

IDENTIFYING EXAMPLES OF SUCCESSFUL COST RECOVERY APPROACHES IN LOW INCOME, URBAN AND PERI-URBAN AREAS

**Report to the
WATER RESEARCH COMMISSION**

by

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Marketing Surveys and Statistical Analysis**

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EXECUTIVE SUMMARY

Background

South Africa has a history of inequitable distribution of water services, skewed by racially discriminatory policies and severe socio-economic inequality. The advent of democracy not only gave all South Africans the right to participate freely in public affairs, but it also constitutionally entrenched rights to eventual access to basic social and economic services. The approach of the Department of Water Affairs and Forestry (DWAF) — outlined in a 1994 white paper — paid careful attention to the financial dimension of expanding basic water services. Drawing in part on conventional thinking in international development organisations, this approach sought to recover recurrent (operation and maintenance) costs of basic services through user charges.

Difficulties in securing user payments soon emerged as a major threat to the continued expansion of basic water services. In 1998, DWAF admitted that, “many of the Department’s RDP water projects are proving unsustainable as cost recovery is not taking place.”

The purpose of the study is to identify the main determinants of successful cost recovery for water services in South Africa and to use this information in the development of practical strategies to overcome obstacles to cost recovery.

Project Objectives

The purpose of the project as a whole is to identify the main causes (determinants) of successful cost recovery for water services in South Africa and to use this information in the development of practical strategies to overcome obstacles to cost recovery. As stated in the project contract, the aims are:

- To audit (countrywide) successful cost recovery for water services provision.
- To establish the institutional, social, economic and political contributions necessary for successful water service provision.
- To identify examples of successful cost recovery programmes which show the way forward.
- Based on the synthesis of these findings, to formulate guidelines for the water service sector.
- To unpack all the above issues and to develop strategies for use by local authorities and other service providers progressively to overcome the obstacles in achieving cost recovery.

All the aforementioned project objectives have been achieved in this Final Project document.

Project Methodology

The project used the following methodology:

- a) Consulting stakeholders such as the Department of Provincial and Local Government, Department of Water Affairs and Forestry, the South African Local Government Association and selected local authorities on the issues, research, design and products required.
- b) Undertaking a national survey of local authorities to identify issues affecting cost recovery. The main objective of the national survey was to collect quantitative data on the cost recovery situation countrywide.
- c) Reviewing literature and existing data.
- d) Identifying four successful local authorities and undertake case studies (in-depth review).
- e) Synthesising findings into a report and identify broad trends and access of interventions

The principal aim of this study is to account for differences in cost recovery outcomes, with particular attention to issues related to low income households. It investigates the interplay between socio-political and institutional context, service infrastructure, and billing and payment policies and procedures in influencing payment rates and debt ratios in diverse municipalities countrywide.

The National Survey

Aim

The principal aim of the national survey was to establish a database of experience at the national level with particular attention to issues related to low income households. It investigated the interplay between socio-political and institutional context, service infrastructure, and billing and payment policies and procedures in influencing payment rates and debt ratios in diverse municipalities countrywide. The empirical findings regarding the causes of successful (and unsuccessful) cost recovery are used to offer guidelines for the development of more effective cost recovery strategies at the municipal and national levels. The national survey data supported the kind of descriptive audit that was planned, but it also made it possible to go further — using statistical techniques — to draw causal inferences about the determinants of successful (and unsuccessful) cost recovery. Although it was not initially clear that the national survey data would be suited to such an exercise, the analysis is directly motivated by the aims of the broader project — to explain why cost recovery succeeds in some cases and fails in others, and to use these empirical findings to inform the development of effective cost recovery strategies.

Results

The national survey of cost recovery yields the most up-to-date available information about water service infrastructure, billing and payment, and cost recovery outcomes in South Africa. The questionnaire was designed to capture as much relevant information as possible while minimising time demands on respondents. Both for respondents' convenience and to ensure an adequate response rate, the time required for completion was limited to approximately ten minutes. The final questionnaire contained 30 questions — of which 16 had structured ("multiple-choice") response options. For questions where respondents were asked to enter specific figures, they were instructed to give their best estimates if exact information was unavailable or inaccessible.

310 questionnaires were returned. Responding municipalities served a total of 3.2 million households, probably representing more than 40 percent of all households receiving municipal water services in South Africa. The data is summarised in the Tables below.

Descriptive Data on Cost Recovery Outcomes

	Municipal data, unweighted mean, with <i>standard deviation</i> (N)	Municipal data, mean weighted by household consumers, with <i>standard deviation</i> (N)	Multiply-imputed data, unweighted mean, with <i>standard error</i> (N=310)
Payment rate	60.7 <i>23.6</i> (306)	60.3 <i>21.0</i> (291)	60.6 <i>23.4</i>
Ratio current to total consumer debt:			
Consolidated accounts	21.7 <i>19.6</i> (259)	21.4 <i>15.2</i> (250)	21.3 <i>19.4</i>
Water only	25.4 <i>23.0</i> (153)	20.8 <i>12.0</i> (148)	26.0 <i>22.9</i>

Note: Source is national survey of municipal cost recovery, 2000. Measures of dispersion around the mean (standard deviations and errors) are in italics. Numbers of non-missing observations are in parentheses.

The results highlight severe constraints on cost recovery — especially for the provision of basic water services to the poor. Combining consumer poverty, low “RDP” service levels (e.g. public standpipes), and the associated inability to punish non-payment by selectively restricting services is the surest recipe for failed cost recovery. Although case studies have identified a few potentially instructive exceptions to this rule, the national survey data suggest that expectation of recovering the operation and maintenance costs of “RDP” water services through user fees is an unrealistic premise for national policy in the foreseeable future. Meanwhile, the national government’s adoption of a “free basic water” policy — itself partly a response to the difficulties of collecting user fees from this segment of consumers — forces careful attention to issues of municipal cross-subsidisation and redistribution through the national “equitable share” mechanism. Neither municipal demarcation nor government commitment to “free basic water” solve the cost recovery challenge, but they substantially alter the institutional and policy environment in which that challenge is addressed.

Analysis: The Causal Model

We constructed a causal model to identify the major factors that explain why some municipalities recover costs for water services while others are less successful. In identifying potential causal relationships, two requirements are paramount. The first is the existence of a logically coherent and compelling account of the process through which the cause is expected to bring about the effect. The second is that the expected effect of a causal factor (or combination of factors) should occur subject to an “all else being equal” condition.

To highlight the concrete implications of this study’s findings, the statistical estimates are presented by simulating the effects on cost recovery outcomes of altering features of an otherwise “typical” South African municipality. The analysis was conducted in two stages — the first in which statistical estimates were calculated for data on actual municipalities, and the second in which simulations were run to illustrate their implications. Because the first stage is fairly technical and the “raw” statistical estimates difficult to interpret, it is reported in an appendix. The second (simulation) stage allows presentation of the same findings in a much more accessible format — expressing the expected effects of altering various features of a typical South African municipality as percentage changes in payment rates and debt ratios.

The simulations focus on expected effects likely to be of broad interest. The first examines the impact of upgrading service infrastructure to metered private connections. The second considers the imposition of service restriction as a penalty for non-payment. The third focuses on the effects of other changes in billing and payment practices — the introduction of a progressive tariff, an active Masakhane campaign, and payment at supermarkets. The fourth combines the impact of each of the first three in order to give a general sense of the degree of influence municipalities have over cost recovery outcomes through decisions about service infrastructure and billing and payment practices. The fifth and sixth consider the

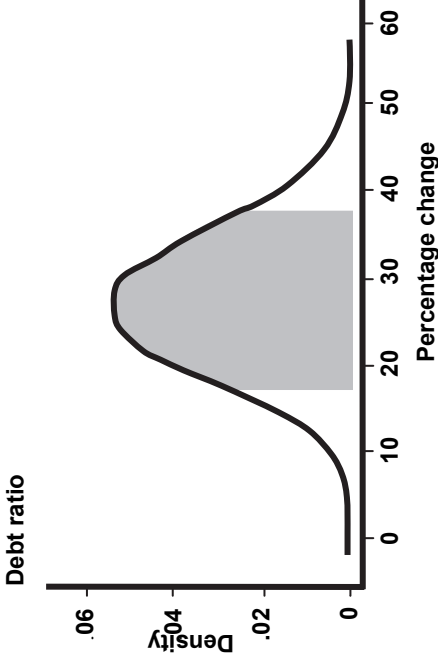
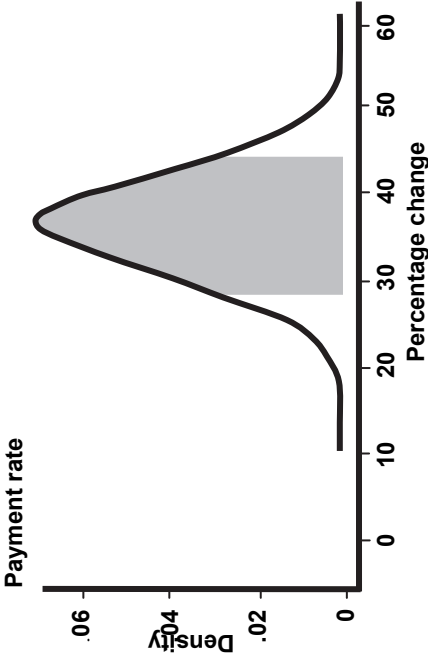
implications of poverty and, more specifically, the extension of basic services to the poor.

The graph below presents the simulation results. The “before” assumptions are of an otherwise typical municipality in which roughly one in five household consumers lacks a private, metered connection; the tariff schedule is not substantially progressive; payment facilities are not available at supermarkets; and there is no Masakhane campaign. In short, the “before” assumptions are of a municipality pursuing “worst practices” for cost recovery. Then, in the “after” simulations, all of these “worst practices” are replaced by “best practices.” Because few actual municipalities approximate the “worst practice” assumptions, the improvements in payment rates and debt ratios available to them by adopting “best practices” will generally be somewhat smaller than the simulated results presented in the figure. The simulations are, however, useful in highlighting the overall sensitivity of cost recovery outcomes to factors within municipalities’ control.

The graph confirms that for a typical municipality the combined effects of moving from “worst” to “best practices” are substantial. The upper graph shows that eight of ten simulations fall in the range of 28 to 43 percent improvements in payment rates, with an average improvement of 36 percent. For perspective, the average simulated payment rate for a typical “before” municipality is 47 percent, while for an “after” municipality it is 83 percent. The lower graph shows that the combined effects on debt ratios is also substantial — with the shaded range stretching from 16 to 37 percent, and an average increase of 27 percent. The corresponding average “before” and “after” debt ratios are 10 and 37 percent, respectively. Municipalities may clearly exert heavy influence on cost recovery outcomes through their own choices and actions.

An unfortunate implication of these results is that extending basic services to the poor shows a strong tendency toward harming cost recovery outcomes. Achieving the goal of financing basic services through improved cost recovery thus appears unlikely in light of the empirical patterns illustrated in the simulations. As pessimistic as this conclusion may seem, it should not be surprising given the findings presented in the analytical sections of the report.

Combined Effects of Possible Cost Recovery Interventions



Shaded areas contain 80 percent of simulated outcomes

Assumptions:

- BEGIN with an otherwise typical municipality where:
- Roughly 20% of household consumers lack private, metered connections;
- Non-payment is not penalised through service restrictions;
- There is not a progressive tariff, payment at supermarkets, nor an active Masakhane campaign.

THEN:

- Upgrade existing consumers to private connections, introduce penalties for non-payment and other billing and payment “best practices”

The Case Studies

Aim

Four municipalities that have had relatively good experience with cost recovery were selected: Mogale (Krugersdorp), eThekweni (Durban), Middelburg, and Nxuba (Alice). The municipalities exhibit differences in terms of size, population, resources etc. and it is recognised that communities present a range of situations related to their specific histories, experience with development projects, access to natural and human resources, models of governance and social organisation and cost recovery systems. The case study approach gives a longitudinal view of the process, which complements the snapshot view provided by the national study. Furthermore, it was hoped that the in-depth review, which the case study methodology format allows, would provide insights by examining both the negative and the positive aspects of the experience that the municipalities had gained.

More specifically, the case studies aimed to do the following:

- assess the roles and relationships of local structures and their bearing on water supply management in the community;
- document the broad socio-economic context in which cost recovery programs are implemented;
- examine the linkage between quality and levels of service and rates of cost recovery;
- identify former (and alternate) water supply arrangements and assess their impact on current cost recovery;
- determine consumer awareness and perceptions about the cost of service in relation to current tariffs and test overall acceptance of the 'user pays' principle;
- obtain an overview of different cost recovery systems, with their strong and weak points;
- identify the main constraints to cost recovery;
- identify the mechanisms and strategies being applied at community level to encourage and enforce payment;
- gain an insight into water management roles and decision making at household level;
- examine the role of women in community water supply management and cost recovery;
- examine the role of community participation in facilitating cost recovery.

The sample includes population groups ranging from 3,800 households to approximately 64,108 households. Variety can be seen in the roles and influence of water boards, community representatives and local government in each community. The study examined both bulk water supply projects and those drawing upon local groundwater resources.

Analysis

A number of very interesting similarities have emerged from the case studies which suggest a basis for a code of best practice. These are:

Preliminary phase

Community perceptions with regard to cost recovery are a very important factor in successful cost recovery. These perceptions will be strongly influenced by the conduct of the municipality over a period of time.

This may include combining increasingly strict enforcement of regulations regarding non-payment with demonstrations of good faith by making investments in infrastructure and upgrading plumbing.

Community involvement

Such a carrot and stick approach must be supported by community interaction. Municipalities must provide dedicated and well-trained staff to communicate with the communities, and act as a go-between between them and the municipality. They should assist residents to be aware of how a council operates: what rules are being used, how water consumption is measured, the different ways of paying for water, budgeting and the like.

Billing

Where pre-paid meters are not being used it is generally considered desirable for electricity to be linked to the water account, and for both services to be billed together. If so, electricity can be cut off instead of water. If this is not possible a link should be made between electricity and water so that a defaulter runs the risk of both being terminated.

Administration

The quality of administration makes an important impact. Good administration must be:

- Responsive
- Convenient
- Clear
- Consistent and unified
- Fair
- Prompt

Treatment of consumers, especially in the case of default

The following are important:

- Deposit
All consumers should pay a deposit for their water connection.

- **Personal contact**
The important aspect here is that the people at the municipal offices must be trained to listen to the individual's problems, and offer solutions that are acceptable to both sides. If the defaulter leaves the encounter feeling in some way obliged to (or in the debt of) the municipality, the chances of the consumer breaking the agreement are much reduced.
- **Second chance**
The normal procedure is for the person to be given an option of either paying off the whole amount, or paying something and agreeing to have the remainder added to the monthly account in installments spread over a period. This is usually acceptable to most people, who feel that their problems have been listened to.

However, as so often with installment agreements, sometimes meeting the extra costs is easier said than done. In this case the normal practice is to cut off the full water supply, and replace it with a flow restrictor which allows only a trickle through the pipes. This is a great inconvenience to the household, but at least gives them access to clean water for basic requirements of hygiene and cooking.
- **Willingness to take strong action**
All municipalities concerned are willing to take strong action if the defaulter reneges on an agreement, or vandalises or bypasses the meter.

The problem of vandalism and illegal connections

Inevitably, one of the responses by consumers is to tamper with meters or bypass them. How the municipality responds to this behaviour is important.

- Tampering is a problem especially with prepayment meters. In such situations it is essential that the consumer knows that there are heavy penalties for tampering, and that failure to pay that penalty will result in the connection being discontinued altogether.
- In cases where the supply has been restricted due to failure to pay an account, the obvious temptation is to get a plumber to remove the flow restrictor. Alternatively where a household finds the water bill too high, to bypass the meter. In such cases the municipality should be able to detect the illegal tampering by monitoring accounts, and/or by field checks of households that have been placed on restricted flows. It then imposes a fine.

Vandalism is a different situation. If it can be reasonably deducted that meters have been vandalised, then the householder must pay a replacement fee.

Technology

In this section we discuss two aspects: pre-paid meters and flow limiters.

- **Pre-paid meters**
In one sense, Krugersdorp has paid the price of pioneering: the meters which they installed suffered from a number of faults which the manufacturer and the municipality have had to correct. As the technology matures, however, so can its electronic capabilities be more fully used.
- **Flow limiters**
The technology of a flow limiter as used in Durban is also quite sophisticated. It is timed to open at 5 a.m. every day, and remain open until a total of 200 litres of water have been used. If less than that quantity is used in a day that surplus cannot be carried forward to the next day, but typically the limit is reached quite early.

Data

As systems become more and more sophisticated, data collection becomes easier. This allows monitoring of individual accounts as well as overall water use and income levels etc. While there is room for congratulation in terms of the recovery of current debts which is an important step forward for many municipalities, there remains a substantial minority of non-payers. Detailed age analysis of the accounts helps to focus the attention of the municipality on such cases, and target resources at those cases. This allows a better definition of which households are truly indigent and which are simply evading payment.

Conclusions

There can be no shortcut to successful cost recovery. It must be a broad-brushed approach involving technical, financial and community aspects. It must be implemented with a unity of purpose between the political and administrative arms of the municipality. Finally it must be seen as a sustainable means by which the standard of service delivery to the public can be enhanced.

There is a close fit between the empirical observations from the case study and the result of the simulations from the National Survey. Predictors of success are individual water meters (in whatever form), prompt and firm response to non-payment, progressive tariffs, good community relations and convenient payment facilities.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

South Africa has a history of inequitable distribution of water services, skewed by racially discriminatory policies and severe socio-economic inequality. For example, the 1996 census found that four of ten South African households lacked piped water, and that more than 95 percent of those without piped water were classified as African.¹ The advent of democracy not only gave all South Africans the right to participate freely in public affairs, but it also constitutionally entrenched rights to eventual access to basic social and economic services.² The policy expression of the government's general commitment to basic service delivery was the Reconstruction and Development Programme (RDP), which (among other things) aimed to provide all South Africans with "a clean, safe water supply of 20 to 30 litres per capita per day within 200 metres."³ At the same time, the RDP document recognised that implementation would be subject to financial constraints, noting that the programme would "redirect government spending, rather than increasing it as a proportion of GDP."⁴ The subsequent publication of the Growth, Employment, and Redistribution (GEAR) macroeconomic strategy — stressing the importance of aggressive fiscal deficit reduction for the country's medium-term growth prospects — highlighted the tightness of financial constraints. A crucial challenge for the government was to reconcile competing pressures to extend basic services to all South Africans and to ensure their financial sustainability.

The Department of Water Affairs and Forestry's (DWAF's) approach — outlined in a 1994 white paper — paid careful attention to the financial dimension of expanding basic water services. Drawing in part on conventional thinking in international development organisations, this approach sought to recover recurrent (operation and maintenance) costs of basic services through user charges.⁵ Resources at DWAF's disposal could thus be devoted to the capital costs of expanding basic service infrastructure. Some allowance was made for the very poor through the approval of subsidised "lifeline tariffs" to make basic services affordable. Yet responsibility was assigned to municipal governments, which could fund them either by using the Department of Finance's "equitable share" grants (based on the number of residents below the poverty line) or by cross-subsidising through increased charges on other consumers. The white paper emphatically stated that DWAF's financial responsibility did not extend beyond grants to cover capital costs of basic services:

¹Statistics South Africa, *Census in Brief* (Pretoria: Statistics South Africa, 1998), 76. The service figures are for piped water available "in dwelling" and "on site or in yard." Classifications by population group (African, coloured, Indian/Asian, white, and unspecified/other) are used to track the legacy of past racial discrimination.

²Republic of South Africa, "Constitution of the Republic of South Africa, 1996," Act 108 of 1996, (Cape Town: Government Printer, 1996), section 27.

³*The Reconstruction and Development Programme: A Policy Framework* (Pretoria: 1994), section 2.6.6.

⁴*The RDP*, section 6.6.3.

⁵DWAF, "Water Supply and Sanitation Policy White Paper" (Cape Town: Government Printer, 1994). For a critique of cost recovery through user charges, see M. A. Schur, "The Need to Pay for Services in the Rural Water Sector," *South African Journal of Economics* 62, no. 4 (Dec. 1994): 419-31.

*“The basic policy of Government is that services should be self-financing at a local and regional level.”*⁶ By insulating itself from obligations related to operation and maintenance costs, the department sought to devote the limited financial resources at its disposal to capital development.

Difficulties in securing user payments soon emerged as a major threat to the continued expansion of basic water services. In 1998, DWAF admitted that, “many of the Department’s RDP water projects are proving unsustainable as cost recovery is not taking place.”⁷ There was no shortage of possible explanations for low payment rates. Consumers of basic services were poor. Similar services had previously been provided free in many areas. Given South Africa’s political history, the popular legitimacy of municipal governments was weak, and the “culture of non-payment” that had taken root in opposition to apartheid was difficult to reverse. The weakness of municipal institutions made the administration of billing and payment systems problematic. Within the existing policy framework, the failure of cost recovery left the government with an unpalatable choice — either allow existing services to collapse, or divert a portion of the capital budget to propping up existing services. The first option involved a clear step backward regarding the goal of extending basic services to all South Africans. Yet the second, by draining the funds available for further capital development, could be construed as a form of exploitation in which, in DWAF’s words, “a small portion of the population enjoys free services whilst the majority has no services.”⁸

The following research report attempts to address the vexatious problem of cost recovery in South Africa.

1.2 PROJECT OBJECTIVES

The purpose of the project as a whole is to identify the main causes (determinants) of successful cost recovery for water services in South Africa and to use this information in the development of practical strategies to overcome obstacles to cost recovery. As stated in the project contract, the aims are:

- To audit (countrywide) successful cost recovery for water services provision.
- To establish the institutional, social, economic and political contributions necessary for successful water service provision.
- To identify examples of successful cost recovery programmes which show the way forward.

⁶DWAF, “White Paper, 1994,” 18, emphasis in the original.

⁷DWAF, Water Services Chief Directorate, “Twelve Successful Cost Recovery Case Studies for Water Services in South Africa” (Pretoria: DWAF, 1998), executive summary.

⁸DWAF, “White Paper, 1994,” 21.

- Based on the synthesis of these findings, to formulate guidelines for the water service sector.
- To unpack all the above issues and to develop strategies for use by local authorities and other service providers progressively to overcome the obstacles in achieving cost recovery.

1.3 PROJECT OUTPUTS

The WRC research contract stipulates the following outputs:

Concept Paper: This paper was an initial exploration of cost recovery concepts, which have since been incorporated in the main body of the report. The Concept Paper is contained in Appendix A for reference.

Research Report: This comprehensive technical report will examine existing cost recovery information both international and local.

National Survey: Resulting from the *national survey of municipal cost recovery*, the report establishes how a range of social, political, and economic factors affects cost recovery in low income areas. These findings are translated into guidelines and strategies to assist municipalities (along with other service providers) and national policymakers in dealing with obstacles to financially sustainable expansion of access to basic water services. The analysis highlights specific, practical measures available to municipalities seeking to achieve improved cost recovery, while also identifying constraints imposed by the social and institutional contexts in which municipal officials operate.

Case Studies: These focus on four municipalities and explore, in detail, the social, political, and economic factors that affect cost recovery in particular municipalities. The findings, guidelines and strategies developed in the research report will be applied and tested on these municipalities which will, in turn, assist improved cost recovery.

Guidelines: The guidelines for municipalities will enable improved cost recovery.

National Workshop: Round table discussions will be held with key stakeholders to establish the most suitable way of using the findings of the report.

1.4 PROJECT METHODOLOGY

- a) Stakeholders such as the Department of Provincial and Local Government, Department of Water Affairs and Forestry, the South African Local Government Association and selected local authorities were consulted on the issues, research, design and products required.

- b) National survey of local authorities was conducted to identify issues affecting cost recovery. The main objective of the national survey was to collect quantitative data on the cost recovery situation countrywide — including behavioural and financial indicators of cost recovery outcomes, social and institutional profiles, infrastructural characteristics and billing and payment policies and practices. The research strategy for the survey component of the project, culminating in the technical report, comprise four steps:
1. From a thorough review of existing international and South African research, an analytical framework identifying major hypothesised determinants of successful cost recovery was formulated.
 2. The national survey and other social data sources (for example, the 1996 census) was used to collect indicators measuring cost recovery outcomes and major hypothesised determinants of successful cost recovery for a sample of South African municipalities.
 3. Appropriate statistical techniques were used to conduct descriptive and causal analyses of the dataset compiled.
 4. The substantive implications of the findings for municipal officials and national policymakers seeking to overcome obstacles to successful cost recovery were highlighted
- c) A literature review was conducted.
- d) Findings were synthesised into a report to identify broad trends and access of interventions
- e) Case Studies were undertaken in four successful local authorities
- The data obtained from this survey included matters such as billing and payment procedures, service levels and community pressures.
 - Conduct interviews with local authorities and other stakeholders to determine their experiences and expectations. These will focus on administrative matters like billing methods, sanctions such as turning off the water and evictions, incentives for good payment, relationships with community leaders and other efforts to promote understanding.
- f) Analyse data and prepare preliminary findings.
- Use findings of first report and in-depth of case studies and develop guidelines for implementation of cost recovery in water services provision.
- g) Make presentation to WRC.

- h) Conduct workshop with selected stakeholders to review findings and develop most effective presentation of findings for use by stakeholders.
- i) Prepare draft final report for WRC.
- j) Prepare final report for WRC.

