks 3 weeks 1 month More than 1 month		
Comments:…… …… …… …… ……		
Water and Sanitation		
1. Which type of toilet is the most common in your community? Chemical toilet Bucket system VIP latrine Pit latrine Urine-diversion toilet Flushing toilet Communal toilet		
2. What is your view of the current sanitation system in your household and your community?		

3. Are you able to maintain your toilet system? (financially and in terms of the technical skills that may be required)	Yes	No
4. Who is responsible for maintaining the sanitation and water systems in your community?		
5. Who is currently maintaining the toilet systems in your community?		
6. Have you been educated or informed of the right health and hygiene practices with regard to water & sanitation? If Yes, by whom?	Yes	No
7. Do you experience water shortages in your community? How often? Daily Weekly Monthly Other…	Yes	No
8. Where do you get water when there are water shortages? Public tap River Dam Borehole Tanker No access Other…		
9. Have you been involved in a sanitation project? If Yes, How? Planning Implementation Decision-making Construction Training/Education (On the use of the systems/Health and Hygiene practices)		
10. Do ward committees and ward councillors inform you about any water and sanitation projects in the municipality?	Yes	No
11. Have you heard of the Blue Drop and Green Drop reports for your municipality? If Yes, where did you hear about them? Have you seen them or read them?	Yes Yes	No No
Comments…… …… …… …… ……		
Service Delivery		

1. Is the water quality good?	Yes	No
2. Is the water supply interrupted often? If Yes, how often?	Yes	No
3. Are water issues attended to quickly?	Yes	No
4. Do the waterborne sewerage systems work effectively?	Yes	No
5. Are the sewer suction tanker services effective?	Yes	No
Comments:…… …… …… …… ……		
Customer Relations		
1. Does the municipality involve you in their projects?	Yes	No
2. How does the municipality involve you in their projects? Is the involvement sufficient?	Yes	No
3. Does the municipality host public meetings to discuss problems in the community? If Yes, how often? Weekly Monthly Only when there are issues in the community Other…	Yes	No
4. Other than the ward councillors, who are the influential leaders in the community? (e.g. farmers, traditional leaders and business owners)		
5. Do you report any of your concerns to them?		
6. Do they speak to the municipality on your behalf?		
7. What is your view on how the municipality is doing its work? Where is it failing/succeeding?		
8. What do you like about your municipality?		
9. What don't you like about your municipality?		
10. What motivates you to report faults or interact with the community?		
11. Does the municipality inform you when there will be service interruptions? If Yes, how do they notify you?	Yes	No

Comments:…… …… …… …… ……
Generic Information

1. What challenges do you face when reporting faults?		
2. Do you think being able to report a problem more easily will make a difference to your life? If Yes, how? If No, why not?	Yes	No
3. Do you think this project will help you engage with the municipality? If Yes, how? If No, why not? What are your concerns?	Yes	No

Comments:…… …… …… ……

Appendix D. Pamphlets for Community Information

Kou-Kamma pamphlet

Ndlambe pamphlet

WHAT TO DO

IF YOU HAVE A WATER AND SANITATION ISSUE PLEASE FOLLOW THE NEXT 4 STEPS

UKUBA UTHE WANENGXAKI ZONGQAMBUKO IOOPHAYIPHU BANGASESE NOFUNA UNCEDO IAMANZI ACOCELALEYO KUFANELE ULANDELE EZIMPAWU

AS JY ENIGE PROBLEME MET WATER EN SANITASIE HET VOLTOOI ASSEBLIEF DIE VOLGENDE 4 STAPPE

STEP 1 / ISIGABA 1 / STAP 1

DIAL

Send a "please call me" to this number * 060 671 1516 # or use the toll-free line number 0800 000 849

Nceda uthumele "please call me" kulenombolo * 060 671 1516 # . Okanye utsalele kule nombolo yamahala 0800 000 849

Stuur 'n "Please call me" na hierdie nommer * 060 671 1516 # of gebruik die "Toll free line" nommer 0800 000 849

STEP 2 / ISIGABA 2 / STAP 2

If you send a please call me, you will receive a call in 24 hours. If you call the toll-free number you will speak directly to someone.

Emva kokuba uthumele u please call me uzopumana umnxeba oveia kuthi phambi kweeyure ezingamashumi amabini anesine. Ukuba uthe watsalele umnxeba wasimahla uzokuthetha nomnutu ngoko

As jy' n "Please call me" stuur sal jy' n oproep binne 24 uur terug kry. As jy' n oproep na die "toll free line", sal jy direk met iemand praat.

STEP 3 / ISIGABA 3 / STAP 3

After the call you will receive a text with a reference number

Emva kokuba usitsalele umnxeba uzofumana inombolo eshicilelweyo (reference)

Jy sal na die oproep 'n SMS met 'n verwysings nommer ontvang

STEP 4 / ISIGABA 4 / STAP 4

Your problem will be attended to

Ingxaki yakho izothathelwa ingqalelo emva kwexesha

Jou probleem sal hanteer word

STEP 5 / ISIGABA 5 / STAP 5

If your problem is not fixed in ten days, use the reference number to follow up with the Municipality (0800 000 849).

Uba ingxakiyakho khange isoujululwe kwintsuku ezilishumi uze weuze ulandelele usebeusize inombolo oyinikiweyo ngoku ubutsala umnxeba ukuxhumana nomasipala

Indien jou probleem nie binne 10 dae opgelos is nie, gebruik die verwysings nommer om met die munisipaliteit optevolg

NDLAMBE MUNICIPALITY

WATER RESEARCH COMMISSION

UNIVERSITY OF CAPE TOWN

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WATER RESEARCH PROJECT

Information for Community
NDLAMBE

iCOMMS

Department of Civil Engineering
University of Cape Town

OCT 2014 - MAR 2015

Appendix E. ICT Design Questionnaire Pre-ICT Implementation Municipality

Module A: General ICT Information		
Do you have access to a computer at your workstation?	YES	NO
Do you have Internet access at your workstation?	YES	NO
If YES, rate the speed of Internet access at you work place?	1. Poor 2. Average 3. Good 4. Very Good	
If NO, how do you access Internet at work?		

Module B: System Access and Usage		
Before today's training, did you try using the ICT System?	YES	NO
If NO, kindly state a reason why you were not able to access and use the system		
If YES, were you able to enter some data into the ICT system?	YES	NO
If YES, how would you rate the ICT system in terms of ease of use?	1. Easy 2. Fairly easy 3. Complex 4. Very Complex	
Rate the speed of access to the ICT system	1. Very Slow 2. Slow 3. Average 4. Good 5. Very Good	
The system is currently hosted online; Would you recommend the system to be hosted at your municipality?	YES	NO
What challenges did you face using the system?		
Did you go through the ICT system user guide?	YES	NO
If NO, please state why you were not able to access the user guide		
If YES, was the user guide helpful?	YES	NO
If YES, how would you rate the user guide in terms of your ease to learn how to use the system	1. Very easy 2. Very Easy 3. Complex 4. Very complex	
Do you think the system will make a meaningful contribution?	YES	NO
If NO, state reasons		

Module B: System Access and Usage		
If YES, state reasons	1. Decision-making 2. Data storage/ retrieval 3. Better reporting 4. Other.....	
Would you recommend the system to another municipality?	YES	NO
What additional changes would you suggest to the system?		
Would you recommend the system to be hosted here for faster access?		

Module C: Training Programme		
Was today's training on system usage helpful?	YES	NO
If NO, could you kindly state any reason?		
Would you that you state that you could learn to use the system without today's training?	YES	NO
If YES, how long would it take you to learn?	1. 30 Minutes 2. One Hour 3. Two Hours 4. One day	
How would you rate the training instructor?	5. Poor 6. Average 7. Good 8. Very good	

Anything else that is interesting or important that you would like to state?

Appendix F. ICT Evaluation Questionnaire – Municipality

Questions	Module A: User Experience		
1	Is the system user-friendly (Easy to use)?	YES	NO
2	If YES, how user-friendly is the system's interface?	1. Very user-friendly 2. Moderately user-friendly 3. Slightly user-friendly 4. Not at all user-friendly	
3	If NO, could you kindly state why?		
4	Does the system often fail (Stop working)?	YES	NO
5	If YES, how often does the system fail?	1. Very often 2. Moderately often 3. Very few times/ Very seldom 4. Not at all	
6	How successful is the system in performing its intended task?	1. Very successful 2. Moderately successful 3. Not successful at all	
7	Rate your speed of access and usage of the system	1. Very Good 2. Good 3. Average 4. Slow	
8	Does the system lead you to make any errors while you are working?	YES	NO
9	Are you able to correct the error?	YES	NO
10	Is the organisation of information in the system appropriate for you?	YES	NO
11	If NO, state reasons why.		
12	How would rate the system the system in terms of doing your job?	**(Select All that are Necessary)** 1. Has made it easier to do my job 2. Very useful in my job 3. Improved my job performance 4. Enhanced my effectiveness 5. Has not changed anything at all 6. Has made it harder to do my job	

Questions	Module B: User Satisfaction		
13	Does the system output the precise information you need?	YES	NO
14	IF NO, state why		