CHAPTER 2: LITERATURE SURVEY

2.1 INTRODUCTION

This chapter is a survey of the literature regarding cost recovery. The purpose is to identify key variables which affect cost recovery, and in so doing provide pointers to aspects which will lead to success.

2.2 BACKGROUND FACTORS

2.2.1 *Social Capital*

The term social capital is a useful one in characterising a community that has a sense of interdependence, and uses its strength as a group to solve problems. A community that is in perpetual conflict, or has no mechanisms for the members to work together is said to have no social capital.

It is not therefore surprising that, in the DWAF report “12 successful cost recovery case studies” (1998), most of the communities referred to have higher than average social capital. However, it would be fair to neither the communities nor the project managers, to assume that social capital just exists. There are many examples of it being developed, and the work of the Mvula Trust in generating community support and trust through the project process emerges from several of the cited case studies (e.g. Gundani, Motlhaba Ntswana-Le-Metsing, Ngqele).

Political divisions can be very destructive, and can be used to give distorted messages. In the DWAF report (op cit) a group which claimed to represent the ANC tried to undermine cost recovery efforts by saying that it was government’s responsibility to pay for water (in George Moshesh).

An important component of social capital is respect for the leadership. A good example is provided by Norokie (the DWAF report “Understanding the cost recovery challenge: a study of ten rural communities”), where the leadership of the first water scheme was provided by two elderly people, one woman and one man. While they were in charge everything worked well. However, this scheme consisted of only a single borehole, and the village was designated to be part of a large water distribution project, with 19 standpipes in the village. While the project followed the conventional system of establishing a water committee, and was not badly implemented, it has nevertheless disrupted the existing leadership. Women feel excluded from the committee (where an ability to speak English is considered to be a qualification for membership), and there are doubts about the fairness of the proposed system of flat-rate payments. The committee is also dominated by the youth whom many members of the community consider to be less trustworthy with money than the previous elderly person.

In Kopela, another of the communities studied in the same report, repayment levels fell to 1.8%. The reasons given included resentments that people were getting water even when they were not paying, suspicions about how the money was being used and poor communications with the water committee and similar “bad attitudes” (to quote a committee member). Leaders are alleged to spread bad feelings and discourage payment at “meeting at night when even the chief does not know”. The report concludes that, “a whole host of underlying tensions and power struggles form the context for this difficult situation. These tensions have lead to the gradual breakdown of co-ordination between the four communities linked by the project. . Operation of the system has been reduced to a level of ad hocery that threatens the supply of water on a day-to-day basis and ultimately for the future”.

2.2.2 Previous Cost Recovery Regime

Many projects have inherited a cost recovery regime that was either non-existent, or enforced very weakly. Others had included payments for water along with the tribal levy, so that, in fact the water element was incidental to the right to occupy the land. Such habits influence people’s likelihood of paying in future.

The Norokie case, referred to above, may experience problems due to the fact that while water had been supplied for more than a year, no cost recovery system had been introduced. While the community had given its consent for the project and promised to pay, while the delays in introducing payments lengthen, so too do the grumblings about the proposed cost recovery system.

Indeed, this situation is encountered quite regularly. In the DWAF report “Local cost recovery practices and attitudes in proposed Amatola Water Board area” (1998) it is reported that in the Stormberg and Mbaxa study areas no payments are being made for the water. No information had been given with regard to how much should be paid or where it should be paid.

However, the DWAF report “12 successful cost recovery case studies” (1998) refers to a change from a situation in Gundani where there was no cost recovery system (diesel for the pump was paid for by DWAF), to one where cost recovery reached 85%. Thus the existence of a previously weak or inefficient system is not fatal to good results.

A similar turn-around was achieved at Douglas, where, from being R1.8 million in the red, Douglas became financially secure with about 85% cost recovery.

2.2.3 Previous Levels of Payment

It would be expected that, where the level of payment for a scheme is very poor, it would be doubly hard to make a change, as customs would have developed with regard to non-payments, and people will not budget for water payments. Choma,

1999, provides the example of Middleburg, which is discussed in more detail below, to demonstrate that even where such poor levels of payment exist, (defaults of 76%) it is possible to turn the situation around to a virtual 100% payment.

Klerksdorp established a reputation for its aggressive boycotts of service charges, with payments down to 11%. However, the situation was turned around, by means of improved service, customer education, and strict enforcement to one where cost recovery reached 94%. (DWAF report “12 successful cost recovery case studies” (1998)).

2.2.4 Previous Standard of Service

An important consideration in many rural schemes has been the degree to which people are satisfied with the standard of service of the water system already in place. A common scenario is one in which a new scheme is introduced which benefits most residents although the remainder were quite satisfied with the service they received before. Where such people did not use to pay for their water there is an added incentive not to pay for the new scheme. The DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998) makes this point in respect of Goara, where almost half the households continue to use the previously installed borehole and/or river.

The report describes a similar situation in Kameelboom. 55 out of the total of 159 are not paying, have never paid, and are not listed in the community treasurer’s books. Some of these are people with their own boreholes.

The same report refers to Modderspruit where the old and the new system operate side by side. The new one has excellent pressure, but due to vandalism and/or unreliable pre-paid technology does not always work. The old system requires arduous hand-pumping. As a result cost recovery efforts are being diluted as some people still use the old scheme, though the committee view it as being a useful safety net for the poor.

2.3 INFRASTRUCTURE

2.3.1 Standard

Durban sets a good example of linking standards of service to the affordability of the customer (DWAF report “12 successful cost recovery case studies” (1998)). The lowest standard is such that a low level of supply is provided such that each household gets no more than 6kl per month, due to the restricted diameter of the pipe. It is cheap, and having no moving parts, reliable. It provides an on-site connection which saves householders the effort of carrying water, without the expense of internal water fittings.

As a second level of supply, in-house tanks are provided at reduced pressure, which still gives a level of supply which is acceptable for most needs, but low in cost from the reticulation point of view as it provides a source of water for use during peak periods.

The motivation for yard taps is high in very many communities, and has obvious attractions from the point of view of cost recovery. In Mogogelo (DWAF “Understanding the cost recovery challenge: a study of ten rural communities” (1998)) community members are saving up to obtain yard connections. However, such is the strength of their feelings on this matter that they refuse to pay for communal standpipes.

An interesting example of community standard-setting occurred in Ganyesa (DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998)). The water supply system, developed in 1996, takes its water from two boreholes, linked to two large reservoirs. However, during a promotional visit to introduce the “enviro-loo”, the presenter mentioned groundwater contamination by pit latrines as reason to support his product. Since then, borehole water is no longer perceived as clean and healthy.

In examining the question of cost-effective water provision in rural areas, the Appropriate Technology Group stated in 1991:

Appropriate technologies which have been successful in other rural areas need to be tested and evaluated, and where necessary modified for local conditions. The following technologies are among those which should be followed up:

- *Rainwater harvesting and storage*
- *Small dams*
- *Disinfection methods for small water supplies*
- *Desalination for remote areas*
- *Water dispensers for distribution terminals*
- *Water storage tanks; and*
- *Village level operation and maintenance hand pumps*

The privatisation of many of the functions related to water supply in rural areas should be promoted. In particular the support framework for entrepreneurs to participate in the construction and implementation of the schemes.

2.3.2 Maintenance and Vandalism

The DWAF report “12 successful cost recovery case studies” (1998) states, as one of its conclusions,

People are only going to pay if they feel that they are getting value for their money. It is no coincidence that every project studied had really good service, with supply very seldom interrupted, of good quality.

While some vandalism is nothing more than adolescent play, for example, in other cases it is a sign of protest. Pre-paid systems tend to attract more vandalism due to their failure to supply water when the means are lacking.

In Modderspruit (the DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998)), a new water system based on pre-paid standpipes. These are operated by tokens. Pre-paid technology was used due to the bad cost recovery rates previously, and was operated by a private company. Vandalism was a serious problem at the beginning of the project, but was not so serious at the time of the survey. Reasons for the vandalism cited included anger on the part of the sections of the community that did not want to be included, unhappiness with the shared standpipes (year taps wanted), and retaliation by owners of private boreholes who did not want their income undermined.

In Mogogelo, cited in the same report, the maintenance system appears to be extremely cumbersome. Community water operators check the system daily and report faults to the water offices. These reports are then only collected every two weeks by the water board, or sometimes only monthly. Repairs are reportedly needed on a very regular basis, especially to taps, valves and wheel valves. Taps are stolen.

2.3.3 *Metering*

Simes Lings and Tshivase (1993) made the point that pre-paid water meters require a high level of capital and sophisticated technology. They warned that there could be resistance from the public, and that communal points could be subject to vandalism. All these predictions have come true, but the literature of successful projects is growing and portrays a more satisfactory picture.

Several different types of prepayment are possible. An intermediate solution is the use of the token – an object that can be bought from shops or the water authority that will deliver a certain amount of water when inserted.

A token system is used at Goara (the DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998)), where a communal water supply is activated by a token. The residents contribute R5 per month. Using this money the operator buys a token from the Water Board. A token a week is needed to activate the flow of water from a central source. The operator activates the flow to the standpipes three times a week. Between these times the taps are kept locked by designated pump caretakers, one next door to each standpipe. The community reports a high degree of satisfaction with the system.

At Modderspruit (cited in the same report) there are several complaints about the pre-paid technology. “The meters do not work properly. . .so that the water does not stop, or it does not count the water you have taken”; “People misuse the system and manage to twist the card so that they get water free”, “Once I had to pay R10.50 to a

vendor just to do my washing because the standpipe didn't give water". During the fieldwork the entire pre-paid system was out of order.

2.4 MANAGEMENT / CUSTOMER CARE

2.4.1 Communications

Communications between the authority and the consumers is a very important variable. Bad communications can quickly result in conflict and retaliatory boycotts of payment, while good communications will result in a responsive public that trusts the authority, understanding their needs in terms of payments, and gives support to it by encouraging all members of the community to do their duty. Nlatleng Trollip and Jordaan (1999) point to the inadequacy of public meetings as a communication tool, and the lack of credibility of the mass media in the minds of most members of the public in light of the apartheid history of the press. They add that even existing community structures are limited, often due to political agendas and a lack of experience in communicating both upwards and downwards. They emphasise the need to employ people, whom they call "community service assistants" whose job is to act as communicators with the public at large, and community structures such as Ward Development Committees. This parallels the experience of Martin (1976) where specially trained teams of community development workers acted as communicators with a total of 27 000 households and obtained their co-operation in situations with huge potential for conflict (removing houses to make way for roads etc).

Smit illustrates the magnitudes of the gap between water authorities and their customers, and emphasises the importance of properly handled customer care.

In the DWAF report "Local cost recovery practices and attitudes in proposed Amatola Water Board area" (1998) the point is made that improved communications linked to improved management practices are required if cost recovery is to be improved. The authors state:

The practical recommendations for improving cost recovery concern the needs for institutional investors in water supply to:

Develop clear relationships between the presently responsible parties and consumer interests regarding all the aspects of improving cost recovery identified above. It is important that institutional relationships and structures in water scheme areas are linked to the development of systems for operation and maintenance where possible and appropriate. In addition these relationships can be extended to other areas of the operation of a scheme such as rehabilitation, the management of payment points, sanctions, billing and planning.

The Appropriate Technology Group in their "Guidelines of the cost effectiveness of rural water supply and sanitation projects" (1991) state:

There is a need for more attention to be paid to the education and training aspects of these schemes. Regional centres, or preferably regional training teams who can move from district to district, need to be established to provide the training and

follow-up support needed. Education needs to focus on sanitation and domestic health and hygiene, as well as creating an awareness of ways of achieving development successfully.

2.4.2 Consumer Involvement

As part of the conclusions in the DWAF report “12 successful cost recovery case studies” (1998) it states:

Projects should be demand driven. It is vital that the community, or as close to grass roots level as possible, are made to feel part of the decision-making process. Without this the sense of ownership will be lost.

Rall summarises a demand-responsive project as follows:

- *The community initiates and makes informed choices about service options, based on their willingness to pay for the service, and acceptance of responsibilities for subsequent operations and maintenance.*
- *The community contributes to investment costs relative to level of service and has significant control over how funds are managed.*
- *There is an adequate flow of information to the community, as well as procedures for facilitating collective action decisions within the community (social intermediation).*
- *Communities can choose how goods and services are delivered and how water and sanitation services are managed.*
- *Government has a facilitative role, sets clear national policies and strategies and creates an enabling environment (including the legal framework) for participating groups.*
- *The community (or representative body thereof) owns and is responsible for sustaining its facilities.*
- *Community capacity is appropriately strengthened.*
- *Innovation is promoted and the need for flexibility is recognised.*

2.4.3 Customer Care

Muller states that customer care is now legislated for under Chapter 9 of the Municipal Systems Act, 2000. She says a clear distinction needs to be made between the customer care and management on one hand, and debt collection on the other. She proposes that debt collection be sub-contracted so that the Council will be able to play the role of the “good guy” while the debt collectors will play the role of the “bad guy”.

Muller also points to the importance of easily accessible pay points, and the need to provide alternative arrangements for those who cannot pay during normal business hours, such as through supermarkets. For example, in Douglas, payments could be made at the same points that pensioners received their pensions, thus saving them much time and trouble (DWAF report “12 successful cost recovery case studies” (1998).

In Klerksdorp considerable efforts were put into customer care and information. These included providing proper facilities for complaints and queries which were operated by trained personnel on a 24hour basis; provision of a council bus that visited townships as set dates to explain the need to pay for water, and respond to concerns about Council and its activities; providing accessible pay points, and reporting any intimidation to the police.

In Durban (DWAF report “12 successful cost recovery case studies” (1998)), community members were trained as plumbers and community liaison officers. This provides the double benefit of making people easily accessible, and creating the impression that the Council supports the community. The plumbers went from house to house to check for leaks, register the customers, and note family size.

2.4.4 Personal Data

Choma (1999) has demonstrated that policy must be informed by good data, and uses Middleburg as an example. This means that the authority must know enough about the circumstances of the customers to respond to their situation effectively. Thus when people claim poverty, the authority must have evidence with regard to whether the claim is true or not.

In rural schemes it is common for data to be collected by a door-to-door census. This gives the customers the chance to ask questions about the scheme, as well as to give accurate information. (DWAF report “12 successful cost recovery case studies” (1998)). In the same report, the example of Douglas is used to identify consumers very carefully and accurately. This included a careful distinction between tenants and owners.

2.4.5 Tariffs and Affordability

The debate about whether water should be treated as a market commodity, social service or a right has many aspects in today's South Africa.

An argument often made about affordability is that while people often find money to pay private water vendors, (DWAF report “Implementing prepayment water metering systems”, p 32 (1997)), when water is supplied through the tap the attitude changes. This demonstrates that water demand is elastic.

Another aspect of demand is that surveys often fail to differentiate between the responses of men and women. Men typically underestimate the effective demand for water, as they do not have to collect it: women are more likely to pay for the lifestyle enhancement of convenient water supplies (DWAF report “Implementing prepayment water metering systems”, p 32 (1997)). The same report makes the point that a few Rand can make a big difference in the context of the poor living in rural areas. A scheme that was estimated to cost R12 per month was rejected, as the residents said they could only afford R7 per month.

To take a more objective approach, Veck and Bill (2001) undertook a study in Alberton and Thokoza in which they questioned people closely about their habits and posed questions about their response to increased water prices. This “Contingent Valuation” approach has been used with success in Perth, Australia. The study showed that the poor cannot afford to pay more as the price increases, and increases in the price of water may encourage the upper income group to reduce water consumption in the short term. The effect is therefore for the lower income group, because of their limited disposable income, to decrease their use of water as the price of water increases.

The DWAF report “Implementing prepayment water metering systems” (1997) states: *Affordability is a very imperfect measure of what people will pay for water. Income and poverty indicators are reported here primarily to demonstrate the importance of:*

- *keeping the price . . . as low as practical*
- *engineers, sociologists and development practitioners not fuelling communities’ demands and expectations for water in excess of basic needs provision. . .*
- *acknowledging the spread of incomes even within rural communities, so that households with higher incomes which are willing to pay the full cost of a higher level of service will have their demands satisfied.*

Hazelton and Kondlo (1998) make the following point:

Sliding scale tariffs may be a useful means of generating some additional funds for cross-subsidising poor communities. This would be particularly true where water costs are low because the infrastructure was installed long ago and the sliding scale tariff is also being used to introduce more uniform tariffs in a district. However even for affluent households higher water prices will curb consumption. . . Since elasticity itself is not constant but dependant on the initial price level, the demand at which the price increase is applied and the relative affluence of the customers . . . Therefore sliding tariff scales should be seen primarily as a demand regulator and not as a provider of additional revenue.

Rall (1999) describes the market driven approach as follows:

- *Basic social services, including water and sanitation, are not fundamental human rights like individual liberty and freedom of expression. They are conditional on the ability to pay. Policy objectives should therefore not be based on providing a particular level of service, even if it is considered to be the basic minimum required for health and human dignity, but on what consumers can afford to pay.*
- *Sustainability of services can only be ensured if consumers pay the full economic cost. This is because, firstly, consumers respond only to economic incentives and disincentives. Treating services as a commodity to be supplied in accordance with the rules of the “market” is the best way to achieve efficiency and cost-effectiveness.*
- *Subsidies to the poor are not good because governments can’t afford them.*

He counters these points by pointing to the need for water as a basic human need, which in cases of poverty must be subsidised. Although government has many limitations, properly targeted and implemented subsidies are an essential part of a sound policy in a country such as South Africa.

Clearly, by not relating charges to consumption per se, usage can be quite high. In typical rural schemes, the usage is limited by the distance that people must carry the water. However, in urban areas such constraints may not apply, and hosepipes and similar devices are used. In the DWAF report "Local cost recovery practices and attitudes in proposed Amatola Water Board area" (1998), the authors report that in Kuntselamanzi township consumption from standpipes was between 150 and 200 litres/day.

To some extent the difficult issues have been addressed in the government's free basic services policy. However, there remain difficulties in addressing this in terms of how the necessary financial support can be delivered in the rural areas where there are not enough large consumers to cross-subsidise the poor, which is complicated by uncertainties with regard to the proposed powers and functions of different arms of local government.

The first successful example of a progressive subsidy being applied was in Durban where the first 6 kl of water have been effectively provided free (Macleod (1999)). This is linked to good customer care and maintenance standards. Choma (1999) makes a similar point in relation to Middleburg: a policy that recognises the fact that poor people cannot pay, or can pay very little, will get community support which will thereafter support cost recovery efforts.

Flat rate tariffs are a cause of friction in many communities. Families living next to a communal standpipe will be likely to use more water than those living far away. Similarly a large family will be likely to use more than a small one. Such inequities are a factor in poor payments (e.g. in Kameelboom (the DWAF report "Understanding the cost recovery challenge: a study of ten rural communities" (1998)). By contrast, the same report gives the case of Modderspruit which uses a pre-paid system which is preferred by many as "big families pay for what they use" although other aspects of the scheme are unsatisfactory due to reliability problems.

A common sentiment is that people will willingly pay more if the standard of service is increased. In the DWAF report "Local cost recovery practices and attitudes in proposed Amatola Water Board area" (1998), the authors cite the case of Tyu-Tyu where people say they would be quite happy to pay the cost of 200 litres/day, which would be R18,24 per month.

2.4.6 Billing and Metering

A recurrent theme, as stated above, is the problem of flat rate charges. In a study of the Umgeni Water methods of cost recovery, Hazelton and Kondlo (1998), citing Hlapo 1996, state:

Soon it became apparent that the flat rate was unpopular and that it was regarded as unfair by some customers because those further away pay the same rate as customers living close to the unit who, as well as not having to carry the water as far, generally use more water. At the same time it was also difficult for Umgeni Water to know whether the money collected was sufficient for the water used as these standpipes were not metered. Vandalisation of such standpipes was quite common.

In response to this difficulty, Umgeni Water introduced metered shared standpipes. These are registered in the name of individuals who control them, and who are fully responsible for them. The standpipe owner can either sell water at a profit or divide the bill equally amongst the households that get the water from the standpipe. The authors state that

When water is sold at a profit each household pays according to its water usage and generally this appears to work well. . . . When households agree to share equally problems often arise if the bill is larger than expected as households with fewer dependants start complaining that they are cross subsidising those with larger families. . . .

However . . . some Umgeni Water officials believe that outstanding debts from those standpipes are high and that Umgeni Water is having difficulty in cutting off the supplies since in most cases customers claim that they have paid for the water. There are also occasional instances of a customer insisting on being given water without paying. If standpipe owners are not paying their debts there must also be some questions with respect to the service they are giving. . . . In the meantime Umgeni Water is encouraging Water Committees to be more careful in identifying prospective shared standpipe owners.

Hunter (1999) describes the problems faced by Johannesburg in terms of billing. These included difficulties in getting access to the meters, faulty or damaged meters, and poor productivity among the meter readers. In addition, records were very poor in terms of accuracy of addresses, ID numbers etc.

There can be no question that integrating a municipal bill provides a useful tool in enforcement of cost recovery. Integration means that all municipal accounts are included in the same bill, e.g. water, electricity, and assessment rates. With this system, when the account is not paid, the easiest response is to cut off the electricity.

Tuck outlines the relatively difficult task of cost recovery where water is billed separately, an aspect that has led to the increasing use of pre-payment meters. While there are quite successful examples of prepayment meters, the technology is much more sophisticated and therefore less reliable. On the other hand, water,

being a comparatively low cost commodity, does not lend itself to stealing, as does electricity.

Muller points to the importance of the deposit as a guarantee against default. This must be linked to a clear policy on indigents, which is fairly and efficiently applied.

Durban uses community members to deliver bills (DWAF report “12 successful cost recovery case studies” (1998)), but Johannesburg has found problems in doing this due to unreliability (Hunter). As an incentive for good payers, prizes and similar incentives are offered for good payers.

For some authorities it would appear that the cost of collection outweighs the need for cost recovery. For example in Mogogelo (DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998)) Magalies Water asked the households in the community to register themselves with the water office. Non-registered households are ignored. Thus of the 5000 households, 100 have registered themselves, and only a third of those are paying.

In Ganyesa (as cited in the same study) residents are supposed to pay R4,00 per month, but are encouraged to make payments on an annual basis as part of the tribal levy. Payment is currently running at about 25%, but if 80% were reached a substantial surplus would be achieved due to the low cost of running the scheme.

2.4.7 Staffing

Efficient cost recovery requires a very well organised team, and weaknesses in management have been one of the problems causing low levels of payment. The most obvious one has been inadequate records (see under billing above). Hunter (1999) describes the management problems facing the Johannesburg Metropolitan Council. These included 13% of the properties not being billed, a lack of capacity in the indigency unit, delays in cutting off supplies in the even of non-payment etc, problems of delivering bills etc.

The solutions adopted by Johannesburg have included improved staff training, incentives for staff in terms of productivity, tougher penalties for non-performance, privatising/ring fencing utilities, and introducing a businesslike approach to management.

2.5 SANCTIONS AND LEGISLATIVE FRAMEWORK

2.5.1 Legislation

Fowler (1999) points to the need under the new legislation (especially the Municipal Finance Management Bill) for Councils to take personal responsibility for cost recovery. The days when Councillors may decide, for political expediency, to waive debts, are over.

Muller points to the requirements of the Municipal Systems Act, 2000, and also to the need for legally binding bye-laws regarding debt collection and credit control. Indeed the DWAF report “12 successful cost recovery case studies” (1998) makes the point that s 106 2f of the Local Government Transition Act second amendment 1996, Councillors were personally liable for losses incurred by failure to collect debt. In Douglas this fact persuaded Councillors to pursue an aggressive cost recovery policy, with remarkable results.

2.5.2 Social

The DWAF report “12 successful cost recovery case studies” (1998) states, as one of its conclusions,

In small rural communities peer pressure and social embarrassment seem to be most effective.

However, the question of social pressure can work both ways. In Kameelboom, the social pressure on the water committee from people with low means has reached the stage where about half the community has been excused from paying on the basis of “economic pressures”. (The DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998))

2.5.3 Water Restriction/Cut Off

Muller says that illegal connections must not be tolerated in any circumstances. A similar view is taken by the tribal authorities of the Motlabe Ntswana-Le-Metsing area who fine anyone making illegal connections R300 – a lot of money in a poor rural area (DWAF report “12 successful cost recovery case studies” (1998)).

In Bisho, an important factor in their successful record has been the prompt and harsh response to unauthorised connections (which in this context means by-passing the meter), which includes paying a fee for re-connection.

In Klerksdorp (DWAF report “12 successful cost recovery case studies” (1998)), the first offence for unauthorised connections results in a fine of R300, while the second is R2 000 or six months in prison.

In Durban (same report) defaulters receive a letter asking why they should not be disconnected. If they give an acceptable explanation, their supply is replaced by a standpipe. They still have to pay their arrears and for the standpipe water, and must sign an agreement stating this. Should they then still not pay, their standpipe is disconnected.

As part of its conclusions the same report states:

Once the need to pay has been communicated, an acceptable, affordable tariff has been negotiated and the promised service has been delivered, then the agreed

punitive measures must be implemented. In general the harsher the measures the better the cost recovery. No amount of adversity must be allowed to sway officials. In this regard the support of Councillors/local authorities is essential. It was interesting to note that there seemed to be about a 3-month acclimatisation period is required, for people to become accustomed to the inevitability of having to pay. The slightest weakness on the part of the service provider in this period will however, spell disaster.