Questions	Module B: User Satisfaction		
15	Is the output information presented in a useful format?	YES	NO
16	If NO, state why		
17	Have you ever contacted iCOMMS for system service/ support?	YES	NO
18	If YES, in your most recent service experience, how did you contact the representative?	1. Email 2. By telephone 3. In person 4. Other……	
19	How helpful was the support you received?	1. Very helpful 2. Moderately helpful 3. Not at all helpful	
20	How long did it take to get your problem resolved?	1. Immediately 2. Less than a day 3. Between 2 and 3 days 4. More than a week 5. The problem is still not resolved	
21	How many times did you have to contact the representative before the problem was corrected?	1. Once 2. Twice 3. Three times 4. More than three times	
22	Overall, how would you rate your satisfaction with the support services to the system?	1. Extremely satisfied 2. Somewhat satisfied 3. Neither satisfied nor dissatisfied 4. Somewhat dissatisfied 5. Extremely dissatisfied	
23	Overall, are you satisfied with the system in your work environment?	YES	NO
24	If YES, how satisfied were you with the system?	1. Very satisfied 2. Satisfied 3. Not satisfied 4. Unsure	
26	If NO, would you kindly state a reason why?		
26	How likely are you able to recommend the system?	1. Very likely 2. Likely 3. Unlikely 4. Not sure	

Suggest anything that we can do to improve the system:

Appendix G. ACW

Below is a detailed explanation of the ACW. It is quoted from C. Jacobs's master's thesis, submitted to the UCT.

Gupta et al. (2010) define institutional adaptive capacity as "*the inherent characteristics of institutions that empower social actors to respond to short and long-term impacts either through planned measures or through allowing and encouraging creative responses from society both ex ante and ex post*". "*Planned measures*" include the formal and informal characteristics, rules, norms and beliefs of institutions that enable society (individuals, organisations and networks) to cope with climate change while "*allowing and encouraging creative responses from society*" refers to the extent to which these institutions allow and encourage themselves to be changed by actors in order to cope with climate change (Gupta et al., 2010).

It is said that an institution promoting adaptive capacity is one that:

- "*Encourages the involvement of a variety of perspectives, actors and solutions;*
- *Enables social actors to continuously learn and improve their institutions;*
- *Allows and motivates social actors to adjust their behaviour;*
- *Can mobilise leadership qualities;*
- *Can mobilise resources for implementing adaptation measures; and*
- *Enhances principles of fair governance*" (Gupta et al., 2010)

It is these aspects upon which the six dimensions and 22 criteria of the ACW are based.

The ACW was developed by Gupta et al. (2010) as a means of assessing and visually communicating an institution's adaptive capacity to show its strengths, weaknesses and opportunities for improvement in adapting and responding to climate and/or environmental changes. It consists of six dimensions. Each dimension is subdivided into criteria (22 in total). Figure 29 shows the ACW with its dimensions and criteria.

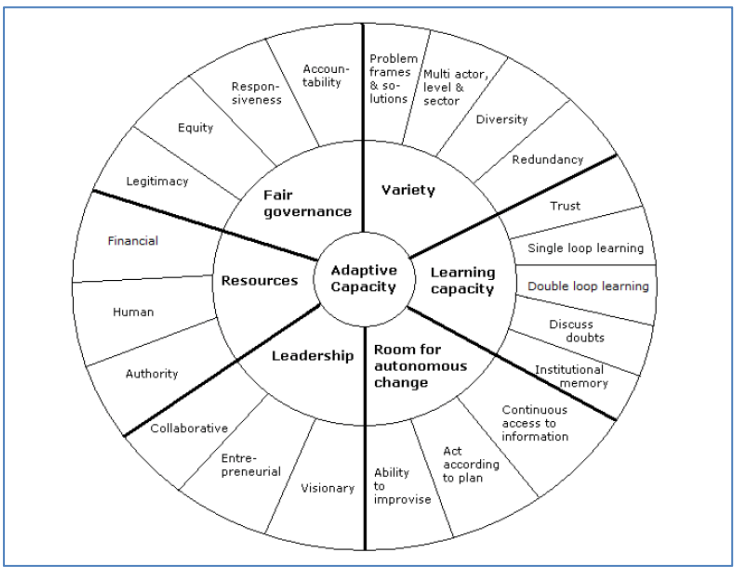

Figure 29: The ACW (Gupta et al., 2010)

The inner circle shows adaptive capacity as a whole, the middle circle shows the dimensions and the outer circle shows the criteria.

1. Variety

An institution is said to embed variety when it meets the criteria described in Table 21:

Table 21: Criteria for variety (Gupta et al., 2010)

Number	Criteria
1	It allows for a variety of problem frames and solutions.
2	It allows for a variety of actors (multi-actor), levels (multi-level) and stakeholders (multi-sector) during the solution formulation process.
3	It promotes diversity to reach context-relevant, tailor-made policies.
4	It allows redundancy in the short-term to promote the best long-term solutions.

2. Learning capacity

An institution is said to demonstrate learning capacity when the criteria in Table 22 exist:

Table 22: Criteria for learning capacity (Gupta et al., 2010)

Number	Criteria
5	A presence of institutional patterns that promote mutual respect and trust.
6	An ability of institutional patterns to learn from past experiences and improve their routines (single loop learning).
7	Evidence of changes in assumptions underlying institutional patterns (double loop learning).
8	An institutional openness toward doubts and uncertainties.
9	An institutional provision of monitoring and evaluation processes of policy experiences.