In a rural setting the measures available are more limited. In Kameelboom (The DWAF report “Understanding the cost recovery challenge: a study of ten rural communities” (1998)), the leadership has been induced to allow the water to run out, because there is no money to pay, to get community members to pay regularly. This has been their only means of putting social pressure on the non-payers, (at one point 92% of the community).

2.6 CONCLUSIONS

The DWAF report “Implementing prepayment water metering systems” (1997) summarises the pre-conditions for effective cost recovery as follows:

- *The service must be reliable*
- *The water quality must be acceptable*
- *The level of service must be appropriate*
- *An appropriate revenue collecting and accounting system must be in place*
- *Unaccounted-for water must be controlled*
- *There must be customer acceptance of the cost recovery options used and of the revenue collecting authority*
- *Assuming the other pre-conditions are in place, customers must know that water will be disconnected if bills are not paid.*

It adds further:

What happens when cost recovery is not implemented:

- *The rich and influential receive more by way of subsidy than the poor*
- *It leads to people being treated as the objects of aid rather than partners in development*
- *As more schemes are commissioned the Government’s budget becomes consumed in operating existing schemes. Thus little or no money is left for the development of new schemes for those who have nothing.*
- *Communities are misled into believing that water provision is cheap.*

These provide an apt summary of the themes running through the literature which we have examined in this chapter.

CHAPTER 3: INTERNATIONAL AND SOUTH AFRICAN RESEARCH ON COST RECOVERY

3.1 INTRODUCTION

Many factors affect a municipality's ability to recover costs for water services. Existing studies have highlighted the impact of community participation, various service technologies related to the metering and regulation of supply, and features of billing and payment systems. Most research has focused on one or a few factors, using case-study techniques to abstract their effects from the more complex causal processes that determine cost recovery outcomes. This study seeks a comprehensive and generalisable understanding of cost recovery using statistical techniques. Such an approach requires a more systematic and explicit conceptual framework that identifies major potential determinants of cost recovery outcomes. The purpose of this chapter is to present a causal model of cost recovery outcomes, which serves as the foundation for the empirical analysis. Importantly, this task is less about formulating an alternative to the existing understanding of cost recovery than it is about integrating and refining insights from previous studies.

The definition of and rationale for a "causal model" of cost recovery merits a brief discussion. Developing a "model," in a generic sense, implies some simplification of reality. Some models are normative or prescriptive in nature: they are simplified guides to appropriate or effective action in a complex environment. In contrast with such models, the "causal model" presented in this chapter aims to provide a simplified guide to answering the question of why some municipalities are more successful than others in recovering costs for water services. The orientation is toward explanation rather than prescription. By combining a logically constructed causal model with empirical evidence, inferences about the causes (and not mere correlates) of cost recovery outcomes can be drawn. Armed with an understanding of what factors influence municipalities' success and failure with cost recovery, municipal strategies and national policies conducive to improved cost recovery can be developed.

This chapter focuses exclusively on the presentation of a causal model, leaving the empirical analysis and the assessment of its implications for later. The development of the causal model involves integrating and refining existing research on cost recovery — including international studies and those specific to South Africa. First, the model's overall structure is outlined, summarising the major sets of factors included. Next, each set of factors is examined in more detail, stating specific hypotheses derived from existing research where possible. A brief conclusion follows.

3.2 A CAUSAL MODEL

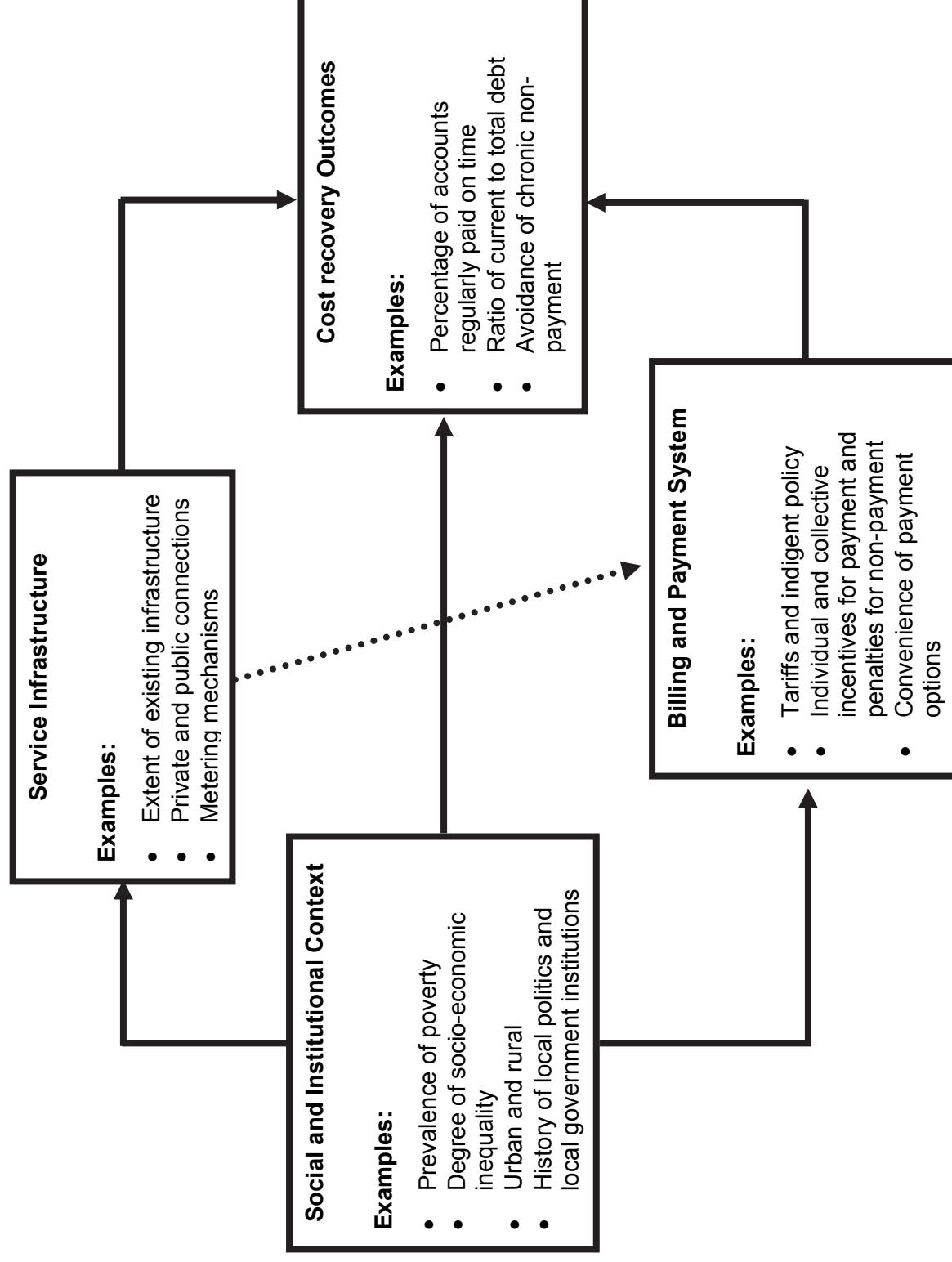
The causal model offers a simplified representation of relationships among major factors that influence cost recovery outcomes. The main concern is with explaining cost recovery outcomes at the municipal level, since under the South African constitution juridical responsibility for service delivery and its financing is assigned to municipal (local) government. Thus, the units of analysis are municipalities. The central purpose of the model is to identify the major factors that explain why some municipalities recover costs for water services while others are less successful. In identifying potential causal relationships, two requirements are paramount. The first is the existence of a logically coherent and compelling account of the process through which the cause is expected to bring about the effect. The second is that the expected effect of a causal factor (or combination of factors) should occur subject to an “all else being equal” condition. So in two otherwise identical situations, altering a particular causal factor should produce the expected effect. This excludes the consideration of factors that are merely correlated with outcomes, but are not causally related to them.

Figure 3.1 is an overview of a causal model of cost recovery at the municipal level. It contains boxes to represent four sets of factors. Cause-effect relationships run from left to right and are marked by arrows.⁹ Because the effects to be explained are cost recovery outcomes, they are at the far right of the figure. Three sets of factors are expected to affect these outcomes — from left to right, the social and institutional context, service infrastructure, and the billing and payment system. Social and institutional context is to the far left, because — besides its direct effects on cost recovery outcomes — it is expected to influence features of municipalities’ service infrastructure and billing and payment systems. Service infrastructure is located slightly to the left of the billing and payment system, since infrastructural features — such as existing pipework and metering mechanisms — are likely to influence the kinds of billing and payment policies and procedures that can be adopted (although it is possible that choices regarding billing and payment could prompt modifications to the service infrastructure). Service infrastructure and billing and payment systems in turn are expected to influence cost recovery outcomes.

The figure is not intended to provide an exhaustive list of every factor that could possibly affect cost recovery outcomes. As a model, it necessarily is a simplification of reality. Each of the four boxes contains a few examples to illustrate the kinds of factors that can be considered. Additional examples could also have been included. This will be clear in the discussion below, which draws on international and South African research on cost recovery to define key concepts more clearly and specify the expected relationships among them.

⁹For a more detailed discussion of the construction of such causal diagrams, see James A. Davis, “The Logic of Causal Order,” *Sage University Paper Series on Quantitative Applications in the Social Sciences* 07-055 (Beverly Hills: Sage, 1985).

Figure 3.1: Outline of Causal Model of Cost Recovery



3.2.1 *Cost Recovery Outcomes*

Cost recovery outcomes are the main phenomena to be accounted for in the study. They are closely associated with the financial sustainability of service provision. In a strict definition, successful cost recovery could be defined as the collection of user charges to cover the full costs of the services provided and the costs of administering the billing and payment system. Conventional definitions have generally been less restrictive, allowing for some subsidisation. For example, in 1982 the United States Agency for International Development (US AID) required cost recovery in which operation and maintenance costs would be met by a combination of user charges and government subsidies.¹⁰ While willing to finance initial capital costs, it insisted that projects be financially sustainable without continued inflows of external donor resources. Within South Africa's current water policies, the national department (DWAF) similarly calls upon municipal governments to recover at a minimum the operation and maintenance costs of local water services, but under some circumstances offers to subsidise the capital costs of expanding basic services.¹¹

The concept of cost recovery implicitly distinguishes between the recovery and the reduction of costs — both of which influence financial sustainability. Cost recovery is the process of raising financial resources to cover existing costs, while cost reduction involves cutting the costs to be recovered. The distinction may seem arbitrary when financial sustainability is the main concern: a rand earned through improved cost recovery is equivalent to a rand saved through cost reduction. But for analytical purposes, considering these different kinds of activities separately is often useful. This study focuses exclusively on cost recovery, with the understanding that cost reduction is another route to improved financial sustainability.

The challenge of cost recovery in South Africa centres around securing greater payment for services from household consumers — particularly from the beneficiaries of expanded basic services and from those who previously received free or heavily subsidised services. Cost recovery for services to businesses and the public sector attracted less attention. There are sound reasons for the focus on household consumers. Most important, data compiled by the Department of Provincial and Local Government (DPLG) suggest that households account for as much as 80 percent of the consumer debt owing to municipal governments, dwarfing the shares owed by other categories of debtors.¹² The shares vary from municipality to municipality, and it is possible that a few municipalities face cost recovery problems rooted in non-payment by business and public-sector consumers. Yet for the vast majority of municipalities the cost recovery challenge is to secure increased payments from household consumers. This study therefore concentrates on cost recovery for water services consumed by households.

¹⁰See Schur, "Need to Pay," 420.

¹¹DWAF, "White Paper, 1994," 21-23.

¹²DPLG, "Project Viability Report, 31 March 2000," 27. These shares were calculated from data submitted by municipalities that broke their consumer debt down into the required categories.

With such a focus, measures of cost recovery outcomes must capture municipalities' success in securing payment from household consumers. Perhaps the most intuitive indicator is the percentage of household consumers who regularly pay their water bills on time — referred to simply as a municipality's "payment rate." Although indicator payment rate is a very useful measure of the ability to induce desired behaviour by consumers, it has two important limitations. The first is that it fails to distinguish between large and small consumers. In doing so, it may distort the bigger financial picture — tending to exaggerate the financial impact of non-payment by households with low consumption and service levels while understating the importance of households with high consumption and service levels. A second limitation of using payment rates as an indicator is that it is insensitive to the effects of chronic non-payment by some consumers. A municipality in which each month a random 50 percent of consumers pay their accounts (so that it is rare that any particular account is more than two or three months in arrears) is in a much better financial position than another in which half the consumers pay every month while the other half never pay. Both would have payment rates of 50 percent, but with very different financial implications. A measure of cost recovery that helps compensate for the limitation of payment rates is the debt ratio, calculated as the proportion of current (not overdue) consumer debt to total consumer debt. A higher ratio of current to total debt indicator indicates more successful cost recovery.¹³

The discussion of cost recovery outcomes — the main phenomenon to be accounted for in this study — can be summarised as follows. Cost recovery is generally defined as the ability to cover the costs of service provision through user charges, often augmented by subsidies deemed appropriate. Cost recovery can be distinguished analytically from cost reduction, although both are closely associated with financial sustainability. This study's focus on cost recovery is sharpened further by the observation that the cost recovery challenge in South Africa primarily involves securing improved payment from household consumers. Payment rates and debt ratios are useful indicators of cost recovery outcomes. A payment rate is the percentage of household consumers who regularly pay their bills on time. It captures a municipality's ability to induce desired behaviour from consumers. A debt ratio is the ratio of current to total consumer debt. It is more sensitive than a payment rate to the financial dimension of cost recovery. Payment rates and debt ratios will be used as complementary measures of cost recovery outcomes in the coming chapters.

¹³On the use of debt ratios to measure cost recovery, also see Hazelton and Kondlo, "Cost Recovery," chap. 4. Hazelton and Kondlo define the debt ratio as the ratio of total to current debt, while here it is defined as the ratio of current to total debt (for intuitive comparability with payment rates). Conversion between the two ratios involves simply taking the inverse of one to calculate the other.

3.2.2 *Billing and Payment Systems*

Billing and payment systems structure the portion of cost recovery processes that generally take place after the consumption of services.¹⁴ The consumer is assessed a charge and may be presented with a set of incentives for payment and penalties for non-payment, along with one or more payment options. In figure 3.1, billing and payment systems are located between cost recovery outcomes (to the right) and social and institutional context and service infrastructure (to the left). This reflects the potential effects of billing and payment on cost recovery outcomes, along with its potential to be affected by social, institutional, and infrastructural factors. This section draws on existing research in identifying billing and payment systems (broadly defined) with the potential to impact heavily on cost recovery outcomes.

3.2.2.1 Tariffs

The money cost of water services to the consumer is determined by the tariff structure. Tariffs can be calculated in many ways, and a wide range of tariff structures are used in South African municipalities.¹⁵ Consumers can be charged a “flat rate” irrespective of their consumption, or, where metering mechanisms are in place, they can be charged variable rates based on their consumption level. Where variable rates are used, the tariff schedule can be neutral, progressive, or regressive. In a neutral schedule, the unit charge (for example, the charge per kiloliter) is constant — that is, a consumer who uses 10 kilolitres per month is charged exactly twice as much as another consumer who uses 5 kilolitres. In a progressive schedule, the unit cost increases as usage increases. To take the example above, the consumer using 10 kilolitres per month is charged more than twice as much as another consumer who uses 5 kilolitres. The unit cost for 5 kilolitres is thus lower than for 10 kilolitres. In a regressive schedule, the unit cost decreases as usage increases. In effect, those whose consumption is higher receive “volume discounts.”¹⁶ Compared with a neutral tariff schedule, a progressive one shifts more of the financial burden onto consumers with high consumption levels. In this sense, progressive schedules are often said to involve “cross-subsidisation” of small consumers (who face lower charges per unit) by large consumers. The effect of a

¹⁴An exception is where consumption is subject to prepayment, such as for prepaid meters; for case studies, see Hazelton and Kondlo, “Cost Recovery,” chap. 5; Greyling and Rodseth, “Prepayment Water Meters.”

¹⁵This diversity is by design, as DWAF explicitly rejects the application of a uniform national tariff — largely because of the very different costs of providing water in different parts of the country, which would entail an elaborate system of financial transfers among municipalities; see DWAF, “White Paper, 1994,” 22.

¹⁶Where water tariff schedules are regressive, consumers often receive bills containing a standard service fee and a variable charge based on usage. The service fee results in regressivity. For example, consider the example of a tariff schedule with a service fee of R20 per month and a (neutral) tariff of R4 per kiloliter. The bill for a consumer who uses 5 kilolitres is R40 (R4 times 5 = R20, plus R20 service fee = R40), implies a unit cost of R8 per kiloliter (R40 divided by 5 kilolitres). Meanwhile, the bill for a consumer who uses 10 kilolitres is R60 (R4 times 10 = R40, plus R20 service fee = R60), implying a unit cost of R6 per kiloliter (R60 divided by 10 kilolitres). The larger consumer receives a bigger bill, but is expected to pay R2 less per kiloliter.

regressive schedule is the opposite: small consumers bear a larger share of the financial burden than they would under a neutral schedule. One final characteristic of tariff structures worth noting is the presence of “lifeline tariffs” for the indigent in many municipalities. These allow for the provision of basic services free or at subsidised rates, often subject to a means test. They improve the progressivity of the tariff structure, at least for those at the bottom of the socio-economic scale.

With respect to cost recovery, an important issue is the link between tariff levels and affordability. All else being equal, as overall tariff levels rise, the expected tendency will be for affordability to decline, thereby putting downward pressure on payment rates and current debt ratios. Current debt ratios may also be influenced by the tariff structure — that is, its neutrality, progressivity, or regressivity — even if payment rates are unchanged. For example, if large consumers pay at higher rates than smaller consumers, the move to a more progressive tariff structure can be expected to improve the current debt ratio, because a larger share of the financial burden is shifted to those who are most likely to pay (assuming resistance to the tariff change does not substantially reduce payment rates among large consumers).¹⁷

A second set of issues pertains to willingness to pay. In research on cost recovery, it is often assumed that consumers hold normative beliefs about appropriate tariffs, and that (all else being equal) they are less likely to pay the more existing tariffs deviate from these beliefs. Three examples from different settings illustrate. First, case studies of rural water projects in South Africa frequently assert the importance of communicating the costs of service provision to communities and involving them in setting tariffs.¹⁸ Communicating cost information is seen as countering the belief that water is part of nature and therefore should be free. Involvement in setting tariffs assures that charges will be acceptable, and that prospective consumers will be willing to pay. Second, studies of water provision using flat-rate standpipes (often in peri-urban areas) have suggested that willingness to pay is an endemic problem.¹⁹ In some cases, such services were previously free, and consumers have rejected the introduction of charges. Another problem has been the perceived inequity of flat rates despite differences in households’ proximity to the tap. Those closest are best served and often consume most, but more distant households are expected to pay the same rate. Willingness to pay for standpipe access can also be undermined by demoralisation associated with “free riding,” because it is difficult to exclude those who do not pay. Willingness to pay drops with the perception that others are effectively enjoying free services. A third example focuses on some areas with metered household connections. Although virtually every South African municipality claims that inspectors read water meters monthly, anecdotal evidence and spot

¹⁷This observation is relevant to the present debate about the provision of basic water services “free.” The move to greater progressivity at least for small consumers (who are generally prone to below-average payment rates) may in itself improve current debt ratios.

¹⁸For example, see DWAF, Water Services Chief Directorate, “Twelve Successful Case Studies,” 20-1; Anonymous, “Five Successful Case Studies,” 55. Enhanced willingness to pay is advanced as one of the key advantages of the “demand-responsive approach” to rural service provision; see Rall, “Demand Responsive Approach”; Anonymous, “Financing Community Water Supply.”

¹⁹Syme and Snijder, “Understanding Cost Recovery,” 108-9; Hazelwood and Kondlo, “Cost Recovery,” 4.4.

checks suggest otherwise.²⁰ Where bills ostensibly reflect actual consumption but do not coincide with meter readings, their legitimacy is suspect, and willingness to pay may decline.

To summarise, the tariff structure is a feature of billing and payment systems with potential implications for cost recovery. Tariffs influence cost recovery through affordability and willingness-to-pay effects. As the tariff applied to a household increases, affordability declines and, all else being equal, the likelihood of payment can also be expected to decline. Willingness to pay is less directly determined by narrowly financial considerations. Instead, it reflects the degree of conformity between the prevailing tariff structure and consumers' normative beliefs about appropriate tariffs.

3.2.2.2 Incentives for Payment

Some municipalities offer incentives for payment that operate somewhat independently of the formal tariff structure. These incentives may operate at the collective or individual level. Probably the most visible attempt to improve cost recovery through collective incentives has been the Masakhane campaign. This campaign has aimed to create a "culture of payment" by rewarding communities with favourable payment records by investing in further service improvements. Individual incentives include giving consumers with paid-up accounts tickets for prize drawings and offering rebates for early payment. A rural municipality that participated in the national survey of cost recovery reported that it encourages payment by holding ox braais — open only to those whose accounts are up to date. This approach combines individual incentives with a social function that introduces a collective dimension.

Although incentives for payment may possibly improve cost recovery, their logical foundations are weak. Individual incentives, like prizes (or chances at prizes) that can readily be assigned a cash value, are functionally equivalent to formal tariff adjustments. Given the choice between paying a tariff and receiving a prize, on one hand, and paying a tariff reduced by the prize's cost, on the other, it is unclear why consumers would systematically choose the first option. For individual incentives to improve cost recovery, some "smoke and mirrors" must be involved. Meanwhile, collective incentives — in which collective payment rates are rewarded with collective benefits — are extremely susceptible to "free riding." Achieving the desired outcome (improved services) requires that most other households also decide to pay. If a household does not expect others to pay, collective benefits will not induce it to pay. Alternatively, if most other households are expected to pay, any particular household will see that the collective benefits will be provided whether or not it pays. Paradoxically, even if every household would prefer to pay and reap the

²⁰See, for example, Syme, "Billing and Revenue Collection," sec. 3.3.

collective benefit, self-interest dictates that they are very reluctant to pay — whatever they expect others will do.²¹

3.2.2.3 Penalties for Non-payment

In contrast with the weak theory and existing evidence to suggest that incentives for payment improve cost recovery, there is near unanimity that penalties for non-payment must be central to any successful cost recovery strategy. Referring to the importance of punitive action, a DWAF report bluntly asserts, “The harsher the measures, the better the cost recovery.” A case study revealed the degree of harshness contemplated, approvingly describing the use of police in armoured vehicles to assist the installation on flow restrictors on defaulters’ connections.²² While this is an unusually graphic example, it is nearly impossible to find a case of successful cost recovery in which credible penalties for non-payment are absent.²³

The rationale behind the close expected relationship between penalties and cost recovery is twofold. The first component hinges on the *ex ante* deterrent effects. If consumers believe non-payment will lead to the restriction or disruption of their water services, they will generally place a high priority on keeping their accounts paid up. By deterring non-payment, the credible threat of penalties can improve payment rates even if the penalties rarely need to be imposed. The second component hinges on *ex post* selection effects. If households that are unable or unwilling to pay their accounts are “dropped from the rolls,” the payment rates and debt ratios calculated for remaining consumers will tend to improve.

A few significant constraints limit the imposition of penalties for non-payment. One is the constitutional right of all South Africans to access to basic water services. This precludes complete disconnection of consumers, unless alternative water supplies are available. The use of flow restrictors bypasses the constitutional restriction by reducing water flow to a trickle, but allowing enough to meet basic requirements. A second constraint is the inability to exclude non-paying households from the use of public taps. When some pay for access to a public tap but others do not, it is difficult to justify even flow restriction, which affects all users equally. In some cases — for example, small and socially cohesive communities — consumers may be able to organise collectively to regulate access, but enforcing penalties can be expected to be highly problematic where public taps are prevalent.²⁴ A municipality’s service infrastructure thus exerts a strong influence on the billing and payment options available to it. A third constraint on penalties is the potential unwillingness of elected councillors to give political backing for their enforcement. Nearly all municipalities adopt formal policies that call for punitive measures for defaulters, but the application

²¹On this paradox, and its relevance to many social situations, see Mancur Olson, *The Logic of Collective Action* (Cambridge: Harvard University Press, 1965). A pessimistic assessment of the Masakhane campaign might blame its perceived failure on such calculations, leaving little more than empty exhortation.

²²DWAF, Water Services Chief Directorate, “Twelve Successful Case Studies,” 22, 14.

²³See, for example, Anonymous, “Five Successful Case Studies”; Syme and Snijder, “Understanding Cost Recovery”; Hazelton and Kondlo, “Cost Recovery.”

²⁴Syme and Snijder, “Understanding Cost Recovery,” 108-12; DWAF, Water Services Chief Directorate, “Twelve Successful Case Studies.”

of these policies may vary. Councillors are often hesitant to impose harsh penalties on the constituencies from which they draw electoral support — especially if non-payment is rife and penalties would have widespread consequences. In the national cost recovery survey, one official — writing a few weeks before the 2000 municipal elections — complained that credit-control policies are useless if councillors are not prepared to implement them. In sum, though penalties can be expected to improve cost recovery, legal, infrastructural, and political constraints may limit their imposition.

3.2.2.4 Administration

Effective administration of billing and payment systems can be expected to improve cost recovery outcomes. One potentially important factor is the convenience of payment options offered to consumers. Prompt payment is more likely if payment is possible outside office hours and for consumers lacking access or familiarity with the banking system.²⁵ Improved administration — for example, through the computerisation of billing and payment and more reliable meter reading — may also raise the legitimacy of water bills in the eyes of consumers, increasing their willingness to pay.²⁶

3.2.3 Service Infrastructure

Service infrastructure is a set of factors related to existing pipework and mechanisms for regulating and metering supply. In figure 3.1, billing and payment systems and cost recovery outcomes are to the right of service infrastructure and the social and institutional context is to its left. The rationale is that while social and institutional context affect patterns of infrastructural development, infrastructure imposes constraints on billing and payment that in turn can be expected to influence cost recovery. Under the heading of service infrastructure, some technologies for regulating and metering water supply — such as distributed storage regulating units and pre-paid meters — have been identified as possible sources of improved cost recovery.²⁷ Yet specific technologies are not prevalent enough to meaningfully measure their effects on cost recovery in a national survey of municipalities.²⁸ The focus here is therefore on more general considerations — in particular, the breakdown between private and public connections, and the share of connections that are metered.

²⁵Chris Smit, "Service Providers Need to Adapt to Changing Environment," *Urban Management* 30, no. 3-4 (Mar.-Apr. 1999): 7-10.

²⁶Syme, "Billing and Revenue Collection"; Smit, "Municipal Cost Recovery."

²⁷For analyses of both these technologies, see Hazelton and Kondlo, "Cost Recovery," chap. 4. Greyling and Rodseth ("Prepayment Water Meters") use a Modderspruit case study to in asserting the benefits of pre-paid meters, but this favourable assessment of the Modderspruit experience is severely questioned in DWAF, Water Services Chief Directorate, "Twelve Successful Case Studies," 1.

²⁸The survey does however offer useful descriptive information about the use and perceived value of pre-paid meters countrywide.

The breakdown between private and public connections has a major impact on municipalities' ability to penalise non-payment through restriction or disruption of service. The distinction between private and public connections is not always clear-cut. For example, private "shared" standpipes and public standpipes are similar in many ways. In both cases, households pay to use a standpipe in the vicinity of their homes. But while a shared standpipe is often positioned in the yard of an individual account holder who sells access to neighbours, a public standpipe is located in a public place and is the responsibility of a recognised collective body, such as a water committee.²⁹ Recognising the potential for ambiguity in some situations, the private-public distinction provides a useful guide to the possibility of punishing non-payment. All else being equal, municipalities with high proportions of private connections can be expected to achieve better cost recovery outcomes.

The second characteristic of service infrastructure with the potential to substantially affect cost recovery is the prevalence of metered connections. The availability of meters widens the menu of tariff structures available, with implications for affordability and willingness to pay. Without meters, tariffs generally cannot be pegged to different consumption levels.³⁰ Put differently, consumers must be charged "flat rates." This makes it impossible to reap the affordability advantages of progressive tariffs, which charge lower-consumption users (who generally have lower incomes) lower unit costs than higher-consumption (and generally higher-income) users. In fact, flat-rate tariffs are extremely regressive, since the marginal charge for increasing consumption is zero: the consumer who uses the most pays the least per unit. This regressivity has been blamed for undermining willingness to pay, as those who consume less — often because of smaller households and greater distance from public taps — come to resent paying the same amount as large consumers.³¹

3.2.4 *Social and Institutional Context*

Social and institutional context incorporates a broad set of factors that form the backdrop for decisions about infrastructural development and the design of billing and payment systems — ultimately affecting cost recovery outcomes in a variety of ways. Its location to the far left of figure 3.1 reflects its ability to affect all the other sets of factors. Some features of social and institutional context that have been emphasised in previous research on cost recovery are the prevalence of poverty and degree of socio-economic inequality, urban versus rural location, and the history of local politics and institutions. A municipality's social profile is likely to affect the affordability of service options to prospective consumers, while, for example, a history of political conflict or institutional illegitimacy may undermine willingness to pay.

²⁹Hazleton and Kondlo, "Cost Recovery," chap. 4.

³⁰An exception is where mechanisms that regulate supply are in place, such as distributed storage units. Tank size imposes a maximum consumption limit, allowing charges to be pegged to the size of the tank; see Hazleton and Kondlo, "Cost Recovery," chap. 5.

³¹Syme and Snijder, "Understanding Cost Recovery," 109.

One of the main themes stressed by advocates of “demand-responsive approaches” to service delivery is that community participation yields valuable information about consumers’ preferences and cultural understandings. By promoting a better “fit” with the local context, community participation has been asserted to improve the overall sustainability of services.³² The contrast is with top-down “supply-driven” policy whose failure is attributed to inattentiveness to affordability and willingness to pay — and a more general inattentiveness to building community support. Locally based social and institutional obstacles to successful cost recovery are particularly steep in South Africa, with its history of political conflict. Opposition to the racially discriminatory regime manifested itself in campaigns to make the country “ungovernable” and to withhold payment for services ostensibly as a form of political protest.³³ Experience since 1994 has belied optimistic expectations that the “culture of non-payment” would quickly recede following the transition to democracy.

The cost recovery challenge in South Africa is deeply rooted in the diverse social and institutional circumstances of municipalities countrywide. The factors related to social and institutional context therefore need to be considered as potentially major determinants of cost recovery outcomes in their own right — as well as indirectly through their effects on infrastructural development and billing and payment systems.

3.3 CONCLUSION

This chapter has presented a causal model of municipal cost recovery. It has drawn from existing research to identify and define potentially major determinants of cost recovery outcomes and to order relationships among factors logically. The rationale has been to develop an analytical framework to guide the analysis that follows. Although previous studies may suggest that certain factors included in the model are likely to be more important than others, such judgements will be left to the analysis of the empirical data. Meanwhile, the exclusion of any factor from the model does not necessarily imply that it is assumed to be inconsequential, as models by their nature require some simplification. Section 4.2 is devoted to describing the dataset to be used for the empirical analysis. The causal model and the data are then brought together in Section 4.3, which use simulation techniques to give empirical substance to the causal model.

³²For a discussion of demand-responsive approaches as applied by Mvula Trust in South Africa, see Rall, “Demand Responsive Approach.” A cross-national study of rural water projects found a statistically significant — albeit quite weak — relationship between composite indicators of demand responsiveness and overall project sustainability; see Sara and Katz, “Making Rural Water,” 45. For a study of policymaking that links the informational contribution of consultative processes to their influence on policy choices, see Rod Alence, “The Informational Politics of Democratic Consolidation: A Quantitative Analysis of Economic Policymaking in South Africa,” paper presented in Human Sciences Research Council public policy seminar, 1999.

³³For an overview, see Tom Lodge and others, *All, Here, and Now: Black Politics in South Africa in the 1980s* (Cape Town: David Philip, 1991).

CHAPTER 4: NATIONAL SURVEY

4.1 RESEARCH AND STRATEGY

The principal aim of this study was to account for differences in cost recovery outcomes, with particular attention to issues related to low income households. It investigated the interplay between socio-political and institutional context, service infrastructure, and billing and payment policies and procedures in influencing payment rates and debt ratios in diverse municipalities countrywide. The empirical findings regarding the causes of successful (and unsuccessful) cost recovery are used to offer guidelines for the development of more effective cost recovery strategies at the municipal and national levels. For a municipality with any given social, institutional, and service profile, the findings can inform the assessment of past performance and identify areas in which changes are most likely to improve cost recovery. Such insights can be particularly valuable following municipal demarcation, as new issues emerge which confront the cost recovery challenge.

Because of cost recovery's centrality to the financially sustainable expansion of water services, several previous studies have sought to identify sources of successful cost recovery in South Africa. This research focussed primarily on three sets of factors — community participation, cost recovery technologies and financial management. Community participation has been identified in international studies as a key ingredient of sustainable water projects, particularly in rural areas.³⁴ This emphasis has influenced the approaches of DWAF and non-governmental organisations such as the Mvula Trust, and several South African case studies have highlighted the value of community participation.³⁵ A second focus has been on the potential contribution to cost recovery of technologies that regulate and meter water supply.³⁶ A third focus has been on improving billing and payment practices — for example, through programmes to improve customer relations and the introduction of computerised billing systems.³⁷ A common characteristic of most existing research

³⁴Perhaps the most ambitious study is Jennifer Sara and Travis Katz, "Making Rural Water Supply Sustainable: Report on the Impact of Project Rules" (Washington: UNDP-World Bank Water and Sanitation Program, 1998), which combines household interviews, technical project assessments, and focus groups in analysing rural water projects in six developing countries.

³⁵Community participation is closely associated with so-called "demand-responsive approaches" to service provision, which are endorsed in DWAF, "White Paper, 1994," 8, and in Martin Rall, "The Demand Responsive Approach to Community Water Supply and Sanitation as Interpreted and Applied by the Mvula Trust," Mvula Trust Strategic and Planning Committee document (Johannesburg: Mvula Trust, [1998?]). South African case studies that explore community participation in some detail include DWAF, Water Services Chief Directorate, "Twelve Successful Cost Recovery Case Studies"; Anonymous, "Five Successful Higher Levels of Service Cost Recovery Case Studies," *IMIESA* 25, no. 3 (Mar. 2000): 43-55.

³⁶D. Hazelton and S. Kondlo, "Cost Recovery for Water Schemes to Developing Urban Communities: A Comparison of Different Approaches in the Umgeni Water Planning Area," Water Research Commission Report 521/1/98 (Pretoria: Water Research Commission, 1998); A. J. Greyling and N. Rodseth, "Prepayment Water Meters: Modderspruit Experience," *Civil Engineering* 6, no. 2 (Feb. 1998): 11-2.

³⁷Chris Smit, "Case Study for a Municipal Cost Recovery/Customer Care Programme," *IMIESA* 24, no. 5 (May 1999): 13-5; Hilary Syme, "North West Water Supply and Revenue Collection Project: An Independent Review [of] a Danida-Funded Pilot Project in the North West Province" (Pretoria: Department of Water Affairs, 1998).

is that it draws on local case studies to assess the possible contribution of particular factors to successful cost recovery. By placing these factors — whether community participation, technologies to meter and regulate water supply, or improvements in management practices — in local context, existing studies provide useful insights into the processes that determine whether cost recovery will succeed or fail.

This study seeks to refine and extend existing research by statistically estimating a causal model of cost recovery outcomes using data from a national survey of municipal cost recovery and analysing the practical implications. The research process has followed a straightforward four-step process. First, a causal model specified that identifies potential determinants of successful cost recovery and the relationships among them. This step involved a thorough review of international and South African research on cost recovery. Second, a dataset of relevant municipal characteristics and cost recovery outcomes was compiled by conducting a national survey and linking the results to social and service profiles calculated from census data. The final product is arguably the most comprehensive and integrated dataset on cost recovery in South Africa. Third, the causal model was estimated statistically using the national dataset. This gave empirical substance to the causal model, making it possible to estimate the impact of specific features and practices of municipalities on cost recovery outcomes. Fourth, statistical simulation techniques were used to clarify the substantive implications of these findings, so as to inform the development of effective cost recovery strategies at the municipal local level and national strategies to expand the provision of basic services.

The national survey was originally envisioned as a descriptive “audit” of cost recovery practice, but developments have pushed it in the direction of a more ambitious, explanatory analysis. The main development in the field was an overwhelming response by municipalities to our postal survey, which was disseminated in November and December 2000. Approximately three hundred municipalities completed our questionnaire and gave us comments about their efforts at cost recovery. These municipalities account for about three million household water consumers. Overall, the realised sample of the national survey accounts directly for the experiences of more than a third of the municipalities, covering nearly half of all household water consumers in South Africa. Moreover, the realised sample appears to be reasonably representative of the entire country demographically and institutionally. The national survey data certainly support the kind of descriptive audit that was planned, but it also makes it possible to go farther — using statistical techniques to draw causal inferences about the determinants of successful (and unsuccessful) cost recovery. Although it was not initially clear that the national survey data would be suited for such an exercise, the analysis is directly motivated by the aims of the broader project — to explain why cost recovery succeeds in some cases and fails in others, and to use these empirical findings to inform the development of effective cost recovery strategies.

Major changes in the institutional and policy environments presented additional reason to proceed with the more ambitious approach to the analysis presented here. On the institutional front, our survey was conducted on the eve of a major restructuring of municipal government — involving a reduction of the number of the

local and metropolitan structures with responsibility for service delivery from more than 800 to 237. This processes has created new municipalities much more internally heterogeneous in many ways — from their social composition, to their political and institutional histories and their service infrastructures. Meanwhile on the policy front, the national government’s announcement of its intention to implement a policy of “free basic services” during the 2000 municipal election campaign has necessitated a thorough rethinking of tariff schedules in the new municipalities. Greater cross-subsidisation of basic services within municipalities using progressive tariffs — as well as the possible enhancement of the equitable-share mechanism for national subsidies to municipalities serving the poor. The institutional and policy changes are intertwined, as municipal restructuring has created wider possibilities for cross-subsidisation, while arguably improving capacity for the effective administration of equitable-share allocations.

By extending this study from a descriptive audit to an explanatory analysis of cost recovery outcomes, important insights can be gained regarding the development of strategies both for effective cost recovery in the new municipalities and for the financially sustainable provision of free basic services at the national level. Statistical estimates of the determinants of cost recovery outcomes for pre-demarcation municipalities can be used to establish informed baseline expectations for cost recovery in the new municipalities, while also identifying key changes capable of improving performance. These will be particularly useful to municipal officials who will increasingly find themselves confronted with greater social, institutional, and infrastructural diversity than before municipal restructuring. Meanwhile, a national strategy to provide free basic water services will have to address the tension between the overriding objective of extending basic services to those currently without to the intensified incentives for municipalities to avoid the adverse financial implications of installing services for which cost recovery will become even less likely.

4.2 THE DATA: MUNICIPAL PROFILES AND COST RECOVERY OUTCOMES

4.2.1 *Introduction*

The data used in the empirical analysis consist of measures of major factors identified in the causal model of cost recovery — social and institutional context, service infrastructure, billing and payment systems, and cost recovery outcomes. They were collected for a sample of South African municipalities that provide water services to their residents. For a visual image of the dataset, think of a table with municipalities listed down the left side, and a column for each of the major factors in the causal model. Reading across a single row in the table identifies a particular municipality and provides a detailed “profile” of characteristics related to cost recovery. The table as a whole contains such “profiles” for every municipality included in the sample. In coming sections, statistical techniques are used to identify the factors that in fact influence cost recovery outcomes and to estimate the sizes of their effects. This chapter is devoted, first, to outlining the process through which the

data were collected and compiled and, second, to comparing the sample with all of South Africa. The descriptive analysis of the dataset — arguably the most comprehensive of its kind in South Africa — provides valuable perspective on the state of cost recovery in the water sector.

The remainder of section 4.2 proceeds in two main parts. The first describes data collection. At the heart of the dataset are results from the national survey of municipal cost recovery conducted in late 2000 specifically for this study. These results were augmented by linking municipal social and service profiles calculated from 1996 census data. Finally, a statistical technique called multiple imputation was used to “fill in” missing values in the dataset, for use in coming sections. (A more technical discussion of this process is presented in an appendix.) The second part of this section is a descriptive analysis of the realised sample. It begins with a discussion of the overall response rate and the sample’s coverage, followed by an analysis of its geographical and social composition. Then the descriptive findings of the survey are summarised — including indicators of infrastructure, billing and payment systems, and cost recovery outcomes. A brief conclusion follows.

4.2.2 Data Collection

Data collection involved collecting information about key factors in the causal model for a sample of South African municipalities. This information was coded numerically and ultimately analysed using statistical techniques, but it is important not to overdraw the contrast between the nature of the data used in this study and that used in existing case studies of cost recovery. Most “qualitative” information used in case studies can easily be represented in numerical format, if required. The answer to a question like “how many households in your municipality have private water connections?” is instantly recognisable as quantifiable, because it is a number. Yet the answer to a question like “is there an active Masakhane campaign in your municipality?” can also easily be represented numerically — by assigning the answer “yes” a value of “1” and the answer “no” a value of “0.” The difference between data collection for statistical and case studies is less philosophical than practical. Because of their limited scope, case studies allow the collection of highly detailed information about particular examples. In contrast, statistical studies cover larger numbers of cases, generally imposing tighter practical constraints on the level of detail that can be captured. Their main advantage is that they support inferences that can be generalised more readily.

The data collected for this study draws on multiple sources, in order to capture the key factors in the causal model as closely as possible. To measure features of service infrastructure, billing and payment systems, and cost recovery outcomes, the main source is a national survey of cost recovery, administered to municipal officials countrywide. And for information on social context, census data was used to calculate municipal profiles. The survey and census data were then linked, and multiple imputation techniques used to “fill in” missing values.

4.2.2.1 National Survey Methodology

The national survey of cost recovery yields the most up-to-date available information about water service infrastructure, billing and payment, and cost recovery outcomes in South Africa. It was administered to South African municipal officials in November and December 2000 using a four-page postal questionnaire. The Department of Provincial and Local Government furnished a list of all 830 “pre-demarcation” municipalities. A first mailing was posted 1 November 2000, containing a covering letter, the questionnaire, and a postage-paid return envelope. The covering letter stated the motivation for the study, briefly described the questionnaire’s content, and asked prospective respondents to complete and return it. A second and final general mailing was sent out 10 December 2000 to those municipalities whose had not yet responded. Through January 2001 municipalities that inquired were encouraged to complete and return their questionnaires, but no other attempts were made to increase participation.

The questionnaire was designed to capture as much relevant information as possible while minimising time demands on respondents. Both for respondents’ convenience and to ensure an adequate response rate, the time required for completion was limited to approximately ten minutes. The final questionnaire contains 30 questions — of which 16 have structured (“multiple-choice”) response options. For questions where respondents are asked to enter specific figures, they were instructed to give their best estimates if exact information was unavailable or inaccessible. To avoid the need to ask respondents to identify their respondents, a four-digit municipal code was individually entered on the back page of each outgoing questionnaire. This allowed returned questionnaires to be associated with the correct municipality. Mailings were addressed to a specific contact person — usually municipalities’ chief executive officers (town clerks) — but the contact person was advised to delegate completion of the questionnaire to other municipal officials, as appropriate. Individuals actually completing questionnaires were not required to identify themselves. For respondents’ convenience, the questionnaire was provided in English and Afrikaans.³⁸

A priority in constructing the questionnaire was to ensure that responding municipalities would provide meaningful information about cost recovery outcomes. Without such information, the effects of the context and practice of cost recovery on success or failure could not ultimately be assessed. The experience of DPLG’s project viability surveys — which, among other things, request basic financial data needed to calculate consumer debt ratios — was instructive. The DPLG survey targeted the same respondents, yet only about 60 percent provided financial data on their consumer debtors, while only about half of these could give breakdowns by consumer and service categories.³⁹ Questions about household consumer debt and household consumer debt for water services were included in the cost recovery

³⁸Of the 310 questionnaires received, 194 used the English version and 116 used Afrikaans. No requests for translations into other official languages were received.

³⁹Municipalities are legally required to complete the project viability questionnaire, but for the March and June 2000 surveys only about 500 of 830 did so. The assistance of Louise Muller and Hermann Schütte in facilitating access to the unpublished datasets is gratefully acknowledged.

questionnaire, but the DPLG experience suggested that many respondents would be unable or unwilling to provide the requested financial data. A much less demanding question about payment rates was therefore also added, reading simply: “What is your best estimate of the percentage of individual [household] water consumers who regularly pay their accounts on time?” Aside from more directly capturing the “behavioural” (as opposed to “financial”) dimension of cost recovery, the question ensured the collection of at least one meaningful indicator of cost recovery outcomes for every responding municipality.⁴⁰

The national survey also collected information about features of service infrastructure and billing and payment systems. On infrastructure, the questionnaire asked respondents the number of household water consumers they served, the percentage of these with private connections, and the percentage charged a flat rate (an indicator of the prevalence of unmetered connections). Tariff structures were explored in questions about water bills for typical households consuming 10 and 40 kilolitres, respectively, as well as in a question about whether an indigent policy was in place. Regarding payment, respondents were asked if they offered individual inducements for payment, and if they have an active Masakhane campaign or similar initiative linking payment rates to collective improvements in municipal services. Penalties for non-payment were probed with questions about whether their municipalities had approved credit-control procedures, and about the conditions under which service restriction was used to penalise non-payment. Payment convenience was explored by asking which of several payment options — such as payment at post offices, cheque payments by mail, and payments at supermarkets — were available to their consumers.

In sum, the national survey was designed to take a detailed “snapshot” in late 2000 of major factors related to municipal cost recovery.

4.2.2.2 Municipal Social and Service Profiles

Municipal social and service profiles based on the 1996 census augmented the national survey. Census data offer the most useful description of the demographics of individual municipalities’ household consumer bases. They can be used to calculate direct measures of the social characteristics of households, as well as indirect measures indicative of the institutional legacies of the apartheid system. Households can be directly described using data on, for example, income and racial classifications employed by the previous regime. These features could influence individual households’ likely of paying for services — through considerations such as affordability and attitudes toward municipal structures. Meanwhile, the distributions of these household characteristics in a municipality help to capture (albeit indirectly) the political and institutional context for cost recovery. That is, knowing a municipality’s degree of socio-economic inequality, poverty rate, racial composition,

⁴⁰An impressive 99 percent of respondents answered the simple question on payment rates. Responses to the financial questions also exceeded expectations, with 84 percent breaking down household consumer debt between current and arrears debtors, and 49 percent doing the same for debt incurred specifically for water services.

and whether it is urban or rural gives very strong clues about how conducive the local context is to successful cost recovery.

The most important use of the census data was to construct socio-economic and racial profiles of likely household water consumers in individual municipalities. This was done by cross-tabulating “adjusted household income” with racial self-identifications.⁴¹ All South African households in the census (10 percent household sample) were grouped into five quintiles based on their adjusted incomes. The bottom two quintiles — comprising the 40 percent of households with the lowest adjusted incomes — roughly correspond with those said to be “below the poverty line,” and they were assigned to a single category. Those “above the poverty line” were divided into three categories — “white,” the most privileged under the apartheid system; “African,” the most disadvantaged; and “coloured/Asian/unspecified” for those with intermediate official status.⁴² These four categories were then applied to “likely water consumers” in each municipality — municipal social and service profiles consisting of the percentages of likely water consumers falling in each of the four social categories.⁴³

Although the municipal profiles capture important features of the context of cost recovery, they have a few limitations. One is that they are based on census data collected in late 1996, and therefore do not reflect social and service changes since then. This time lag is a source of measurement error, yet much of the diversity in South African municipal profiles is deeply entrenched and therefore unlikely to have changed fundamentally within five years. A second limitation is that, for confidentiality reasons, Statistics South Africa does not report specific municipality codes in the household census dataset for municipalities with less than 2000 households. In these cases, it is impossible to restrict municipal profiles to the sub-population of likely water consumers. However, because these profiles are very similar to profiles calculated for the entire population using the individual census dataset, multiple-imputation techniques can reliably be used to construct them.

4.2.2.3 Multiple Imputation of Missing Values

Multiple imputation is a statistical technique for “filling in” missing values in a dataset — essentially by using what is known to infer what is unknown.⁴⁴ Although multiple

⁴¹“Adjusted household income” is defined as household income divided by the number of people in the household, with minors counted as 0.5 of a person. The adjustment reduces the distorting effects of differing household sizes on the relationship between household income and the disposable income available to households after basic subsistence requirements have been met.

⁴²One exception to this classification scheme is that whites in the second and third income quintiles were included in the “below the poverty line” category. This exception was based on preliminary analysis using data for the full five (income categories) by three (racial categories) cross-tabulation, which showed that whites in the second and third income quintiles behaved more like whites in the third and fourth quintiles than like those in the first quintile. Possible interpretations include a race-specific relative-deprivation effect that raises the “behavioural poverty line” for whites, and income measurement error.

⁴³“Likely water consumers” are defined as households whose main water source is “piped water in dwelling,” “piped water on site or in yard,” “public tap,” or “water-carrier/tanker.”

⁴⁴For a detailed and more technical discussion of multiple imputation, see Gary King, James Honaker, Anne Joseph, and Kenneth Scheve, “Analyzing Incomplete Political Science Data: An

imputation is still rare in applied social research, in virtually all circumstances it is statistically superior to the other methods that are used. These include dropping variables (columns in a data table) from the analysis if they have several missing values, dropping observations (rows in the data table) if they have any missing values, or filling in missing values with guesses or estimates and then treating them the same as known data. The first two options generally introduce greater statistical bias or inefficiency or both. The third assumes an unwarranted degree of certainty about true values where data are missing. Multiple imputation uses a formal statistical model to “fill in” missing values, but it fills in different values in the same position in a set of otherwise identical datasets. The distribution of these imputed values represents the degree of uncertainty about the true value. If other information in the imputation is a good predictor of the variable with the missing value, the imputed values will be very similar from dataset to dataset. If the variable with the missing value is not closely associated with the others in the model, a wide range of values will be imputed — representing the uncertainty of the imputation process. Once the imputed datasets have been created, an identical analytical model is estimated separately using each one, and the results are combined in a way that accounts for variation within and across datasets.