3. Room for autonomous change

An institution is said to provide room for autonomous change when the criteria in Table 23 exist:

Table 23: Criteria for room for autonomous change (Gupta et al., 2010)

Number	Criteria
10	An accessibility of data (information) within institutional memory and early warning systems to individuals.
11	An increase in the ability of individuals to act by providing plans and scripts for action, especially in the case of disasters.
12	An increase in the capacity of individuals to self-organise and innovate i.e. a fostering of social capital.

4. Leadership

An institution is said to embed leadership when it encourages the rise of the types of leadership described in Table 24:

Table 24: Criteria for leadership (Gupta et al., 2010)

Number	Criteria
13	Visionary leadership (which includes elements of reformist, intellectual and sticks and carrots leadership). This allows room for long-term visions and reformist leaders.

Number	Criteria
14	Entrepreneurial leadership (which includes elements of leadership by example, designing tools to engage the market, unilateral and directional leadership). This allows room for leaders that stimulate actions and undertakings.
15	Collaborative leadership (which is also referred to as instrumental leadership). This allows room for leaders who encourage collaboration between different actors (adaptive co-management).

5. Resources

An institution is said to be resourceful when they encourage the criteria in Table 25:

Table 25: Criteria for resources (Gupta et al., 2010)

Number	Criteria
16	Authority – There is provision of accepted or legitimate forms of power and the institutional rules are embedded in constitutional laws.
17	Human Resources – There is availability of expertise, knowledge and human labour.
18	Financial Resources (including access to technological resources) – There is availability of financial resources to support policy measures and financial incentives.

6. Fair governance

An institution is said to have fair governance when it promotes the criteria highlighted in Table 26:

Table 26: Criteria for fair governance (Gupta et al., 2010)

Number	Criteria
19	Legitimacy – Whether there is public support for a specific institution i.e. legitimate policymaking that is accepted by members of society.
20	Equity – Whether institutional rules are fair and policy processes and outcomes account for unequal circumstances in society.
21	Responsiveness – Whether institutional patterns show response to society and whether responsive processes show a high degree of transparency and are able to respond to different voices in society.
22	Accountability – Whether institutional patterns provide clear accountability procedures that assign responsibilities to different parties.

If an institution meets all the criteria described above, it is said to promote adaptive capacity. However, as Gupta et al. (2010) point out, there are some key points to consider when using the ACW:

1. In the case that an institution does promote adaptive capacity, it does not mean that society will necessarily make use of this capacity and/or adapt successfully.
2. The dimensions and criteria of the ACW are not independent of one another. They can reinforce each other – for example, *Fair Governance* and *Adequate Resources* can reinforce the other dimensions. Tension between different dimensions and/or criteria can also occur – for example, strong *Leadership* may not always lend itself to high *Variety*.
3. Some criteria may cause others to be less relevant – with sufficient *Entrepreneurial Leadership Visionary Leadership* may not be needed.
4. The dimensions and criteria are context dependent – the importance of certain dimensions and/or criteria will vary according to the specific problem it is being applied to. This implies that weighted criteria and/or dimensions should be used according to the specific problem.

Because of this, the ACW cannot be applied objectively. Rather it is applied subjectively using normative judgments on the part of the researcher. To remain scientifically relevant, it is important that the ACW be transparent and that similar results (for the same institution) be obtained when used by different researchers (Gupta et al., 2010; Klostermann et al., 2010).

Appendix H. IVC – Questionnaire Municipality

Step	Perspective	Dimension	Objective	Feature
Input	Information needs	Manage information Engagement	Appropriate information	What information is available? What information is needed? (across departments) What information does the customer require?
	Information assessment	Engagement Skills & resources		Are the sources of information categorised? What are the information sources? What are the communication channels? Who are the information brokers? How are the information gaps prioritised?
Process	Capture information	Manage information		Standardise data sources Assign resources to update information Eliminate redundant data Link multiple capture channels across departments
	Store information			Integrate systems to allow all agencies access to information
	Institutional processes	Analyse information Workflow Skills & resources		Train staff to handle operations Existing communication channels Inter-department communication Assigning workflow
	Query information	Workflow Skills & resources	Appropriate time	Prioritise queries & ensure valuable information is delivered Provide dynamic feedback – generate reports & queries instantly

Step	Perspective	Dimension	Objective	Feature
Share	Distribute information	Engagement Workflow		Understand how stakeholders want to receive information Evaluate policy that prevents information sharing among various departments Establish intranets, shared repositories or central database Identify communication channels to provide feedback
	Analyse information	Workflow Skills & resources	Appropriate decision	Ensure resources have skills to analyse information Regularly update customer information Establish governance model that promotes analysis
Output	Act/ learn	Use knowledge Final outcome		Provide incentives for resources to act in the best interest of customers Provide services based on customer needs Develop processes to incorporate lessons learnt Establish processes & management systems to measure outcomes & predict future performance
	Achievement	Use knowledge Final outcome		Information capabilities Informed decision-making Human & social capabilities – influence policy, strategy, IDP, etc.