Multiple imputation helps to fill two important gaps in the cost recovery dataset — missing values in the municipal social and service profiles due to confidentiality protections in the household sample of the 1996 census data, and missing values in current debt ratios for water services due to the limitations of municipal financial records. In both cases, missing values are common, but covariates are available that substantially reduce the range of multiple imputations. For the municipal profiles, data available from the individual sample from the census help to impute values that cannot be calculated from the otherwise more flexible household sample. Meanwhile, current debt ratios for water are closely related to overall consumer debt ratios (and, to a lesser extent, to payment rates for water) that are available for most municipalities. Multiple imputation thus plays an important role in compensating for practical difficulties related to data collection, allowing maximum exploitation of the data that are available.

4.2.3 *The Realised Sample*

The realised sample in a postal survey consists of those who completed and responded to the questionnaire. The inferences that can be drawn from the survey data depend not only on the number of respondents, but also the extent to which they are in some sense “representative” of the broader population from which they are drawn. Unlike a survey administered to a randomly drawn sample, respondents “select themselves” in a postal survey when they decide whether or not to respond. For the purposes of causal analysis, the sample’s strict representativeness of a population in a random survey is not necessary. Yet attention to two possible pitfalls is required. The first is selection bias, which would be present in this study if

Alternative Algorithm for Multiple Imputation,” unpublished paper (Cambridge: Harvard University, 2000).

municipalities with better cost recovery outcomes were systematically more (or, conceivably, less) likely to respond. The second is insufficient coverage of the range of existing municipal profiles, which would limit the range of municipalities to which the findings could be applied, since it is hazardous to make “out-of-sample” projections. However, without substantial selection bias and reasonable coverage, reasonable causal inferences can be drawn and applied.

The remainder of this section describes the realised sample of municipalities and compares it with the broader South African population where possible. The first sub-section discusses the response rate. The second analyses the sample’s geographic and social composition. The third provides descriptive statistics on infrastructure, billing, and payment from the survey results. The fourth and final sub-section considers reported cost recovery outcomes and the possibility of selection bias.

4.2.3.1 Response Rate

An important concern in administering the survey was to achieve an adequate response rate. The target population was the set of all South African municipalities that directly or indirectly provided water services to household consumers in November 2000. According to DPLG, only 515 of the total of 830 municipalities existing at the time were “self-administered,” with the remainder administered by a district council. But because it was impossible to identify which provided water services and which did not in advance, questionnaires were sent to all 830 municipalities, with the understanding that this number exceeded the size of the target population. Given the questionnaire’s content and the type of intended respondent, the cautiously optimistic expectation was for a response rate of 40 percent of the true target population. With 830 as the upper bound on the population’s size and the 515 self-administered municipalities as the lower bound, the expected number of responses fell in the range 206 to 332.

Through the survey, incoming questionnaires were logged against a database of municipalities to monitor the rate and distribution of responses. It quickly became clear that the expected range of responses would be met. The first round of mailings in November 2000 yielded roughly 200 responses on its own, and the follow-up mailing in December 2000 eventually brought another roughly 100 responses. When the survey was closed in mid-February 2001, the realised sample stood at 310.⁴⁵ This almost certainly represented a response rate of at least 40 percent of the target population.⁴⁶ Moreover, responding municipalities reported numbers of household consumers totalling 3.2 million, probably representing more than 40 percent of all households receiving municipal water services in South Africa.

⁴⁵See appendix A.1 for an alphabetical list of municipalities in the realised sample.

⁴⁶During the survey, 66 municipalities reported that they were not involved in providing water services, bringing the upper bound of the target population down from 830 to 764. The 310 responses received represent 41 percent of this upper bound.

4.2.3.2 Geographic and Social Composition

The overall response rate was quite satisfactory, but it is also important that the realised sample reflect the diversity of the municipal cost recovery challenge in South Africa. Being a postal survey, there was no guarantee that the realised sample would closely approximate the target population. Obvious comparisons between sample and population are in their geographical and social composition.

Table 4.1 focuses on the sample composition by province, listing the number of responses received from each province and the reported household consumers in those municipalities, along with a comparison of each province's share of reported consumers in the sample and its share of consumers in the national population. The Western Cape comes up as the leading province in both responding municipalities (68) and reported household consumers in the sample (743,091). The Northern Province had the least responses (13) and reported consumers (75,817). Leaving these two provinces aside for the moment, the comparison between the reported consumers in the sample and consumers as a percentage of the population (based on 1996 census data) show remarkable similarities: for each of these seven provinces, the difference between the two shares is less than 5 percent. Discrepancies between the sample and the target population in table 4.1 are therefore restricted mainly to the Western Cape (which is overrepresented in the sample) and the Northern Province (which is underrepresented).

Table 4.1: Sample Composition by Province

Province	Responses	Reported household consumers in sample	Reported consumers as percentage of sample	Provincial consumers as percentage of population
Eastern Cape	35	269,654	8.4	9.9
Free State	49	400,258	12.5	8.1
Gauteng	16	817,572	25.5	25.9
KwaZulu-Natal	36	398,611	12.4	15.3
Mpumalanga	29	203,685	6.3	7.0
Northern Cape	40	107,151	3.3	2.3
Northern Province	13	78,817	2.5	10.2
Northwest Province	24	195,473	6.1	8.2
Western Cape	68	739,934	23.0	13.0
TOTAL	310	3,211,155	100.0	99.9

Note: Figures for reported household consumers include multiply-imputed values for 15 municipalities. "Provincial consumers as percentage of population" calculated from 1996 census figures for households whose main water supply is "piped water in dwelling," "piped water in site or yard," "public tap," or "water-carrier/tanker." Percentage columns do not necessarily add to 100.0 due to rounding.

Table 4.2 presents another comparison between sample and population, this time using the four social categories from the municipal profiles. It illustrates the extent to which the socio-economic and racial composition of municipalities in the sample conforms with those of the national population. The table again shows a quite reasonable fit. White households above the poverty line are slightly overrepresented in the sample (16.3 percent, compared with 13.5 percent), as are coloured/Asian/unspecified households above the poverty line (15.0 percent, compared with 11.0) percent. Meanwhile, African households above the poverty line (36.4 percent, compared with 38.2 percent) and all households below the poverty line (32.3 percent, compared with 37.4 percent) are slightly underrepresented.

In sum, the geographic and social composition of the sample are generally quite closely aligned with the national population. The social composition of the sample is consistent with the observation that municipalities serving higher levels of African and poor consumers were less likely to complete the survey questionnaire than those with larger percentages of white, coloured, Asian, and racially unspecified households above the poverty line were. This pattern seems to partly explain the Western Cape's overrepresentation and the Northern Province's underrepresentation. Yet the gaps in responses from these two provinces exceeds what would be expected based on social differences alone — at least if the other seven provinces are a useful guide.

Table 4.2: Sample Composition by Social Category

Social category	Households as percentage of likely water consumers in sample municipalities	Households as percentage of likely water consumers in population
Above "poverty line"		
White	16.3	13.5
Coloured/Asian/unspecified	15.0	11.0
African	36.4	38.2
Below "poverty line" (combined)	32.3	37.4
TOTAL	100.0	100.1

Note: The table uses municipal profiles calculated from the 1996 census for households whose main water source is "piped water in dwelling," "piped water in site or yard," "public tap," or "water-carrier/tanker." Sample composition estimates include multiply-imputed values. The "poverty line" is defined as the 40th percentile in per capita household income (adjusted to weight minors 0.5) for the entire South African population. Percentage columns do not necessarily add to 100.0 due to rounding.

4.2.3.3 Infrastructure, Billing and Payment

Much of the questionnaire was devoted to collecting information about infrastructure, billing, and payment relevant to understanding cost recovery outcomes. With the understanding that the sample is reasonably similar to — but not strictly representative of — the broader national picture, the survey results offer a valuable snapshot of the state of cost recovery practice in late 2000, just before municipal restructuring.

Selected descriptive data are presented in table 4.3. The first column contains percentages as unweighted municipal averages. The second column weights the percentages by the number of reported household consumers in the municipality. So a municipality with 10,000 consumers would be weighted ten times as high (that is, treated as ten times as "important") as a municipality with 1,000 consumers. The third column contains the averages using multiple imputations to "fill in" missing data.

The two rows at the top of the table pertain to key characteristics of service infrastructure. The first shows that roughly four out of five household consumers of municipal water services have private connections. The second row shows that roughly one in five pay flat rates, meaning that it is very likely that their connections are not metered. It is likely that many of those lacking private connections are also paying flat rates, although in some cases private connections are not metered, while there are some public connections that are metered.

The few rows on the table focus on tariffs. First, tariff schedules are classified as

either progressive, neutral, or regressive. These classifications are based on comparing reported charges for 10 and 40 kilolitres consumption. Schedules were classified as neutral if the charge for 40 kilolitres was four times higher than the charge for 10 kilolitres, give or take 10 percent. If the 40-kiloliter charge exceeded the 10-kiloliter charge by more than 10 percent, the schedule was classified as progressive. And if the 40-kiloliter charge was more than 10 percent below four times the 10-kiloliter charge, the schedule was classified as regressive. The unweighted data seem to indicate a fairly even split among the three categories, with progressive schedules being the least common. Yet the weighted data paint a different picture: progressive schedules are by far the most common. This seems to show that small municipalities are much more likely to have regressive schedules, while large ones opt more often for progressivity. The next row on the table focuses on indigent policy, with nearly half of municipalities offering subsidised rates to the indigent.

Next are some details about incentives for payment and penalties for non-payment. Few municipalities appear to use individual incentives like prizes and rebates to encourage payment. Nearly half, however, claim to have active Masakhane campaigns or similar initiatives linking collective payment rates to improved service provision. Meanwhile, there are noticeable differences in the use of service restrictions to penalise non-payment. Nearly two-thirds of municipalities (accounting for about three-fourths of consumers) report restricting service to consumers who are less than 90 days in arrears. Nearly one in five reports restricting service as a penalty, but only after consumers are more than 90 days in arrears. A similar share (accounting for 8.6 percent of consumers) report never penalising non-payment by restricting services.

The final two rows of the table cover payment options. Although the possibility of paying at supermarkets is limited to more densely populated areas, 12.7 percent of municipalities — serving nearly half the household consumers in the sample — report offering this option. Meanwhile, pre-paid meters have gained widespread attention as a possible “technological” solution to the problem of securing payment for public taps. A full 37.2 percent of municipalities reported that pre-paid meters are available to at least some of their consumers.

Table 4.3: Selected Descriptive Data on Infrastructure, Billing and Payment

	Municipal data, unweighted percentage (N)	Municipal data, weighted by household consumer (N)	Multiply- imputed data, unweighted percentage (N=310)
Households with private connections	82.0 (293)	80.4 (279)	81.7
Households charged flat rates	20.8 (306)	19.2 (290)	22.3
Tariff schedules:			
• Progressive	26.4 (299)	60.6 (286)	26.2
• Neutral	32.5 (299)	21.2 (286)	-
• Regressive	41.1 (299)	18.2 (286)	-
Indigent policy in place	46.7 (302)	37.1 (286)	-
Individual incentives for payment offered	10.0 (310)	19.7 (294)	-
Active Masakhane campaign	48.2 (303)	59.3 (288)	47.9
Approved credit-control policy	90.3 (310)	95.8 (294)	-
Service restriction to penalise non-payment:			
• Less than 90 days in arrears	62.5 (304)	72.8 (288)	62.4
• More than 90 days in arrears	18.8 (304)	19.1 (288)	18.8
• Never	18.7 (304)	8.1 (288)	18.8
Payment possible at supermarkets	13.0 (308)	52.3 (292)	13.0
Pre-paid meters for some consumers	37.5 (307)	51.0 (291)	-

Note: Source is the national survey of municipal cost recovery, 2000. Numbers of non-missing observations are in parentheses. Multiply-imputed data are available only for items used to estimate the statistical model.

4.2.3.4 Reported Cost Recovery Outcomes

Reported cost recovery outcomes are the most crucial element of the dataset, since without them it is impossible to distinguish success from failure. The questionnaire was designed to elicit information about cost recovery outcomes in three ways. One was through a simple question about the percentage of household consumers that regularly pay their bills on time. Nearly every respondent answered this question. It therefore gave useful insight into the “behavioural” dimension of cost recovery — how do municipalities influence the payment behaviour of their consumers? The second was a set of questions to collect data needed to calculate current debt ratios for consolidated consumer accounts, intended to measure the general “financial” dimension of cost recovery. Surprisingly, more than 80 percent of respondents were able to answer these questions. And third was a set of questions to collect data needed to calculate current debt ratios specifically for water, which 50 percent of respondents answered.

Table 4.4 contains average cost recovery outcomes, along with measures of dispersion. The first row focuses on payment rates, for which there were almost no missing data. The weighted and unweighted means are almost identical, at about 60 percent. The weighted figure has a very straightforward interpretation: three of five households served by municipalities in the sample pay their water bills regularly. At the same time, standard deviations of more than 20 percent show that payment rates can vary quite widely from municipality to municipality. The second row in the table focuses on current debt ratios for consolidated accounts. The ratios just over 20 percent imply that for every rand of current consumer debt held by municipalities, they are owed nearly four rands in arrears debt. The standard deviations again show wide diversity in debt ratios among municipalities. Finally, the third row focuses on current debt ratios specifically for water. The unweighted figures are slightly more favourable than the comparable figures for consolidated account, although generally the picture is quite similar.

The data on cost recovery outcomes help to refine the understanding of the behavioural and financial dimensions of the cost recovery challenge. Importantly, they also point to the diversity of outcomes experienced by South African municipalities. A later section focuses on identifying the main reasons for these varying fortunes.

Table 4.4: Descriptive Data on Cost Recovery Outcomes

	Municipal data, unweighted mean, with <i>standard deviation</i> (N)	Municipal data, mean weighted by household consumers, with <i>standard deviation</i> (N)	Multiply-imputed data, unweighted mean, with <i>standard error</i> (N=310)
Payment rate	60.7 <i>23.6</i> (306)	60.3 <i>21.0</i> (291)	60.6 <i>23.4</i>
Ratio current to total consumer debt:			
Consolidated accounts	21.7 <i>19.6</i> (259)	21.4 <i>15.2</i> (250)	21.3 <i>19.4</i>
Water only	25.4 <i>23.0</i> (153)	20.8 <i>12.0</i> (148)	26.0 <i>22.9</i>

Note: Source is national survey of municipal cost recovery, 2000. Measures of dispersion around the mean (standard deviations and errors) are in italics. Numbers of non-missing observations are in parentheses.

4.2.4 Conclusion

This section has offered a detailed overview of the data used in the empirical analysis of cost recovery. It began with the data collection process and continued with a descriptive analysis of data for the realised sample. Data collection centred around a national survey of municipal cost recovery, which was used to measure key features of service infrastructure, billing and payment systems, and cost recovery outcomes. The survey results were augmented with municipal social and service profiles, calculated from census data as a way of capturing the diverse social and institutional contexts in which municipal cost recovery takes place. The realised sample — consisting of those municipalities whose officials chose to complete the survey questionnaire — could conceivably have been quite unrepresentative of the target population of municipalities providing water services to household consumers. However, comparisons between the geographic and social composition of the sample and the population showed them to be extremely similar — with the exception of a substantial overrepresentation of the Western Cape and underrepresentation of the Northern Province. The dataset collected thus is a valuable snapshot of key features of cost recovery processes as of late 2000. In the next section the data is used to identify the main determinants of successful cost recovery and explore implications for municipal strategies and national policy.

4.3 SIMULATION RESULTS

4.3.1 *Introduction*

This section analyses the substantive implications of the national survey for understanding cost recovery outcomes. The findings are based on statistical estimates of an operationalised version of the causal model described in section 4.3.2 using the dataset described in section 4.2. The estimates were calculated with multivariate techniques that measure the effect of each cause (or “determinant”) of cost recovery while controlling statistically for the effects of the others. Such techniques are well suited to identifying empirical patterns consistent with cause-and-effect relationships, rather than simple correlations. Identifying such patterns contributes to the understanding of why some municipalities achieve better cost recovery outcomes than others. Perhaps more importantly, it also yields practical guidance for the development of more effective cost recovery strategies. For example, for a municipality with any given social and institutional profile and service infrastructure, the estimates can be used to establish informed expectations about the likely effects of particular changes in billing and payment practices — such as tightening penalties for non-payment or introducing a Masakhane campaign.

The findings presented in this section show that much of the variation in municipal cost recovery outcomes — that is, differences in payment rates and debt ratios between successful and unsuccessful municipalities — can be explained by straightforward differences in social and institutional context, service infrastructure, and billing and payment practices. For a municipality with typical social, institutional, and infrastructural characteristics, for example, the findings suggest that replacing billing and payment “worst practices” with “best practices” and upgrading service infrastructure can reasonably expect to improve its payment rate by more than 35 percent and its debt ratio by more than 24 percent. The precise degree of improvement likely in any particular municipality depends on its existing structural characteristics and practices. But in any case, the results demonstrate that factors within the control of municipal officials have substantial effects on cost recovery success and failure.

At the same time, the results also highlight severe constraints on cost recovery — especially for the provision of basic water services to the poor. Combining consumer poverty, low “RDP” service levels (e.g. public standpipes), and the associated inability to punish non-payment by selectively restricting services is the surest recipe for failed cost recovery. Although case studies have identified a few potentially instructive exceptions to this rule, the national survey data suggest that expectation of recovering the operation and maintenance costs of “RDP” water services through user fees is an unrealistic premise for national policy in the foreseeable future.⁴⁷ Recent institutional and policy changes may, however, create opportunities for alternative strategies to achieve financial sustainability. Municipal restructuring through demarcation aims to create more financially and administratively viable

⁴⁷Cf., for example, DWAF, Water Services Directorate, “Twelve Successful Case Studies.”

municipal institutions, while also facilitating more equitable and efficient allocation of resources within and across municipalities. Meanwhile, the national government's adoption of a "free basic water" policy — itself partly a response to the difficulties of collecting user fees from this segment of consumers — forces careful attention to issues of municipal cross-subsidisation and redistribution through the national "equitable share" mechanism.⁴⁸ Neither municipal demarcation nor government commitment to "free basic water" solve the cost recovery challenge, but they substantially alter the institutional and policy environment in which that challenge is addressed.

To highlight the concrete implications of this study's findings, the statistical estimates are presented by simulating the effects on cost recovery outcomes of altering features of an otherwise "typical" South African municipality. The analysis was conducted in two stages — the first in which statistical estimates were calculated for data on actual municipalities, and the second in which simulations were run to illustrate their implications. Because the first stage is fairly technical and the "raw" statistical estimates difficult to interpret, it is reported in appendix B.⁴⁹ The second (simulation) stage allows presentation of the same findings in a much more accessible format — expressing the expected effects of altering various features of a typical South African municipality as percentage changes in payment rates and debt ratios.

4.3.2 Overview of the Operationalised Model

The operationalised model is a variant of the causal model with specific empirical measures substituted for more abstract concepts. Like the initial causal model, it incorporates several municipal characteristics international and South African research has suggested are likely to influence cost recovery outcomes — such as features of the social and institutional context, service infrastructure, and billing and payment practices. And like the causal model, it is an intentional simplification of reality. So while the effects of factors included in the operationalised model are estimated using the dataset described in section 4.2, the exclusion of a factor does not imply an assumption that it is inconsequential. The assignment of specific empirical indicators in place of abstract concepts distinguishes the operationalised model. These indicators capture the underlying concepts imperfectly, and they are subject to some degree of measurement error. While it is important to be conscious of the limitations of the operationalised model and related pitfalls, these limitations are not fundamental obstacles to analysis.

⁴⁸Palmer Development Group, "Free Basic Water": Draft Implementation Strategy Document," prepared for the Department of Water Affairs and Forestry, March 2001.

⁴⁹One difficulty stems from the use of a nonlinear (logistic) transformation of the two indicators of cost recovery outcomes, resulting in effect parameters in units not intuitively interpretable as payment rates and debt ratios.

The operationalised model is described in table 4.5. The table presents each of the measures used, the category within which it falls (see figure 3.1), and a brief comment about the rationale for its inclusion.

4.3.2.1 Cost Recovery Outcomes

The first category of measures in table 4.5 is cost recovery outcomes. It includes payment rates and debt ratios for water services. Payment rates are defined as the percentage of household consumers who regularly pay their accounts on time, and it is a “behavioural” indicator of cost recovery. Debt ratio is the ratio of current debt to total (current plus arrears) debt, and it is a financial indicator. Both are positively associated with successful cost recovery — that is, municipalities that are successful tend to have high payment rates and debt ratios. The source of both measures is the national survey — in which respondents were asked to give their best estimates if exact figures were not available and verification was not feasible. Virtually all respondents provided estimates of their municipalities payment rates (306 of 310), but only slightly less than half (153 of 310) provided the figures required to calculate debt ratios for water services. Multiple imputation was used to “complete” the data on debt ratios, introducing a greater degree of measurement error than for payment rates. So while debt ratios are more direct indicators of the financial dimension of cost recovery, they are also measured less precisely than payment rates.

Table 4.5: Description of Measures Included in Operationalised Model of Cost Recovery Outcomes

Measure	Category	Comment
Payment rate for water services	Cost recovery outcome	Behavioural indicator of cost recovery outcomes.
Debt ratio for water services	Cost recovery outcome	Financial indicator of cost recovery outcomes.
Social composition of household consumers: ▪ Proportion below poverty line (all groups) ▪ Proportion above poverty line (African) ▪ proportion above poverty line (Coloured/Asian/Unspecified) ▪ proportion above poverty line (White)	Social and institutional context	Income profiles capture consumer characteristics related to capacity to pay for water services; Income combined with racial classification captures features of municipalities' political and institutional histories.
Number of household consumers Proportion of household consumers with private connections Proportion of household consumers charged a flat rate	Service infrastructure Service infrastructure Service infrastructure	Indicator of the administrative scale of cost recovery. Indicator of prevalence of high service level. Indicator of prevalence of metered connections (consumers with metered connections generally not charged a flat rate).
Existence of a progressive tariff schedule	Billing and payment practices	Indicator of whether small consumers charged less per kiloliter on average than large consumers.
Use of service restriction to penalise non-payment:	Billing and payment practices	Indicator of penalties for non-payment.
▪ within 90 days; ▪ more than 90 days; ▪ never.		
Existence of an active Masakhane campaign	Billing and payment practices	Indicator of use of collective incentives for payment.
Existence of option of paying at supermarkets	Billing and payment practices	Rough indicator of convenience of payment options (not feasible for municipalities without supermarkets).

4.3.2.2 Social and Institutional Context

A municipality's social and institutional context is measured by calculating the social composition of household consumers. Households whose main source of water was classified as "piped water in dwelling," "piped water in site or yard," "public tap," or "water-carrier/tanker" in the 1996 census were considered to be likely household consumers of municipal water services. These households were broken down into four categories based on income and race. First, a "poverty line" was defined at the fortieth percentile of adjusted per capita household income for all South African households, and those below the poverty line were placed in a single category.⁵⁰ Then, those above the poverty line were subdivided into three racial classifications, again using census data — "white," "coloured/Asian/unspecified," and "African." All likely household water consumers in a municipality were thus assigned to one and only one of the four categories, and the municipality's social composition summarised by the percentages of its household consumers in each of the four categories.⁵¹

Social composition measures various features of the social and institutional context in which efforts at municipal cost recovery take place. Income profiles capture consumer characteristics related to the capacity to pay, with municipalities where large proportions of water consumers fall below the poverty line likely to have greater difficulty with cost recovery. Meanwhile, the racial breakdown of those above the poverty line provides valuable clues about histories of local governance. In general, municipalities that served constituencies more privileged under the apartheid system are likely to enjoy a legacy of greater administrative capacity and more favourable interactions with consumers. This contrasts with municipalities catering to racial groups disadvantaged to varying degrees by apartheid, which are more likely to combine administrative weakness and political hostility often manifested in "cultures of non-payment." Although racial composition as measured by the 1996 census certainly cannot fully capture the full diversity of histories of local governance and their legacies, it conveys substantial information about social and institutional context.⁵²

The precision of social composition estimates is reduced by confidentiality restrictions imposed by Statistics South Africa, which make it impossible to calculate

⁵⁰"Adjusted per capita household income" was calculated by dividing household income by the number of individuals in the household (adjusted to weight minors 0.5).

⁵¹A fifteen-fold breakdown was initially examined, with each of the three racial categories broken down into the five income quintiles for the full population. Following preliminary analysis of the cost recovery data, this was simplified to the fourfold scheme used in the analysis. One exception to the general framework is that the very small number of white households falling in the second and third income quintiles were combined with those below the poverty line, due to behavioural similarities. It is possible that these households' income was subject to measurement error, or that a "relative deprivation" effect (specific to racial category) leads them to behave similarly to the poor in other racial categories.

⁵²This is probably more true for the "transitional" municipal structures that are the subject of this study than it will be for their "post-demarcation" successors, which — at least once institutionalised — will be less directly linked to the apartheid legacy.

household breakdowns for many small municipalities. (Data for these municipalities are combined with those for adjacent municipalities, making it impossible to recover the original information.) For this reason, social composition estimates for 150 of 310 municipalities were calculated by multiple imputation.

4.3.2.3 Service Infrastructure

Service infrastructure is measured using data reported in the national survey. The number of household consumers in a municipality is a straightforward indicator of the administrative scale of cost recovery. Prior research does not support a clear expectation about whether municipal cost recovery is subject to economies or diseconomies of scale — that is, whether municipalities serving large numbers of consumers are likely to experience better or worse outcomes than their smaller counterparts. Other indicators of service infrastructure are the proportion of household consumers with household connections and the proportion charged a flat rate. Although there are many technical options other than private connections and public taps, the prevalence of private connections is a very simple yet powerful measure of service levels and the possibility of using targeted service restrictions to penalise non-payment. Meanwhile, the prevalence of flat rates is a useful indirect indicator of the absence of metered connections, since it is unusual for those with meters to be charged a flat rate.

4.3.2.4 Billing and Payment Practices

Billing and payment practices are also measured using data from the national survey. Unlike the other indicators, which assume a continuous range of numerical values, the billing and payment measures are dichotomous “dummy” variables that assume values of “1” if a particular practice is reported present and “0” if it is absent. The survey questionnaire contained many questions about billing and payment, but only four items are included in the operationalised model. One indicator is for the presence of a progressive tariff schedule — defined as one in which consumers of 40 kilolitres per month are charged a unit price (inclusive of fixed “basic charges”) at least 10 percent higher than consumers of 10 kilolitres per month. Because consumption tends to be positively associated with income, a progressive tariff can be expected in many circumstances to improve cost recovery, since a greater burden is shouldered by those consumers for which affordability constraints are least likely to be binding.⁵³ A second indicator uses two dummy variables to reflect the use of service restriction to penalise non-payment. One variable is equal to “1” if service restrictions are applied to consumers whose accounts are overdue by 90 days or less, and the other is equal to “1” if restrictions are used for accounts overdue by more than 90 days. Where service restrictions are not used to penalise non-payment, both variables are assigned values of “0”. A third indicator measures

⁵³Of course, there are limits to this approach, as progressive tariffs tend to discourage consumption among large consumers, and extremely steep tariffs may be perceived as punitive and provoke resistance.

the presence or absence of an active Masakhane campaign “or other initiative that links payment rates to improvements in municipal services.” Finally, the third indicator is for the presence or absence of the option of paying municipal water bills at supermarkets. It is a rough measure of the convenience of payment options — in particular, the prevalence of payment points accessible outside normal working hours. Unfortunately, payment at supermarkets is not feasible for all municipalities — particularly those in very rural areas.

The response rates for the survey questions on billing and payment options were very high. However, it was not possible to verify the information provided by municipal officials.

4.3.3 *Simulation Results*

The simulation results illustrate the substantive implications of statistical estimates of the operationalised model. The estimates reflect patterns or relationships among the various causes (or “determinants”) of cost recovery and cost recovery outcomes, and the simulations present these patterns in a clearer format.⁵⁴ The simulations reported below illustrate the expected effects on cost recovery outcomes of changing one or more features of a municipality’s social and institutional context, service infrastructure, or billing and payment practices. This is done by comparing the expected cost recovery outcomes of two hypothetical municipalities. First “before” outcomes are calculated by assigning values to each of the municipal characteristics in the operationalised model and using the statistical estimates to simulated expected outcomes. Then “after” outcomes are calculated by changing one or more characteristics and running a second batch of simulations. The differences between the “before” and “after” outcomes represent the expected effect of the changed characteristics.⁵⁵

To represent the probabilistic nature of the statistical estimates, expected effects are described as distributions of many thousands of simulations rather than single numbers.⁵⁶ These distributions are pictured using density graphs, which are like smoothed versions of the more familiar histograms or frequency distribution graphs.⁵⁷ The horizontal axis indicates the expected difference between “before” and “after” simulations, while the vertical axis indicates the density of simulations over any particular point or interval. The density curve is thus highest above the range of expected effects where the largest proportion of simulations fall. Fewer simulations fall under the portions of the curve that tail off to the right and left of the

⁵⁴See King, Tomz, and Wittenberg, “Making the Most of Statistical Analyses.”

⁵⁵This approach adopts a “comparative statics” approach to causality, which does not directly represent the processes through which changes in municipal characteristics produce changes in cost recovery outcomes. In most cases, these processes would occur over some period of time — not overnight.

⁵⁶Each result in this chapter is based on ten thousand simulations. The unusually large number of simulations is due to the use of ten multiply-imputed datasets (with one thousand simulations generated from each dataset). While such a large number of simulations may not be strictly necessary, there is no harm in doing “too many” and potential problems with doing too few.

⁵⁷Density is scaled so that the area under the entire density curve is equal to 1.0.

peak. In the graphs, the area excluding the highest and lowest 10 percent of the expected effects is shaded, marking an interval within which the remaining 80 percent of simulations fall. That is, one would expect the effect to fall in this range eight out of ten times — or be “80 percent confident” in such an outcome. (Such a range is directly analogous to the statistical “margin of error” routinely reported for, for example, public opinion surveys.)

The number of possible “before” and “after” comparisons that can be simulated using the statistical estimates is infinite. The expected effects of a straightforward change like, say, tightening penalties for non-payment, could be “customised” to the social and infrastructural profile of any particular municipality (real or hypothetical). Likewise, the expected effects of many different combinations of changes in cost recovery strategies can be simulated. The simulation results presented below are thus a small subset of those that could conceivably be generated. To make them useful to the broadest possible audience, the usual assumption is of a municipality “typical” in every way except for the one or more characteristics whose expected effects are simulated. “Typical” means that the municipality has the average characteristics of municipalities in the sample.

The simulations focus on expected effects likely to be of broad interest. The first examines the impact of upgrading service infrastructure to metered private connections. The second considers the imposition of service restriction as a penalty for non-payment. The third focuses on the effects of other changes in billing and payment practices — the introduction of a progressive tariff, an active Masakhane campaign, and payment at supermarkets. The fourth combines the impact of each of the first three in order to give a general sense of the degree of influence municipalities have over cost recovery outcomes through decisions about service infrastructure and billing and payment practices. The fifth and sixth consider the implications of poverty and, more specifically, the extension of basic services to the poor.

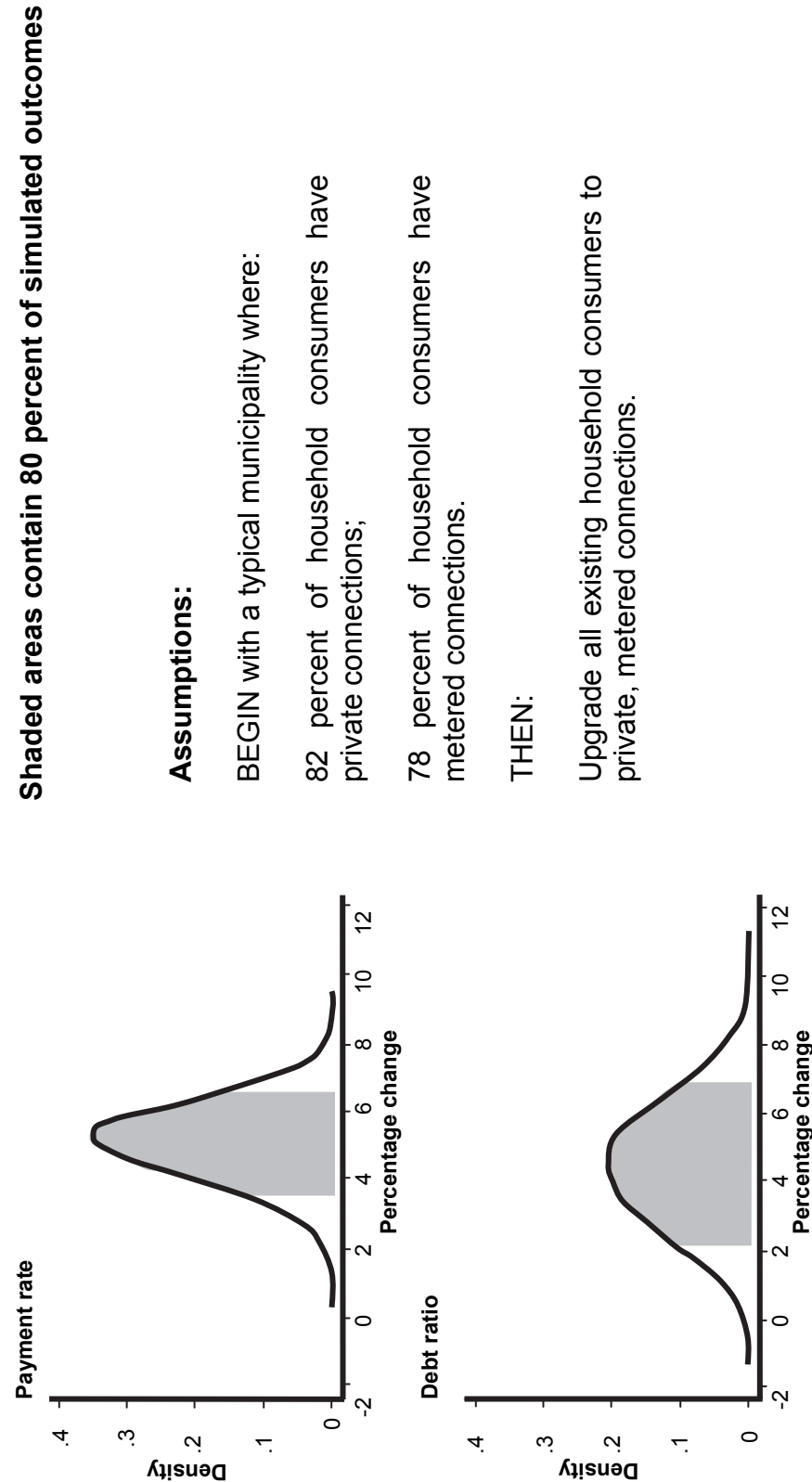
4.3.3.1 Expected Effect of Upgrading Existing Service Infrastructure

The first simulation clarifies the effects of upgrading service infrastructure on cost recovery outcomes. The “before” assumptions are of a municipality typical in every way of the national sample. As shown in figure 4.1, this implies that roughly one in five household consumers lacks a private connection and one in five also lack metered connections. Private, metered connections are generally believed to improve cost recovery. Reasons include greater consumer satisfaction with higher service levels, greater legitimacy of charges levied against metered consumption, and the ability to selectively penalise non-payment. To check whether upgrading infrastructure improves cost recovery (all else being equal, including the social composition of the consumer base), the “after” assumptions are that all household consumers previously without them are provided with private, metered connections.

The expected effects of this change on payment rates and debt ratios are illustrated in the two density graphs in figure 4.1. The upper graph shows that simulated percentage changes in payment rates are concentrated around the range of about 4 to 6 percent. This means that a typical municipality in which roughly one in five household consumers lack private, metered connections can expect to achieve an improvement in payment rates in this range by upgrading infrastructure. The lower graph shows that the effect on debt ratios is only slightly smaller, and with a wider range of possible values — roughly from a 2 to 7 percent improvement.⁵⁸ In sum, the graphs confirm the conventional wisdom that upgrading infrastructure improves cost recovery. They also provide more concrete estimates of the likely magnitude of improvements, which can help to inform decisions about whether the benefits exceed the costs of undertaking infrastructural upgrades.

⁵⁸The wider range is probably attributable mainly to greater measurement error for debt ratios (which include many multiply imputed values) than for payment rates, although debt ratios — which reflect past as well as present consumer behaviour — are also probably more difficult to explain using municipalities current characteristics.

Figure 4.1: Effects of Upgrading Existing Service Infrastructure

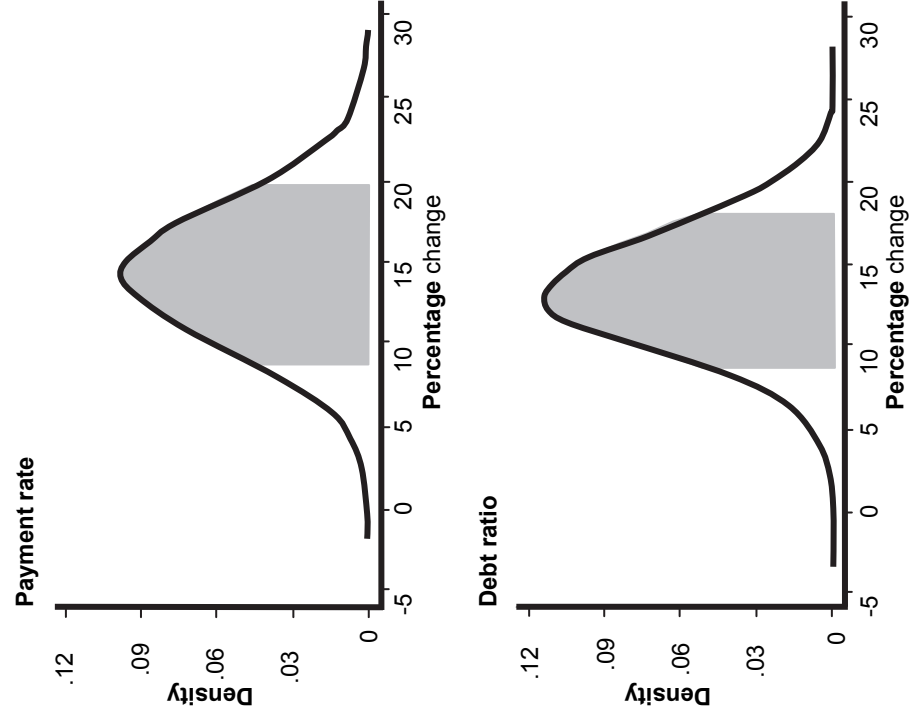


4.3.3.2 Effects of Introducing Penalties for Non-payment

Perhaps the clearest evidence that a municipality is aggressively pursuing cost recovery is the use of service restrictions (including complete disconnection, where practically and legally feasible) to penalise non-payment. The firm implementation of penalties is repeatedly noted as a key element of any successful cost recovery strategy. The national survey made it possible to distinguish municipalities that penalise non-payment when accounts are 90 days or less overdue, those that impose penalties after 90 days, and those that do not penalise non-payment. Figure 4.2 presents simulated effects of taking an otherwise typical municipality that does not penalise non-payment (“before”) and introducing penalties for overdue accounts within 90 days (“after”).

The simulation results confirm the importance of penalising non-payment by restricting services. The upper graph shows that in eight of ten simulations the introduction of penalties increases payment rates by between roughly 10 and 20 percent. The lower graph shows that debt ratios improve by between about 9 and 17 percent. It is unlikely that any other single practice within the control of municipal officials has as large an impact on cost recovery outcomes as penalising non-payment. Restricting services to consumers whose accounts are overdue has two important benefits with respect to cost recovery: it creates incentives for existing consumers to pay (reflected most clearly in higher payment rates), and it limits the consumption of chronic defaulters (reflected most clearly in improved debt ratios). Service restriction appears to be most effective in municipalities with large proportions of private connections, since they are able most easily to target penalties at defaulting households. However, the general findings suggest that any municipality that is not making a serious effort to punish non-payment by restricting services could improve its cost recovery outcomes substantially by doing so.

Figure 4.2: The Effects of Penalties for Non-payment



Shaded areas contain 80 percent of simulated outcomes

Assumptions:

BEGIN with an otherwise typical municipality that:

Does not penalise non-payment by restricting services.

THEN:

Introduce service restriction as a penalty for non-payment, applied to consumers by the time their accounts are 60 days overdue.

4.3.3.3 Effects of Introducing Billing and Payment “Best Practices”

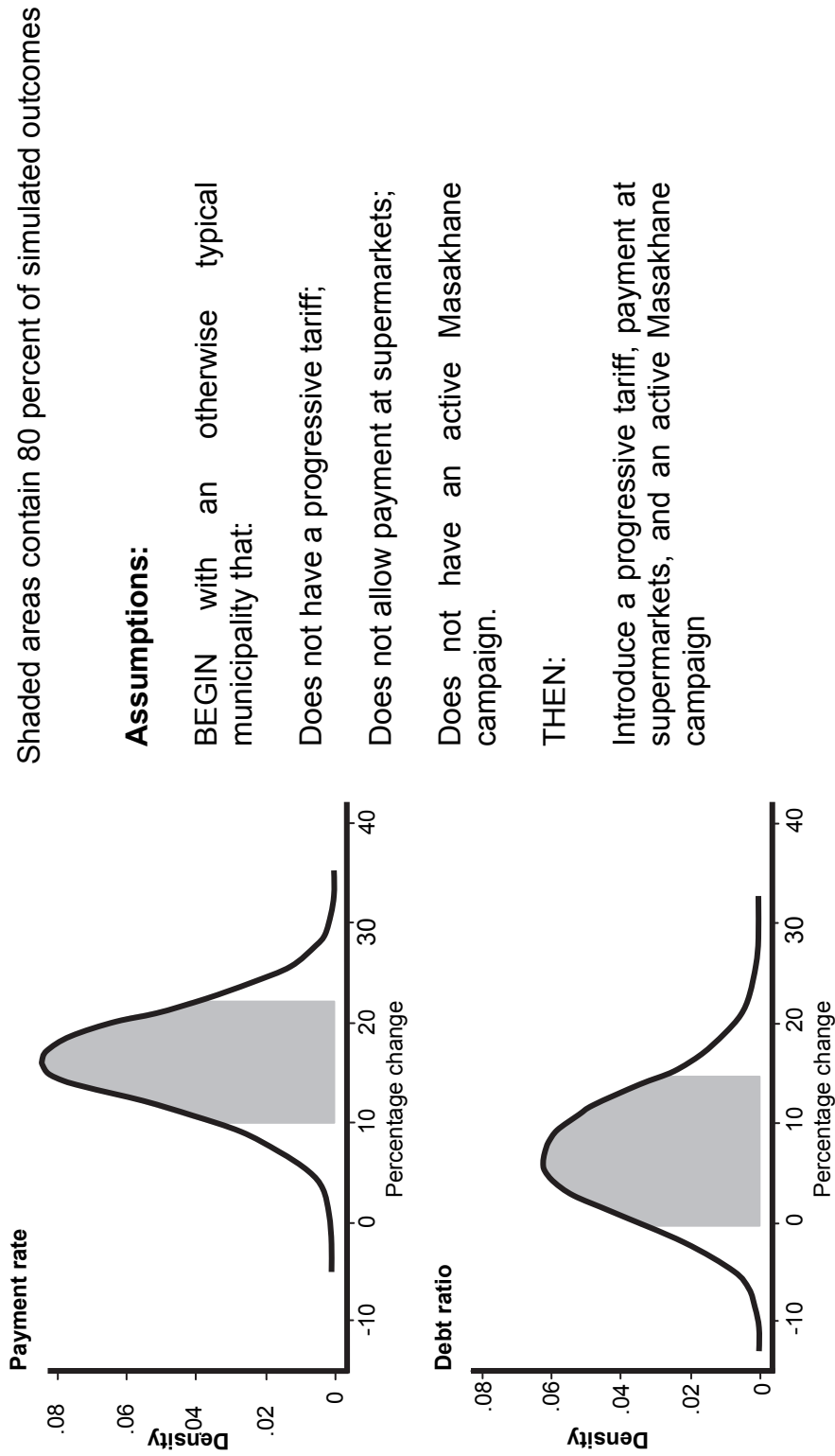
Aside from penalising non-payment, several other billing and payment practices are often associated with improved cost recovery. Practices included in the operationalised model are the establishment of a progressive tariff schedule (in which larger consumers are charged higher average unit prices than smaller ones are), the availability of payment facilities at supermarkets (which, where feasible, improves the convenience of payment), and the pursuit of an active Masakhane campaign. To give a sense of their joint impact, figure 4.3 presents simulations of the expected effects of simultaneously introducing a set of improved billing and payment practices. The “before” simulation is an otherwise typical municipality that lacks a progressive tariff, does not allow payment at supermarkets, and does not have an active Masakhane campaign. The “after” introduces each of these specific “best practices.”

The simulation results show that these practices jointly bring a substantial rise in payment rates, along with a more modest improvement in debt ratios. In eight of ten simulations, payment rates increase between 12 and 25 percent.⁵⁹ The average expected increase (19 percent) is even slightly greater than that associated with introducing penalties for non-payment (15 percent). Meanwhile, the impact on debt ratios is generally positive, but much less impressive than for payment rates. The 80 percent confidence interval ranges from slightly below 0 to 16 percent, with the average expected effect being an increase of 8 percent. The more modest improvements in debt ratios suggest that the specific billing and payment “best practices” considered exert stronger influence on behavioural than financial outcomes — probably encouraging higher payment rates mainly among small (and often poor) consumers whose influence on overall municipal debt ratios is modest. However, improvements in behavioural outcomes may be desirable in themselves, and they are likely to carry greater financial weight in municipalities that are unusually dependent on payments from large numbers of small consumers.

The simulation results provide some useful insights into the impact of Masakhane campaigns. While initiated to improve cost recovery through a combination of collective incentives and civic exhortation, these campaigns have been criticised as very ineffective. The simulation results suggest that they have had some positive effects — that is, municipalities with Masakhane campaigns have achieved slightly better payment rates than municipalities without them (all else being equal). However, the small size of those effects — and their failure to translate into substantial improvements in debt ratios — mean that Masakhane campaigns have

⁵⁹On average, increases in payment rates can be attributed to each of the “best practices” as follows: progressive tariffs and payment at supermarkets each account for about two-fifths of any increase, and the remaining fifth is accounted for by the introduction of Masakhane campaigns.

Figure 4.3: The Effects of Introducing Billing and Payment "Best Practices"



not made much of a dent in the overall task of ensuring the financial sustainability of basic water service provision.

4.3.3.4 Combined Effects of Possible Cost Recovery Interventions

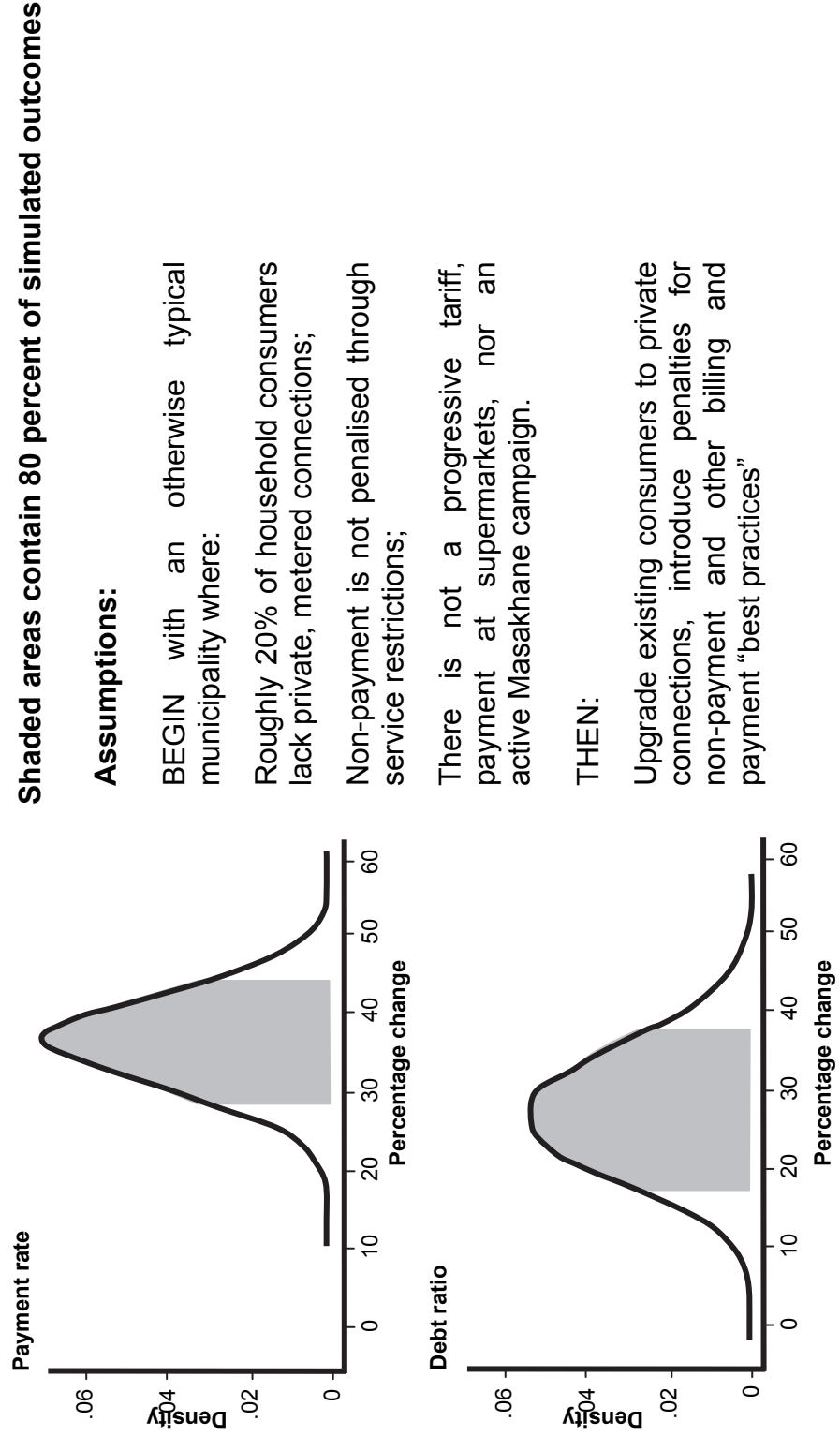
A crucial question in understanding the cost recovery challenge is how much influence factors within the control of municipalities and their agents can reasonably be expected to have on outcomes. The previous three sub-sections have considered a series of specific interventions that could conceivably be incorporated in municipal cost recovery strategies — upgrading service infrastructure, imposing penalties for non-payment, and adopting various other favourable billing and payment practices. This sub-section considers the combined effects of all these interventions — providing perspective on the differences in cost recovery outcomes attributable to the strategies adopted in particular municipalities.