Appendix I. Community Engagement Analysis

Assessing public participation methods that have been used by the municipality in the past and during the WRC project.

1. **Do you know what public participation is and do you know who your public participation officer is?**
2. **What methods of public participation does the municipality use? Select below:**

   a) Focus groups
   b) Public comment (filling in questionnaire or telephone interview, survey)
   c) Public hearing /public meeting
   d) Public education/ notices (Posters, pamphlets, news media)
   e) Advisory groups (neighbourhood council /sub-committees/committee councils)

3. **Out of these methods which do you feel are the two best, which are the two worst and why?**

   Two best:

   Explain why you prefer these two :----------

   Two worst:

   Explain why you do not like these approaches:
   ……

4. **Which of these methods were used to communicate with you about the need for participants for the WRC research project?**

5. **Have you ever been a part of a focus group? Yes/No**
6. **How many of you were in the last focus group interviews conducted by the WRC Research Team?**

(Based on your experience of focus groups, including the one conducted through research, did it do the following?)

6. Do focus groups do the following:	**Strongly Agree**	**Agree**	**Not sure**	**Disagree**	**Strongly Disagree**
a) Inform and help you understand the current problems surrounding water and sanitation delivery and what the project is about?	⬭	⬭	⬭	⬭	⬭
b) Educate you on your rights and policies pertaining to water, sanitation and public participation?	⬭	⬭	⬭	⬭	⬭
c) Help you to know what the WRC project is about (or any other water and sanitation projects) or actions being taken to address the water and sanitation problems?	⬭	⬭	⬭	⬭	⬭
d) Include all stakeholder stakeholders in the decision-making process of water and sanitation delivery?	⬭	⬭	⬭	⬭	⬭
e) Give you a chance to state your view/ preferences or contribute knowledge on projects?	⬭	⬭	⬭	⬭	⬭
f) Make you feel included in decisions made?	⬭	⬭	⬭	⬭	⬭
g) Aid in building trust with the municipality or experts running projects?	⬭	⬭	⬭	⬭	⬭
h) Reduce conflict among community members or between community and municipality?	⬭	⬭	⬭	⬭	◯

i) Save time and money compared to the other members? (i.e. do you agree that these meetings do not take a lot of time or do you disagree?).					

7. 7. Have you attended a public hearing/meeting? If not, explain why not, if you can. If Yes, did you find it useful?

---

8. Do public meetings/public meeting do the following: (Also make reference to the public meetings held during running of project)	**Strongly Agree**	**Agree**	**Not sure**	**Disagree**	**Strongly Disagree**
a) Inform and help you understand the current problems surrounding water and sanitation delivery?					
b) Educate you on your rights and policies pertaining to water, sanitation and public participation?					
c) Help you to know what projects or actions are being taken to address the water and sanitation problems?					
d) Include all stakeholders in the decision-making process of water and sanitation delivery?					
e) Give you a chance to state your view/ preferences or contribute knowledge?					
f) Include all stakeholders in the decision-making process of water and sanitation delivery?					
g) Aid in building trust with the municipality or experts running projects?					
h) Reduce conflict among community members or between community and municipality?					
i) Save time and money compared to the other methods?					

9. Have you ever filled in a questionnaire, survey, or had a telephone interview? (Public comment)

10. Do questionnaires, survey or telephone interviews do the following:	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
a) Inform and help you understand the current problems surrounding water and sanitation delivery?					
b) Educate you on your rights and policies pertaining to water, sanitation and public participation?					
c) Help you to know what projects or actions are being taken to address the water and sanitation problems?					
d) Include all stakeholders in the decision-making process of water and sanitation delivery?					
e) Give you a chance to state your view/ preferences or contribute knowledge on projects?					
f) Make you feel included in decisions made?					
g) Aid in building trust with the municipality or experts running projects?					
h) Reduce conflict among community members or between community and municipality?					
i) Save time and money compared to the other methods?					

11. Have you ever received information via notices, pamphlets or news, radio announcements? Did you find it useful?

---

17. Do you feel that notices, pamphlets, news and radio announcements do the following:	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
a) Inform and help you understand the current problems surrounding water and sanitation delivery**?**					
b) Educate you on your rights and policies pertaining to water, sanitation and public participation?					
c) Help you to know what projects or actions are being taken to address the water and sanitation problems?					
d) Include all stakeholders in the decision-making process of water and sanitation delivery?					
e) Give you a chance to state your view/preferences or contribute knowledge on projects?					

f) Make you feel included in decisions made?	⬭	⬭	⬭	⬭	⬭
g) Aid in building trust with the municipality or experts running projects?	⬭	⬭	⬭	⬭	⬭
h) Reduce conflict among community members or between community and municipality?	⬭	⬭	⬭	⬭	⬭
i) Save time and money compared to the other methods?	⬭	⬭	⬭	⬭	⬭