Figure 4.4 presents the simulation results. The “before” assumptions are of an otherwise typical municipality in which roughly one in five household consumers lacks a private, metered connection; the tariff schedule is not substantially progressive; payment facilities are not available at supermarkets; and there is no Masakhane campaign. In short, the “before” assumptions are of a municipality pursuing “worst practices” for cost recovery. Then, in the “after” simulations, all of these “worst practices” are replaced by “best practices.”⁶⁰ Because few actual municipalities approximate the “worst practice” assumptions, the improvements in payment rates and debt ratios available to them by adopting “best practices” will generally be somewhat smaller than the simulated results presented in the figure. The simulations are, however, useful in highlighting the overall sensitivity of cost recovery outcomes to factors within municipalities’ control.

Figure 4.4 confirms that for a typical municipality the combined effects of moving from “worst” to “best practices” are substantial. The upper graph shows that eight of ten simulations fall in the range of 28 to 43 percent improvements in payment rates, with an average improvement of 36 percent. For perspective, the average simulated payment rate for a typical “before” municipality is 47 percent, while for an “after” municipality it is 83 percent. The lower graph shows that the combined effects on debt ratios is also substantial — with the shaded range stretching from 16 to 37 percent, and an average increase of 27 percent. The corresponding average “before” and “after” debt ratios are 10 and 37 percent, respectively. Municipalities clearly exert heavy influence on cost recovery outcomes through their own choices and actions.

⁶⁰That is, all consumers are upgraded to private, metered connections; service restrictions are introduced to penalise non-payment within 90 days; a progressive tariff schedule is adopted; payment facilities at supermarkets are provided; and a Masakhane campaign is initiated.

Figure 4.4: Combined Effects of Possible Cost Recovery Interventions

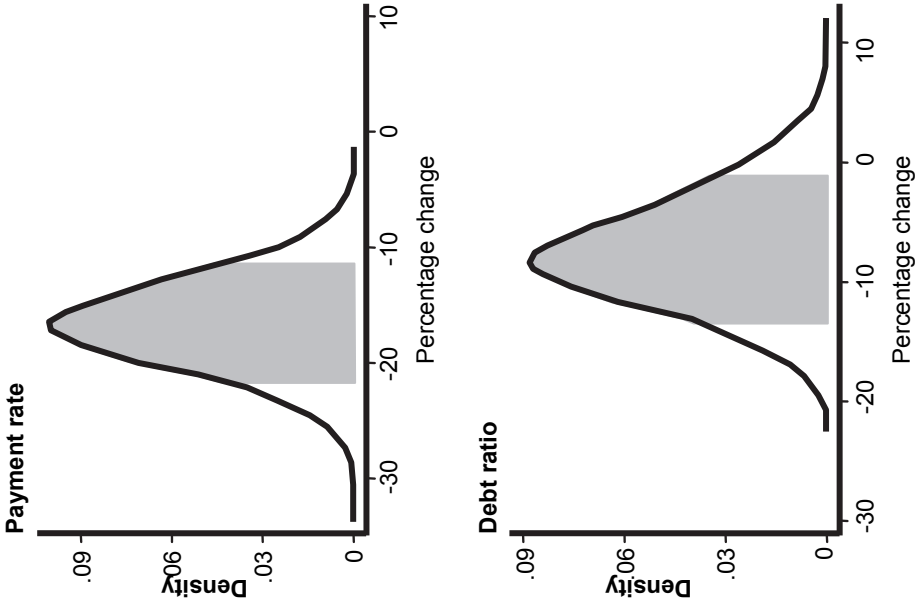


4.3.3.5 Effects of Poverty Profiles on Cost Recovery

The simulations presented above illustrate the expected effects of factors over which municipalities and their service-providing agents can exert some control. Yet other factors beyond their control also affect cost recovery outcomes. Arguably the most entrenched socio-economic obstacle to cost recovery for water services in South Africa is the poverty of many household consumers. Poverty's most direct effect on cost recovery is in making even very modest charges unaffordable — or very difficult to afford — for consumers with many pressing demands on very scarce resources. Poverty also indirectly hinders cost recovery by, for example, making it less likely that consumers will willingly contribute financially to upgrading to service levels (especially, private connections) that make the application of billing and payment “best practices” most effective. But for ease of presentation, the simulations in figure 4.5 isolate the “direct” effects of poverty, while holding other municipal characteristics constant.

The “before” and “after” assumptions are straightforward. The “before” municipality is an otherwise typical one in which one third of household consumers fall below the poverty line (that is, in the bottom 40 percent of the national adjusted household income distribution). The “after” municipality is an identical one in which two thirds of consumers are below the poverty line. The simulations thus illustrate the effects of doubling the proportion of poor consumers while holding all other characteristics constant. The impact on payment rates is an average drop of 17 percent, with eight of ten simulations falling in the range of -22 to -11 percent change. Meanwhile, debt ratios also fall notably. The average decline is 7 percent, with the confidence interval stretching from -13 to -1 percent. These results highlight the concrete disadvantages faced by municipalities with unfavourable poverty profiles. Put differently, it is important to recognise that even if a municipality with a large proportion of poor consumers adopts “best practices,” its cost recovery outcomes are likely to be inferior to those achievable in a wealthier municipality with identical practices. This is not to say that poor municipalities should not adopt “best practices,” but rather that definitions of success need to account for social context — a 50 percent payment rate for a wealthy municipality might reasonably be regarded as failure, while the same rate might indicate resounding success for a poorer counterpart.

Figure 4.5: The Effects of Poverty Profiles on Cost Recovery



Shaded areas contain 80 percent of simulated outcomes

Assumptions:

BEGIN with an otherwise typical municipality where:

One-third of household consumers fall below the “Poverty Line”

THEN compare with an otherwise typical municipality where:

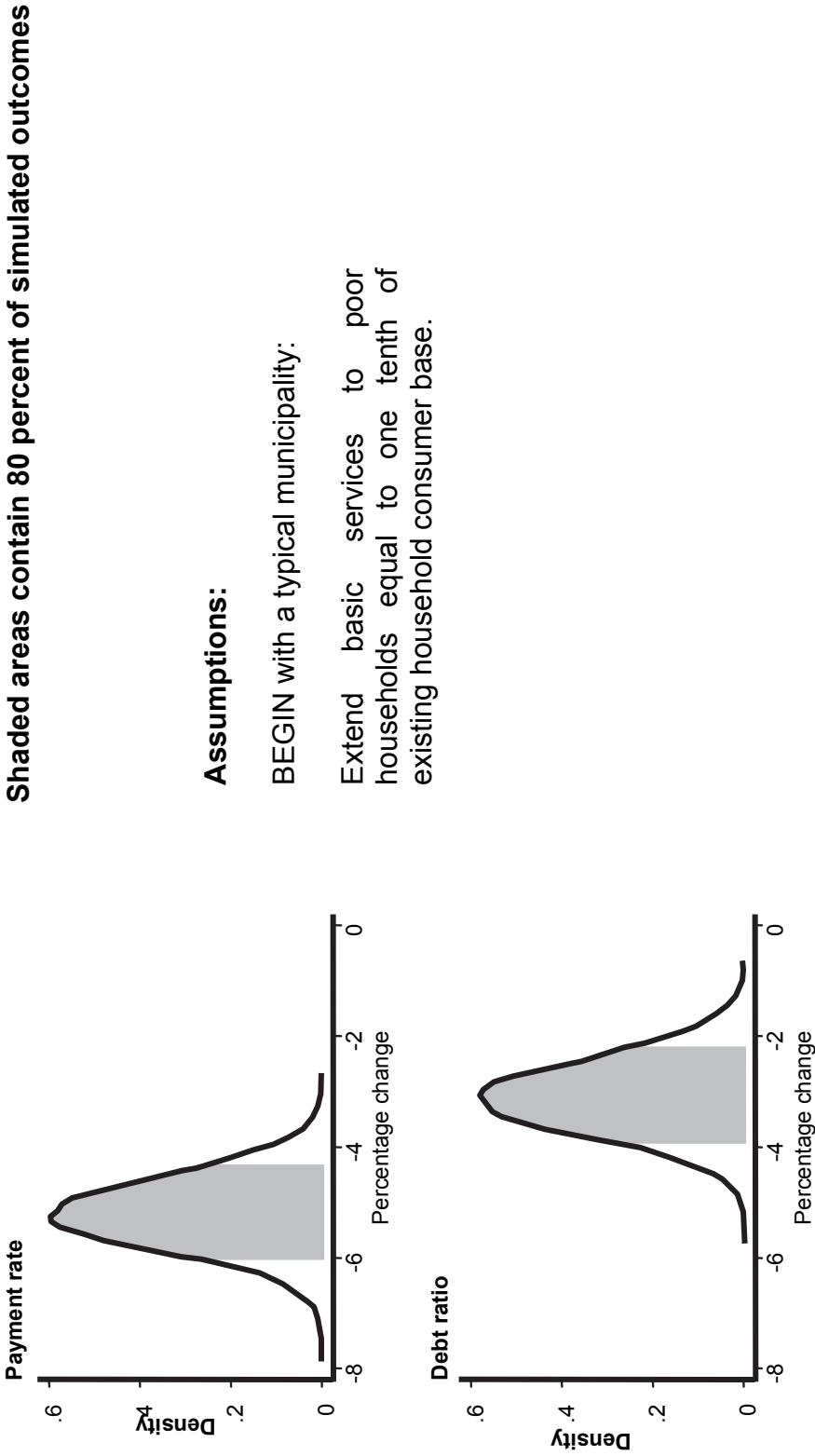
Two-thirds of household consumers fall below the “poverty line”

4.3.3.6 Effects of Extending Basic Services to Poor Consumers

The goal of putting the extension of basic services to poor consumers on financially sustainable footing has been the impetus behind the push for more effective cost recovery in South Africa. In the most common scenario, providing basic services has involved installing public taps within 200 metres of prospective consumers' homes. As a result, the social profile of a municipality's consumer base and the characteristics of its service infrastructure change. Serving previously unserved poor households raises the proportion of the consumer base below the poverty line. At the same time, because they are served with basic public taps, the proportion of consumers with private and metered connections drops. Finally, the expanded number of consumers increases the burden on those responsible for administering billing and payment systems. The simulation results in figure 4.6 capture these multifaceted consequences of extending basic services to the poor.

The "before" assumptions are of a municipality typical in every way. The "after" assumption is that basic services are extended to poor households amounting to one fifth the number of previously existing household consumers. So, for example, if there were one thousand household consumers "before," basic services would be extended to an additional hundred poor consumers (to give a total of 1100 household consumers "after"). The upper graph in figure 4.6 shows the effects on payment rates. In eight of ten simulations, payment falls by between 4 and 6 percent, with an average drop of 5 percent. For perspective, the average simulated payment rate for the typical "before" municipality is 64 percent, while after extending basic services it drops on average to 59 percent. The lower graph paints a very similar — if slightly less negative — picture for debt ratios. The shaded interval stretches from -4 to -2 percent, with an average decline of 3 percent. This corresponds with a drop in debt ratios from an average of 19 percent "before" to 16 percent "after."

Figure 4.6: Effects of Extending Basic Services to Poor Consumers



The unfortunate implication of these results is that extending basic services to the poor shows a strong tendency toward harming cost recovery outcomes. Achieving the goal of financing basic services through improved cost recovery thus appears unlikely in light of the empirical patterns illustrated in the simulations. As pessimistic as this conclusion may seem, it should not be surprising given the findings presented in previous sub-sections. The various “ingredients” of the process of extending basic services — worsening socio-economic profiles of household consumer bases (with more consumers falling below the poverty line), greater reliance on public and unmetered taps, and a heavier administrative load in running billing and payment systems — is a recipe for sliding payment rates and debt ratios. Although occasional cases of successful cost recovery “against the odds” have emerged — and may continue to emerge — statistical estimates from a broad cross-section of municipalities countrywide reinforce the unfortunate message that the odds are stacked heavily against generalising these successes.

4.3.4 *Conclusion*

This section has analysed the substantive implications of the national survey for understanding cost recovery outcomes — and, therefore, for developing more effective cost recovery strategies. By operationalising the causal model described in chapter 3 and estimating it using the dataset described in section 4.2, the effects of several causes (or “determinants”) of cost recovery were measured while controlling statistically for the effects of the others. Major findings were illustrated using simulations, which are easier to interpret than the “raw” statistical estimates. The simulations were designed to address major debates about the sources of successful cost recovery — such as upgrading service infrastructure, imposing strict penalties for non-payment, and adopting other billing and payment “best practices.” They also addressed social constraints on cost recovery, particularly with respect to the extension of basic services to the poor. Yet these particular simulations only scratch the practical insights that can be derived from the statistical estimates of the operationalised model — as simulations could be “customised” to cater to an infinite array of configurations of municipal characteristics and practices.

The findings have generally confirmed and always refined major elements of the conventional wisdom on cost recovery. Factors generally asserted to be conducive to successful cost recovery — such as private and metered connections, penalties for non-payment, and convenient payment facilities — have been shown to contribute to higher payment rates and debt ratios. And factors seen to be antithetical to cost recovery — especially poverty — have been shown to lead to less desirable outcomes. Yet the analysis has gone farther than most prior research in attaching quantitative estimates (with varying ranges of confidence) to the effects of these factors. At a general level, this made it possible to estimate the overall impact of factors within the control of municipalities and their agents on cost recovery outcomes. These turned out to be quite large for a typical municipality — on the order of 35 percent for payment rates and 25 percent for debt ratios. The estimates also have great practical value, in that they provide municipalities with concrete information about the likely effects of specific changes in cost recovery strategies

they might consider. After all, in deciding whether or not to adopt some (possibly costly) practice, it is important to know not only whether it is likely to improve cost recovery, but also by how much.

The analysis of simulation results ended with the unfortunate observation that the extension of basic services to the poor is associated with declining cost recovery outcomes. Prospects for making the extension of services financially sustainable by improving cost recovery are therefore not particularly rosy. The South African national government's announcement in late 2000 of its intention to adopt a policy of "free basic services for the poor" can be interpreted at least in part as a product of the realisation that cost recovery for basic services has failed to meet earlier expectations. The new policy will require innovative thinking about intra-municipal cross-subsidisation and cross-municipal "equitable share" allocations. Meanwhile, municipal restructuring through demarcation is altering the institutional context within which the new policy will be implemented. Some of the issues raised by these policy and institutional changes will be discussed briefly in the concluding chapter.

CHAPTER 5: CASE STUDIES

5.1 INTRODUCTION

This section examines the cost recovery successes of four municipalities in urban, peri-urban and rural settings. The case studies seek to deepen the understanding of the constraints and opportunities in cost recovery in community water supply in four councils in four provinces, namely, Mpumalanga, Gauteng, Eastern Cape and KwaZulu Natal.

The municipalities exhibit differences in terms of size, population, resources etc. and it is recognised that communities present a range of situations related to their specific histories, experience with development projects, access to natural and human resources, models of governance and social organisation and cost recovery systems.

More specifically, the case studies address the following:

- assessing the roles and relationships of local structures and their bearing on water supply management in the community;
- documenting the broad socio-economic context in which cost recovery programs are implemented;
- examining the linkage between quality and levels of service and rates of cost recovery;
- identifying former (and alternate) water supply arrangements and assess their impact on current cost recovery;
- determining consumer awareness and perceptions about the cost of service in relation to current tariffs and test overall acceptance of the 'user pays' principle;
- obtaining an overview of different cost recovery systems, with their strong and weak points;
- identifying the main constraints to cost recovery;
- identifying the mechanisms and strategies being applied at community level to encourage and enforce payment;
- gaining insight into water management roles and decision making at household level;
- examining the role of women in community water supply management and cost recovery;
- Examining the role of community participation in facilitating cost recovery.

The sample includes population groups ranging from 3,800 households to approximately 64,108 households. Variety can be seen in the roles and influence of water boards, community representatives and local government in each community. The study examined both bulk water supply projects and those drawing upon local groundwater resources.

5.2 CRITERIA FOR THE SELECTION OF THE CASE STUDIES

The following constitutes a breakdown of the criteria applied by the project team in the selection of the four case studies.

5.2.1 *Size and classification of municipality*

It was considered important that the sample group include municipalities from all three classes and represent large, medium and small structures.

5.2.2 *Geographical spread*

By achieving a geographic and regional spread, externalities like policy interpretation and the institutional capacity of municipalities can be covered.

5.2.3 *Macro-economic contexts*

Taking account of the diversity of macro and micro-economic contexts that characterise the municipal canvas of the country it was considered important to reflect this diversity in terms of the socio-economic conditions being experienced by the municipalities.

5.2.4 *History of cost recovery*

Crucial to any examination of municipal cost recovery is both the historical path experienced by municipalities in introducing and achieving cost recovery for urban services. It was important in this project to include municipalities with different histories regarding cost recovery.

5.2.5 *Socio-economic profile*

The socio-economic profile of an area in which cost recovery is being or has been introduced is important not only in terms of affordability at the household level but also at the municipality level for sustainability reasons. A mix of socio-economic conditions is therefore important for the sample group of case studies to be selected.

5.2.6 *Access to information*

Over and above these criteria is the concern for ease of access to readily available information to be sourced either via documentation and/or discussions and meetings with officials, councillors, local residents and other stakeholder groups.

5.3 METHODOLOGY

The study included a number of phases, beginning with meetings and discussions with key stakeholders to collect preliminary data about the short-listed communities. Investigation involved, among others, getting some basic information on population figures, geographic location, recent water projects and, in some cases, problems being experienced by the community, etc.

Two questionnaires were developed: a household questionnaire designed for quantitative analysis, and a qualitative questionnaire for use during the various focus group discussions. An extensive list of items and possible questions was finally narrowed down to a 2-page quantitative questionnaire and guidelines for the formal discussions.

The household surveys were conducted by two enumerators during one day of fieldwork per community and, where possible, covering all the sections of the community. The selection of households was random, avoiding interviews in neighbouring households and alternating households on either side of the road. As it was anticipated that most respondents would be female, an effort was made to include male respondents as well. Respondents had to be a resident of the community and over the age of 18.

On completion of the fieldwork, the responses to the household questionnaires were entered into a database to facilitate analysis. The qualitative data was compiled in field notes and formed the basis for the narrative report.

5.4 DURBAN, KWAZULU NATAL

5.4.1 *Background*

Of the 600 000 households in the Durban Metro, 200 000 have been identified from physical counts to be in informal settlements. Of the remaining 400 000 households, 350 000 have formal water connections, and the remaining 50 000 are either rural (40 000) or consist of backyard shacks, granny flats etc where there is no direct link between meter and user. Since low income households are the focus of the cost recovery investigation, this interview concentrates on the 200 000 informal settlement households, as well as the low cost housing component of the 350 000 metered connections. There are currently 561 informal settlements in the Municipal area. There are plans to undertake in-situ upgrading or relocation of all 200 000 informal units such that by 2012, every unit has an individual metered connection. With regard to low cost housing, new units are being constructed at a rate of about 17 000 per year.

5.4.2 *Description of Service*

Three levels of service are relevant in this instance: un-metered communal standpipes, ground tanks and semi-pressure roof tank systems.

About 170 000 informal households obtain water from un-metered standpipes. No costs are recovered from this sector. Most of the standpipes are unattended, and as there are no bulk meters in many areas, there is no volumetric control of usage. From the perspective of cost recovery, this is a challenge that the Metro is trying to solve. From a global perspective however, the total unaccounted-for water (UFW) has dropped from 43% when the Metro was formed in 1995, to 23% in 2000. It is estimated that 10 to 15% of current UFW emanates from un-metered standpipes. However, the practice of making unauthorised individual connections is a common one in these areas, and poses a problem.

Some 30 000 households in informal settlements have ground tanks. A ground tank is a 200 litre opaque plastic tank, which rests on a concrete block at table height. It is usually located outside the front door of the dwelling. Residents are supplied with a roll of pipe, which they must install in a 300mm deep trench from the tank to the nearest standpipe. A manifold is installed at each standpipe, which enables 80 to 100 pipe connections to be made to one standpipe. Initially, a bailiff was employed (at a cost of R400/month) to open and shut the valve at the standpipe in order that the tanks may be filled. This was replaced a year ago with an electronic timer control valve, based on an irrigation type timer, to operate once a day to fill all tanks connected to the manifold. The device is subject to tampering and needs to be made secure. The daily volume of 200 litres was arrived at from a survey which found that when water was still being filled in private containers and carried back to the household, between 75 to 100 litres/household was being used daily. Based on this figure it was felt that double the volume was a reasonable amount to have available in a tank at the house. Coincidentally, this volume corresponds to free basic water allowance as well, so that no cost recovery is necessary. The only cost is the initial R263 connection fee, which includes the tank and a roll of pipe to connect the tank to the standpipe. Cato Crest, Durban's largest informal settlement, has about 3 500 dwellings served in this way, from 35 standpipe/manifold installations.

The next step up in level of service is the 170 litre roof tank system. Unlike the ground tank, the roof tank is continuously filled (as it empties) via the Municipal reticulation system, monitored by a metered connection. It can service any facility that can operate under a 2 to 3m head e.g. flushing toilet, shower, geyser etc. The main advantages to the municipality are the relatively lower installation cost (3/4 the cost of full pressure installation), the fact that it reduces the peak demand on the reticulation system, and lower maintenance costs associated with smaller pipe diameters (50 and 75mm as opposed to 100 and 150mm). The consumer benefits by paying only 2/3 of the full pressure tariff for consuming between 6 and 30kl. The connection fee of R580 is usually borne by the developer (of low cost housing) which in turn is usually taken from the housing subsidy. One of the disadvantages of the system is that dirt can get into the valve and as a result damage the seal or not shut off properly. This system is in place in some 50 000 households that fall under the

low cost housing category. It was also installed in 30 000 to 50 000 households in existing townships where water losses of 60 to 80% were being experienced. In these cases, reticulation was replaced, individual connections installed, and a new billing system built from scratch.

5.4.3 Community Involvement

The municipality has full time staff for liaison with the community. For example, consumers who are being put onto individual meters for the first time are visited and the system is explained, and their co-operation is obtained. After the first month, a bill is sent out which details the amount of water used, and states the amount that would be paid in normal circumstances. This is followed, on the second month, by a real bill, which must be paid. It has been found that even after such a process, protests can develop on the grounds of insufficient consultation, and in a recent case, the community insisted that public meetings must be held before the community's consent could be assumed. In consequence, the start of the billing was deferred for three months, but it appears that co-operation is now assured.

In the face of disconnections of the regular supply and installation of flow restrictors, public protest can flare up quickly and result in damaging confrontation. However, patience and discussion are used to resolve the issues, and in a recent case (Mpumalanga) matters appear to have been resolved to everyone's satisfaction.

With regard to standard of service, residents in township upgrading contracts were given a choice between semi-pressure (roof tank) and full pressure systems, and it is believed that the split was roughly half.

Once installed, the municipality explains to the semi-pressure users how the metering and billing system works (see financial aspects below).

Unfortunately, the metro has not been successful in getting people to report water leaks. A recent case of a leak of 1500 litres/minute went unreported for three days, even though it adversely affected the water supply in that locality.

5.4.4 Financial Aspects

For communal standpipes in informal settlements, there is no cost recovery. Apart from the connection fee, there is also no cost recovery from informal settlements with ground tanks.

Cost recovery does take place from users of roof tanks. Meter reading and postal billing is done monthly. Payment for water use between 6 and 30kl per month is charged for at roughly two-thirds of R4,25 (which is the flat rate for full pressure users). For the first month, a dummy bill is received which does not have to be paid but gives the user an indication of his usage and corresponding cost. Payment starts from the next month's bill onwards. If payment is not made within 45 days of date of

issue, the supply is disconnected. Upon visiting the municipality, the user then receives an explanation, and is given the choice to make arrangements for payment, or agrees to have a flow limiter installed. The flow limiter opens once a day and shuts off automatically after 200 litres has flowed through (the free basic volume). Although the technology is problematic and is subject to vandalism, some 5000 limiters have already been installed. Indeed the latest information is that due to the large number of flow limiters that do not work (about 88%) the metro has changed to a policy of installing a trickle system that delivers about 200 litres per 24 hours. Illegal connections are also on the increase, especially in the shared standpipe areas.

Unfortunately there are many defaulters with the roof tank system (the rate of successful recovery is not yet known). There are basically three groups of non-payers:

- Up to R100 in arrears – these are in fact good paying customers, using typically 500 litres/day
- R100 – R1000 in arrears – use typically 600 – 700 litres/day
- More than R1000 in arrears – typically their consumption escalates even if in arrears. There are several users with arrears amounting to some R30 000.

An earlier Council decision to not disconnect water supply was revised when, as a result of this approach, the total arrears account escalated from R30m to R170m. Although further investigations will continue, it is believed that one of the causal factors could be that the roof tank system is perceived as an inferior level of service.

The tariffs were increased in 2001. A comparison of present and previous tariffs is given below for a consumption of 35kl.

Table 5.1: Comparison of Present and Previous Tariffs for 35kl Consumption

	Old (R's)	New (R's)
Fixed charge	23,20	33,20
6kl	Nil	nil
24kl	78,48	102,00
5kl	32,70	42,50
Total for month	134,3	177,70

Current debt in connection with water stands at nearly R306 million for all users. Disconnections for non-payment take place at an average of about 5000 per month.