18. Did you find this particular WRC pamphlet useful? If so, please explain why.

---

19. Do you know any advisory groups e.g. committee councils? If Yes, do you find them useful?

---

20. How is your relationship with your ward committee or ward councillor?

21. Do advisory groups e.g. (Ward committee council) do the following:	**Strongly**	**Agree**	**Not sure**	**Disagree**	**Strongly Disagree**
a) Inform and help you understand the current problems surrounding water and sanitation delivery?	⬭	⬭	⬭	⬭	⬭
b) Educate you on your rights and policies pertaining to water, sanitation and public participation?	⬭	⬭	⬭	⬭	⬭
c) Help you to know what projects or actions are being taken to address the water and sanitation problems?	⬭	⬭	⬭	⬭	⬭
d) Include all stakeholders in the decision-- making process of water and sanitation delivery?	⬭	⬭	⬭	⬭	⬭
e) Give you a chance to state your views/perceptions or contribute knowledge on projects?	⬭	⬭	⬭	⬭	⬭
f) Make you feel included in the project or decisions made?	⬭	⬭	⬭	⬭	⬭
g) Aid in building trust with the municipality or experts running projects?	⬭	⬭	⬭	⬭	⬭
h) Reduce conflict among community members or between community and municipality?	⬭	⬭	⬭	⬭	⬭
i) Save time and money compared to the other methods?	⬭	⬭	⬭	⬭	◯

Town:

Interviewer:

Number of participants:

Community questions – Topic Guide – to be asked in semi-structured context

How many of you heard about the project through the pamphlets? If you heard via other methods, please specify.

How many of you called toll-free line and how many of you sent an SMS text?

Which methods did you prefer: this one or walking in to an office?

Goal 1 – Informed and educated

Did you feel informed and have a clear understanding of how you should use the new reporting system?

Did the call or feedback text help you understand better what is being done about your water or sanitation problem?

Did you learn anything from using the mobile and toll-free line or about the municipality? (How to send a please-call for the first time or who to speak to?)

Goal 2

Do you feel the app/new reporting system introduced took into consideration your previous concerns about not knowing who to report to and the costs of reporting?

Does it include all stakeholders in the decision-making process of water and sanitation delivery (Ward Committee, women, men, young, old)?

Could everyone use the phones or were there people who could not use the system or who never got to use the systems?

Goal 3

Did using the app reporting system or toll-free line give you a chance to state your view, preferences or contribute knowledge on projects?

Did it help you communicate better with Municipality And share your challenges?

Did you feel you now have a role to play in the decision-making of what happens concerning your water problems?

Goal 4

Did getting an SMS text feedback help you build trust that your problem is being dealt with?

Did speaking to someone on the toll-free line help you build trust with the municipality or research team?

Do you think mutual respect & trust have improved between the Municipality And citizens since the introduction of the system?

Goal 5

Does this method reduce conflict between members and municipality (e.g. does it provide a space where differences on water and sanitation delivery issues are resolved)?

Were you getting your problems attended to? How many did / How many did not?

Goal 6

Did using the toll-free line or text save time and money compared to the other methods such as walking in?

Overall questions about the system

Are the limitations of the municipality discussed openly?

Have citizens been accepting/supportive of the system?

Appendix J. ICT System Interface

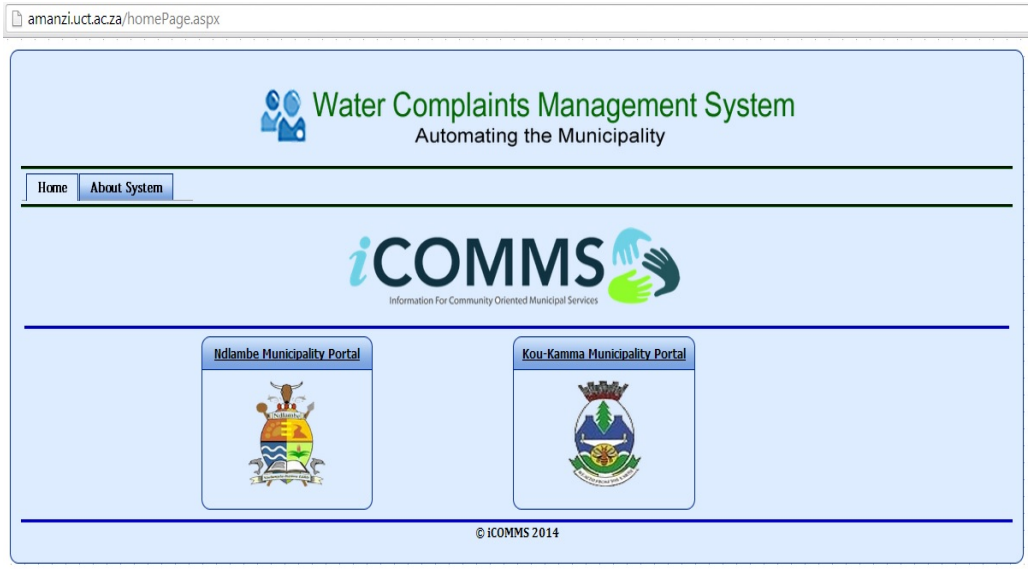

Figure 30: Municipality selection screen

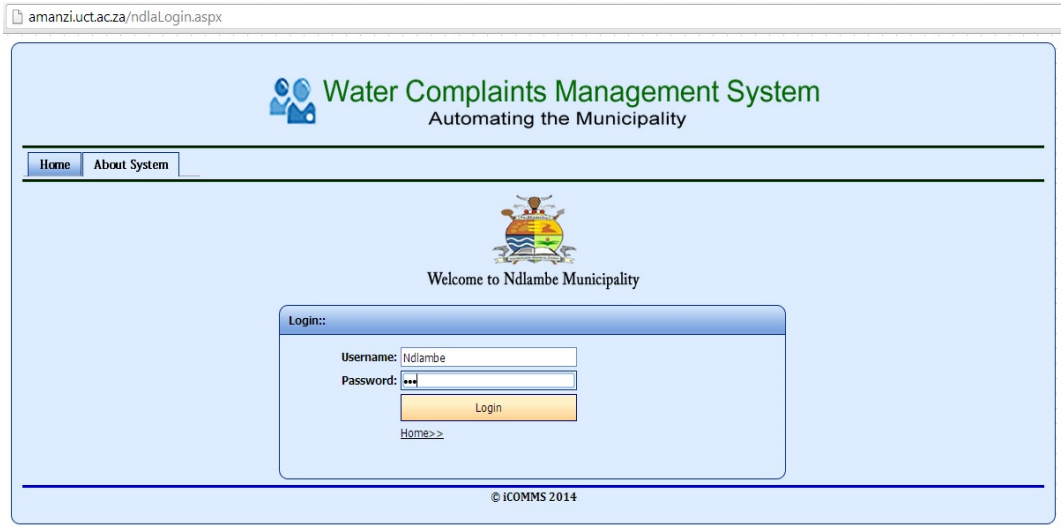

Figure 31: Login screen

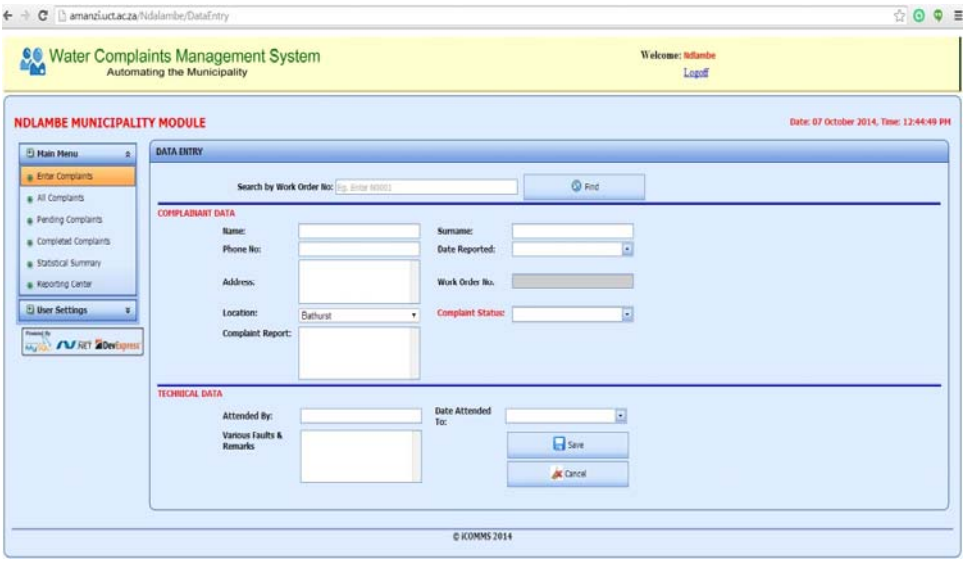

Figure 32: Enter complaints screen

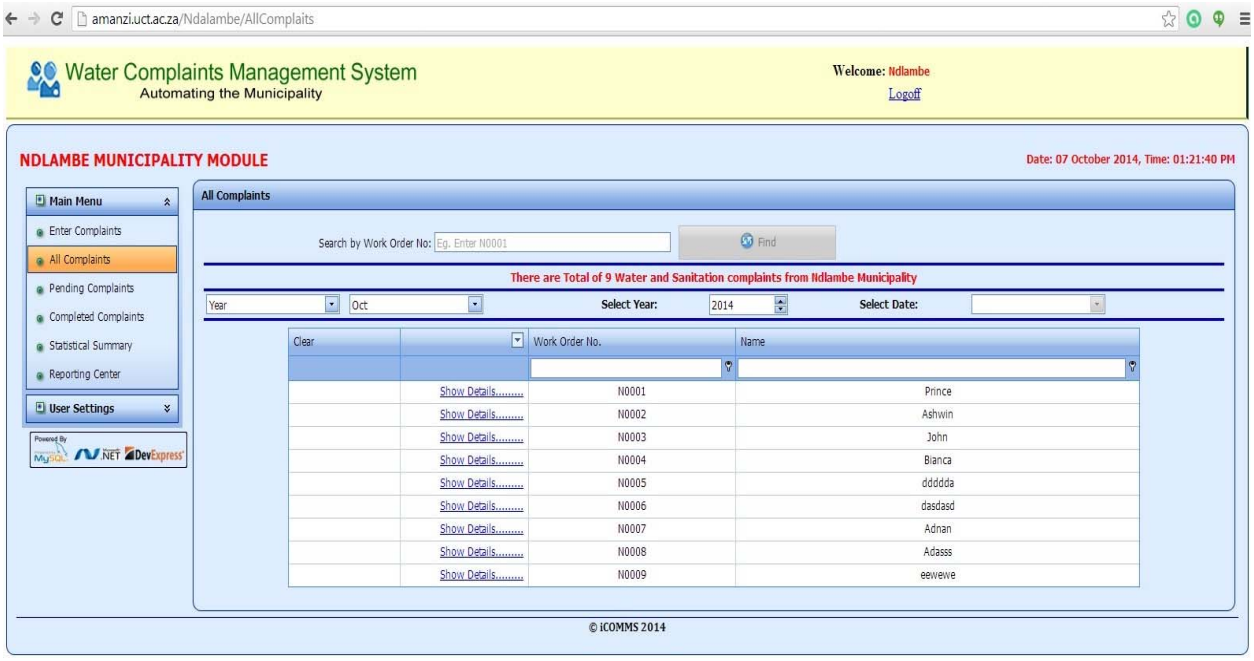

Figure 33: All complaints screen

Figure 34: Complaint details

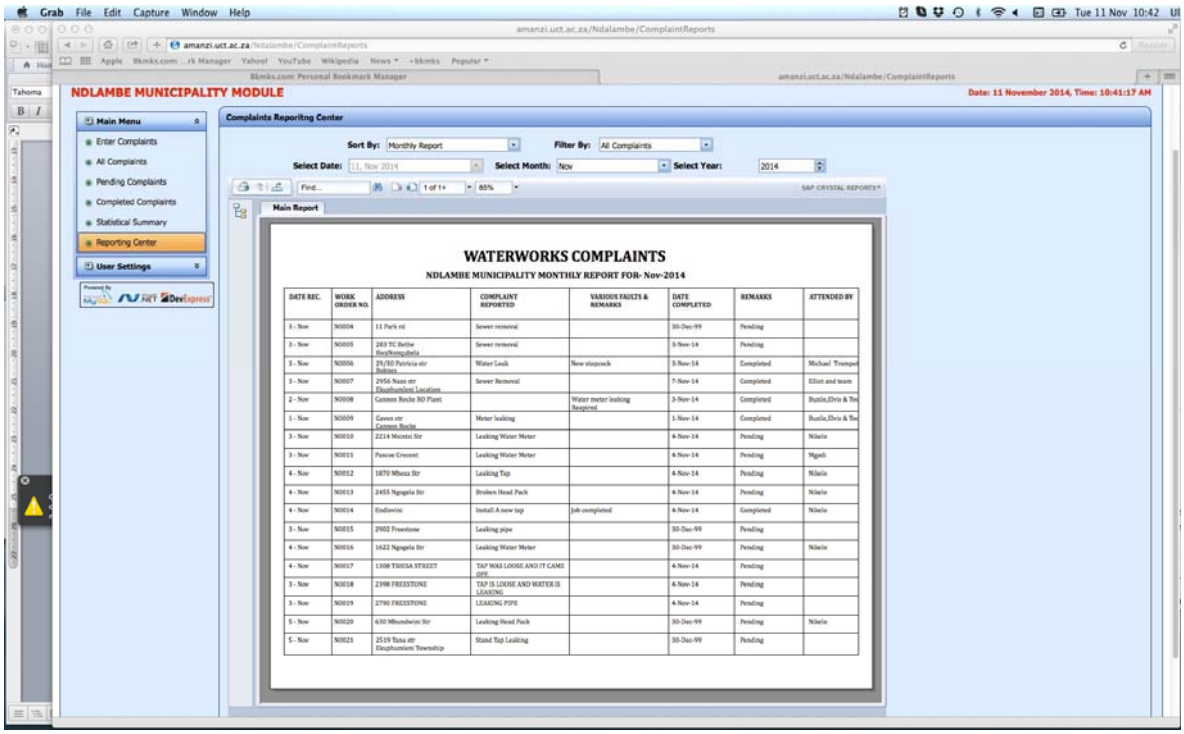

Figure 35: Example of report