5.4.5 Trends in Cost Recovery

While there can be no doubt that Durban has a creditable record and has pioneered many innovative methods and modes of service delivery, the statistics suggest some cause for concern. The following are examples from recent data.

Table 5.2: Percentage of Bad Debt Consumers and Accounts Disconnected

	Dec 2001	Mar 2002
Percent of consumers classified as bad debt	8,5%	8,9%
Percent of accounts disconnected in designated (low cost housing) areas.	8,3%	13,6%

5.4.6 Significant Features in Support of Better Cost Recovery

Communication is considered important. Apart from the work done by CLOs, pamphlets in people's own language are distributed and discussed. They explain each system, and outline their advantages, disadvantages and costs. Demonstration trailers are widely employed to show physically what the tank system entails. People are thus able to take their own decision as to what type of service they want, in accordance with what they are able and willing to pay.

To ensure all customers were registered, local councillors were asked to identify people to be trained as plumbers and CLOs. Once trained they then did a house-to-house survey to register people, note family size, and check for leaks. (One month's grace is given for leaks within the erf to be repaired). For the semi- and full pressure systems meters are read, by a private company using hand held electric meters, and about 280 000 monthly accounts are rendered. Where postal services are not available, community members are paid to hand deliver accounts. Payment can be made during work hours at any post office, township pay point or municipal office. As the tank system has a pre-paid fixed rate, accounts are not rendered and payments are made to the bailiffs.

Emerging consumers typically use 6, 16 and 29kl/month for the tank, semi-pressure and full pressure systems respectively. Initially there were a number of supply interruptions to the system as a result of bursts and leaks: this has since improved considerably. Durban Metro guarantees to fix bursts within 24 hours and leaks within 48 hours. There is a toll free number that people with complaints or queries can phone.

Defaulters receive a letter asking why they should not be disconnected. If they give an acceptable explanation, their supply is replaced by a standpipe. They still have to pay their arrears and for the standpipe water, and must sign an agreement stating this. Should they then still not pay their standpipe is disconnected. As an added incentive to pay Durban Metro is starting a metro club with prizes for account payers. Unauthorised connections are a problem in some areas. When found people have to pay the connection fee to have it regularised.

Durban Metro officials have the full backing of their councillors who are prepared to stand their ground in the face of adversity. Durban Metro have found that if one gives good service, is people-focused and is steadfast in the implementation of disciplinary action, (and has councillor support), that people soon come to accept the inevitability of payment.

An innovative system in Durban has been the use of incentives. Members of the public can join the metro club for a nominal sum (about R10 per month). If their accounts are up to date, they stand to win substantial prizes (e.g. a car) which are drawn on a lottery basis monthly. The Metro also publishes a general interest monthly magazine which is designed to foster a loyalty to the metro by the public, and which is given free to all customers.

5.4.7 Political interference

Durban reported that Ward Councillors exerted strong pressure on the administration to prevent water cut-offs. Before elections the Council instructed the staff not to cut off water supplies.

In addition they had to contend with large protests which were not necessarily political but which had the effect of preventing the staff from conducting their duties. For example, in Mpumalanga Township in 2001 there was mass action against the municipality following disconnections for non-payment.⁶¹ Council staff were prevented from entering the township, installations were damaged and an atmosphere of serious hostility prevailed. This has since calmed down but in many townships, including Mpumalanga, disconnection teams are followed by community members who either reconnect or vandalise the system.

In order to limit the negative impact of disconnections on the municipality and the potential for political interference, contractors, not municipal staff, are used for disconnections. Furthermore, the decision to disconnect is based on rules approved by the council and does not require ratification by any member of the political body.

5.4.8 Conclusions

Of the Metropolitan Councils, Durban is considered the pioneer in terms of innovative and responsive cost recovery systems. However, although it is doing relatively well, the staff admit that substantial problems remain. The water services still run at a loss, in spite of substantial tariff increases last year, while there are negative trends in some respects.

⁶¹ In Durban "disconnection" consists of placing a flow limiter on the incoming pipe to limit the supply to a trickle of 200 litres a day

5.5 MOGALE LOCAL MUNICIPALITY (KRUGERSDORP), GAUTENG

5.5.1 *Background*

Krugersdorp is an urban settlement to the West of Johannesburg with a population of about 223 657 [census 1996]. Kagiso is the main township and is populated mainly by low income consumers. In the township, there were many consumers in arrears in their water bills – that is before the introduction of the pre-paid meters.

The illiteracy rate in the municipality is about 9.3% for persons over 15 years old, which compares favourably with the national rate. About 70% of the residents of the municipality are engaged in some form of employment. Roughly 6% of households have no source of income.

There are three housing types: traditional, informal and formal housing. Formal housing accounts for 73%, informal 23%, traditional 1.1% and the rest are homeless or have a makeshift mode of shelter.

5.5.2 *Description of Service*

After the amalgamation of the local authorities, Krugersdorp found itself with a greatly expanded jurisdiction and problems, mainly:

- Inherited networks were in dire need of repairs and overhaul.
- Furthermore, the water section found itself with many un-metered water connections.
- There was also an entrenched culture of non-payment.

It was clear from the onset that service delivery, metering, billing and accounting had to be in order before any payment for service could be enforced in any way. Funds were made available and the entire network overhauled. All existing water connections including the standpipes in the township were metered using conventional meters.

About 62% of household have individual connections, 26% have a yard tap, 5% depend on public taps, 6% depend on boreholes, and the rest on other means. The water service delivery is generally satisfactory.

Maintenance: Many complaints have been made about the technology, for example:

- The system sometimes shuts down when there is heavy rain. (The system is being upgraded on continual basis. It could be due to water coming in contact with the electronic components, surges in water pressure, tampering, etc)
- The system sometimes shuts down even when there is still money on the card – this may be due to surges in pressure. As a result there are problems associated with credits and transactions
- Untimely failure of battery in some meters

- The system is an electronic device and can be tampered with
- Leaking meters and fittings
- Constraints in staffing capacity

Most of the complaints are addressed on a daily basis. The technology of prepayment water meters has not yet been perfected. Successful implementation requires a good working relationship between the service provider and the supplier of the meters. The manufacturers are constantly upgrading the system.

5.5.3 *Community Involvement*

The strategy in popularising pre-paid water metering included:

- Holding workshops to highlight the advantages of pre-paid metering
- The installation of pre-paid meters free of charge to all previously connected houses. Furthermore pipe fittings and sewerage were generally upgraded to reduce wastage, also free for most homes. In addition, the consumer was entitled to have 10kl for the first month of installation.
- The involvement of the community in the process
- No empty promises being made

5.5.4 *Financial Aspects*

Level of Payment: The deeper socio-economic problems that underline non-payment, besides metering and billing issues, will need to be addressed before and after implementation of pre-payment. Mogale municipality seems to have succeeded primarily because:

- There is a high level of commitment by the municipality to succeed
- There is a constant consultation with the community on municipal policies and plans
- Most of the residents are literate, employed and live in formal houses that have pre-payment meters.
- Consumers have become conscious of their water consumption and only use what they have paid for.

With prepayment the recovery rate should be 100%. However, there have been a number of technical problems with the meters which have caused some water to be lost. Furthermore, there is tampering with the meters to obtain water without being charged, as well as vandalism and illegal connections.

Tariff System: The municipality adopted a policy of individual metered and pressured yard connections to each and every household whether formal or informal. All billing operations were reviewed and what followed was an upgraded IT capacity. The software allows for 6kl free basic water to be given every month to every household. Pre-paid metering has improved cost recovery mainly because:

- Most houses have pre-paid meters installed

- Generally the most economic and viable households tend to use a greater proportion of water that is already paid for
- Billing and general paper work tends to be redundant with pre-paid
- Metered standpipes are made available in the townships/informal settlement. Residents buy smart cards for R50. They can use the cards to obtain 6kl per month free, above which money is deducted from the card.
- One household in three in Kagiso with no swimming pool or garden needs R50 per month

Credit control and debt collection system: There is an elaborate system in operation which seems to be working satisfactorily. The municipality and consumers can effectively:

- Detect leakage, theft, etc
- Make projections for the water consumption pattern
- Consumers can only use water that has been paid for
- Wastage is by and large very minimal

Furthermore the municipality can:

- Prosecute for damage to meters
- Terminate/restrict water connections to defaulters
- Consumers still owing money before the introduction of the prepayment meters have a programme of payment developed jointly with the municipality whereby they repay the outstanding debt in instalments added onto their payments

5.5.5 Significant Features in Support of Better Cost Recovery

- The municipality is improving the service delivery of water on a daily basis.
- It is the wish of the municipality that all homes should have a pre-paid meter with or without the consent of the consumers, but it has achieved notable successes to date in achieving co-operation.

5.5.6 Political interference

Before the installation of prepaid meters, political interference was a regular occurrence. Indeed one of the reasons for advocating pre-paid meters was that they greatly reduced the scope for political interference. Against that background, it is remarkable that the programme to install pre-paid meters has run so smoothly. This is ascribed to the fact that the Council was brought fully into the picture at the beginning of the process and fully endorsed the pre-paid water meter.

5.6 ADELAIDE, NXUBA MUNICIPALITY, EASTERN CAPE

5.6.1 *Background*

Adelaide is a small town that is also the seat of the Nxuba Local Municipality, in the Amatola District Municipality of the Eastern Cape.

Adelaide is divided into the main town and the three townships. The main town is predominantly populated by relatively well-off people; whilst in the township there are many unemployed and low income residents. In one of the townships, as in the main town, all the houses have water and sewerage reticulation systems connected. The remaining two townships have only public standpipes - this may not be unconnected with their willingness to pay for services rendered. There are however plans to meter all connections.

5.6.2 *Description of Service*

The current water supply system was commissioned in 1933. For more than ten years the municipality has been providing free basic water to its consumers. The consumers were expected only to pay for water above 5kl. This has now been increased to 6kl. However, there is a basic charge of R17 per month – an “availability fee” which covers refuse removal, sewerage and assessment rates. The municipality is also the electrical service provider, which allows it to disconnect electricity when the accounts get into arrears.

There are 3,800 households served with water. 3,000 of these are metered while the remaining 800 are un-metered standpipes. The standpipes are mainly found in the black township of Jumbo. The town and the coloured townships have their houses connected to the water supply system. The quantity of free water has been increased from 5kl to 6kl to adhere to government policy. However, all consumers pay a monthly availability fee of R17. Those that collect water from the standpipe only pay the availability fee of R17. The other consumers have water connected to their houses that is metered and they pay for any water they use in excess of the stipulated 6kl per month. The tariff is such that the unit cost of water increases with the quantity of water used.

5.6.3 *Community Involvement*

Communications: The Municipality shares information with consumers regularly and as needed through workshops, mass and ward meetings and the press. Also the Ward Councillors are effective in relaying important information relating to the services to the consumers.

Involvement of consumers in operating the billing system: The ward councillors help identify indigents and defaulters so that these can be recorded and updated. They also investigate the reason for defaulting. The community as a whole provides

information on anyone causing damage to the water supply system and they are asked to report on any illegal connections.

Response to problems experienced by consumers: It was reported by the Municipality that all problems are addressed promptly and some consumers we spoke with confirmed this assertion.

5.6.4 Financial Aspects

Level of Payment: The recovery rate is 62%. The maximum levels of payment vary from 65% in townships to 85% in the town. Those that are in the high-income bracket stay in the town while the lower income bracket households are found in townships. Households in the lower income bracket generally have problems with payment. Most of the households that have their water cut off and are taken to court for non-payment are low income earners.

Meters: As indicated earlier in this study, consumers in the town and one of the townships have their houses connected to a water supply system and therefore have them metered. The meter is the conventional mechanical type, which requires periodic reading. There are three meter-readers working for the Municipality, who collect information once a month. These meter readers are also responsible for identification and correction of faults. The data so collected are taken to the office and loaded into the computer for processing. The bills are then produced and distributed amongst the consumers. Apart from the availability fee, the users of non-metered public tap-stands do not pay any other fee.

Credit control and debt collection system: The Municipality has developed an elaborate system of controlling credit and collecting debt and we were informed that this system is implemented to the letter. The municipality understands their role of providing services for its people and the same time expects the people to pay for these services in return. These services include water, sewerage, electricity, etc. This understanding is effectively communicated to the consumers through meetings directly with the consumers and through their respective ward councillors. The Municipality therefore has adopted and enforced a no-pay no-service policy for those who are able to pay.

As a first step every consumer enters into a service agreement with the Municipality. It is made clear to the consumer that in the absence of such an agreement, the Municipality is not bound to provide the services.

The prospective consumer is required to pay a service deposit (equivalent to at least 2 months supply for each service) to the Municipality prior to the availability of the services. This deposit will be utilised to reimburse the Municipality for amounts due to the Municipality in the event of non-payment or a discontinuation of services. On termination of services on the request of the consumer, the deposit will first be utilised to pay the amounts due to the Municipality and the balance is paid out to the consumer.

Connections and supply of new services will only be made after all charges in respect of deposits and reconnection fees have been paid.

On a monthly basis the consumer is furnished with monthly accounts indicating inter alia the amount due for payment in respect of services and the due date for payment.

In the event that a consumer fails to make full payment of the amount due or fails to take necessary action to ensure payment is effected prior to the payment due date stipulated on the account, the Municipality will take the following actions: immediately serve notice of intention to discontinue service delivery after 14 days and immediately after the notice period disconnect the supply of any services to the consumer and institute legal action for the recovery of the amount due.

There is provision for extension of time (not more than 12 months) for the payment of overdue accounts but such arrangement must include signing of an agreement. This agreement must include consent by the consumer that any service supplied according to a pre-payment system may be discontinued as a measure to enforce the terms of the agreement.

The Municipality charges interest on all outstanding amounts at a rate 1% above the prime bank overdraft rate as charged by the financial institutions as adjusted from time to time. The consumer is responsible for all costs incurred in order to collect overdue accounts. The consumer will be subjected to punitive measures approved by the municipality in the event that the consumer is guilty of unauthorised consumption, theft or damage to municipal property and immediate termination of the supply of services to the consumer will be implemented.

As a last resort, all cases where arrangements and judgements are ignored are handed over to the Municipality's attorneys.

The Municipal customers are divided according to geographic considerations with a "township supervisor" identified for each geographic area. The "township supervisor" who knows the socio-economic status of all household in his or her designated area keeps and updates the list of names and address of consumers, deliver monthly accounts to households and monitor the payment levels of their respective areas. They report to the Revenue Accountant on a daily basis.

Another member of staff, who reports to the Revenue Accountant is responsible for inputting data and managing the computer records. This person works closely with the Township Supervisors.

Fault identification, reporting and repair system: The small but efficient team of four checks on the system on a daily basis and repairs are done immediately when the need arises. In some instances consumers report problems which are solved within an hour. There has been no reported case of malfunction of the meters.

5.6.5 *Political interference*

There has been no political interference in the operation of the system. Our interpretation of this is that, in practice, in spite of the existence of well developed procedures for dealing with defaulters, in practice the system is operated very leniently, hence the rate of only 62% payment. This practice of leniency by the administration has reduced conflicts with the consumers and hence the absence of political interference.

5.6.6 *Significant Features in Support of Better Cost Recovery*

With a repayment level of 62%, there is room for improvement. Officials of the municipality admit that the introduction of pre-paid meters will go a long way in assisting in cost recovery. The IDP includes the installation of a pre-paid meter system but for lack of funds this plan may not be implemented within the next five years. Some of the consumers intimated us that a pre-paid meter system will help them plan and budget for water and that poor and improper billing will be eliminated.

To address the problem of wastage and failure to generate income from water consumed from standpipes, the new water management system plans to replace all standpipes with metered tanks with restricted flows.

5.7 MIDDELBURG, MPUMALANGA

5.7.1 *Background*

Middelburg is a medium sized industrial town in the Highveld region of Mpumalanga. In 1994, losses of up to 76% were experienced from the black townships, which accounted for 110 000 persons out of a total population of 140 000 of the then TLC.

The Council decided to conduct a survey to identify the consumption patterns, incomes, and other data, so as to be able to respond appropriately to a situation of default.

The housing to which the case study relates is conventional “township” housing, with mostly individual connections.

In 1994 there were many squatters, living in appalling conditions. By 2000 these had all been eliminated, and re-housed in RDP housing. Similarly, the hostels, which were perceived to be a hotbed of crime, were demolished and the residents given stands.

5.7.2 *Description of Service*

In 1994 the situation presented a number of difficulties. Service charges were charged at a flat rate, with consequent lack of incentives on behalf of the users to economise. In addition there were massive problems with illegal connections of electricity: about R70 000 was being lost monthly due to this.

The first decision was to install pre-payment electricity meters. These were generally welcomed by the users. At the time this was done, pre-payment meters were not common, and it was found difficult to obtain a sturdy tamper-proof model. However, a relatively good system came on the market at the time which was adopted. In those days, pre-paid meters were not in conformity with the Electricity Act, so the TLC had to develop and adopt special by-laws.

Water meters were also installed at the same time so that everyone pays for what they use. Charges for sewerage and refuse removal were also modified to reflect the size of the erf. One of the most important reforms was the introduction of a system of electronic system for recording meter readings. This forces the meter readers to make the reading and can quickly detect any errors. The system gives the public confidence in the accounts rendered.

Electricity meters were installed inside the house so that the residents would be responsible for their maintenance.

Maintenance: The Council aimed at a quick and efficient method of dealing with maintenance problems. A 24-hour service was introduced, and response was normally within 30 minutes.

5.7.3 *Community Involvement*

The Council took a very firm line with regard to consumer relations. This was that, if the war against non-payment was to be won, there had to be co-operation between the parties, and that all Councillors should stand behind the policy. This meant taking very unpopular decisions: they learned from the experience of Witbank where the Chair of the Executive Committee had given instructions that disconnections should cease after a demonstration by the residents took place. This had totally destroyed that Council's efforts.

In Middelburg there had been divisions between Councillors and between Council and SANCO, but these had been resolved, so that all parties spoke with one voice.

In implementing the policy, they had taken the position that mass cut-offs were not the answer, and that they should be treated as a personal matter. Theft – mainly in terms of illegal electrical connections was dealt with very firmly – and those who did so were charged R1 200 for reconnection. Informers were paid R300 for information on illegal connections. The SANDF was brought in to protect distribution boxes.

At the same time, Council made payment easier in a number of ways, and introduced many extra pay points.

The Council is against sale of houses in execution, and will only do this in extreme circumstances.

5.7.4 Financial Aspects

Level of payment: These measures meant that, from a payment level of 35% in 1994, by 1998 about 98% were paying.

Tariffs: A sliding scale tariff was introduced to encourage careful use of water. This tariff has since been modified to incorporate the need for free basic water usage of 6kl, and reflect increased price levels:

Table 5.3: Sliding Tariff Scale and Modification to Incorporate Free Basic Water

Amount	Previous (R/kl)	Amount	Current (R/kl)
First 5kl	0.70 per kl	First 6kl	Free
5kl – 40kl	1.20 per kl	7 – 10kl	2.10 per kl
Above 40kl	1.40 per kl	10 – 40kl	2.76 per kl
-	-	Above 40kl	2.90 per kl

A similar approach was taken in regard to electricity tariffs. Consumer agreements were introduced and signed by each and every consumer.

Assessment rates were set at 7c in the Rand: personal residences were given a 40% discount, and pensioners 60%.

A detailed income survey was used to identify the indigent, who were classified as earning less than R800 per household. Indigent families were given basic services free of charge. However, the households were subject to random checks to ensure that their economic circumstances had not changed. 40% of the households fit into that category.

5.7.5 Political interference

The outstanding characteristic of the system in Middelburg has been the good relationships between the stakeholders in spite of the application of quite strict conditions. In terms of the relationships between staff and Council, for many years the Council has been a strong supporter of firm treatment of defaulters which explains the very substantial increases in recovery rate in the late 1990s.

5.7.6 *Significant Features in Support of Better Cost Recovery*

The Council has a policy of upgrading infrastructure in low income housing areas as a reward for good payment. Thus, while in 1994 there were few tarred roads in the townships, the Council responded to improved payment levels by tarring the roads. By 2000 most roads had been tarred. Additional pay points may be provided from trucks.

Since the increase in the boundaries of the municipality in December 2000, there have been additional challenges. Some of the areas were what were known as Eskom towns, which were built by Eskom and occupied by its employees. These areas have caused very little difficulties as their monthly charges are paid directly by Eskom, an extremely cost effective system which, unfortunately, few other employers are willing to use.

The other situation is of particular interest here. Hendrina was a small town with an income of about R20,000 a month from its water and rates accounts. Within six months this had been increased to R800 000 per month, even R1 million at times. The municipality's explanation for turn-around was:

- Before the amalgamation, teams were sent to Hendrina to prepare them for the change.
- Ensure that meters are read correctly – the previous contractor responsible for meter reading had not bothered to read, and accounts were all based on estimates.
- Be strict in terms of cutting off supply (by fitting flow restrictors) if people did not pay.
- Enter into agreements with the consumers to pay off their arrears (of which there were very many).
- Increase service delivery, including water, roads and electricity, and improve the quality of the water purification.
- Provide better and easier payment facilities

CHAPTER 6: CONCLUSIONS

6.1 BACKGROUND

This study's principal aim has been to account for differences in municipal cost recovery outcomes, with particular attention to issues related to the provision of basic water services to low income households. South Africa has a history of inequitable distribution of water services, skewed by racially discriminatory policies and severe socio-economic inequality. With the advent of democracy, all South Africans were granted constitutional rights to access to basic social and economic services. The government expressed its commitment to these rights' realisation in its Reconstruction and Development Programme, which (among other things) aims to deliver basic water services to all — with the pace of implementation subject to the availability of financial resources. The Department of Water Affairs and Forestry's (DWAF's) 1994 white paper paid careful attention to the financial dimension of service delivery. Drawing on then-dominant thinking in international development organisations, its approach was premised on the recovery of recurrent (operation and maintenance) costs of service provision. DWAF's own limited resources could therefore be devoted to capital expenditure on expanded basic service infrastructure. Some allowance was made for municipalities to offer subsidised "lifeline tariffs" to the very poor, but financial responsibility of these subsidies was assigned to municipal governments. Successful cost recovery through user fees was thus essential to the 1994 DWAF approach to redressing historical inequalities in the provision of basic water services in South Africa.

This study was inspired by the practical challenge of achieving successful cost recovery. Within a few years of initiating its major campaign to extend basic water services, DWAF recognised that difficulties securing user payments threatened the financial viability of existing and planned RDP projects. Yet despite the generally bleak picture, cost recovery in some municipalities was substantially better than in others. If the sources of success could be identified and transferred to those experiencing difficulties, the cost recovery challenge could conceivably be met. The analytical problem was the availability of so many plausible explanations for difficulties in achieving cost recovery. One set of factors is related to the local social and institutional context. Poverty and socio-economic inequality — along with the historical legacy of popular resistance to local authorities, giving rise in many areas to a "culture of non-payment" for municipal services — pose heavy obstacles to successful cost recovery. A second set of factors is related to characteristics of service infrastructure, with some touting technical solutions to problems of non-payment — including pre-paid meters and regulated-flow tanks. A third set of factors encompasses a range of billing and payment practices — such as tariff schedules, incentives for payment and penalties for non-payment, the convenience of payment facilities, and overall administrative efficiency. While many studies have been conducted in South Africa and internationally that either explore a subset of these potential determinants of cost recovery outcomes or focus on a few local case

studies, there have been very few efforts to look at underlying causal process more comprehensively and systematically.

Multivariate statistical techniques were used to estimate a causal model of cost recovery outcomes. The model was developed by drawing insights from prior international and South African research on cost recovery. Rather than treating the various factors put forward as competing explanations, they were integrated into a single causal model (see chapter 3). Key concepts in the model were then operationalised and measured for a sample of 310 municipalities — comprising more than 40 percent of municipalities involved in water service provision, as well as more than 40 percent of municipal water consumers. The dataset linked newly collected national survey data on cost recovery outcomes, service infrastructure, and billing and payment practices with municipal social profiles calculated from the 1996 census (see chapter 4). Multivariate statistical techniques were then used to estimate the model, making it possible to identify the effects of each causal factor (or determinant) while holding the others constant. Major findings of the statistical analysis were presented by simulating the effects on cost recovery of altering various features of a typical South African municipality.

The statistical study makes three important contributions to the understanding of cost recovery in South Africa. First, the collection of a dataset on cost recovery outcomes and determinants provides a very valuable descriptive “snapshot” of cost recovery in the water sector just before the municipal restructuring of December 2000. Previous research on cost recovery in South Africa has lacked such a broad empirical foundation, tending to rely exclusively on much smaller numbers of local case studies. By contrast, the results presented in this report are based on the “hands-on” experiences of a large and diverse cross-section of municipalities. They therefore yield practical lessons that can more readily be applied countrywide. Second, the estimation of a multivariate causal model incorporating a range of potential determinants of cost recovery makes it possible to arbitrate in a systematic and empirically grounded way among the many hypotheses advanced in previous research. By measuring the effects of each determinant while holding the others constant, the statistical analysis helps to distinguish causal relationships from simple correlations. Third, the use of simulations to illustrate findings showed that even fairly technical analyses can be presented in an accessible way that clarifies their practical value. Despite the complexity of the causal model and statistical techniques used, this report arguably provides more straightforward and concrete guidance to those seeking to achieve improved cost recovery than much previous research has.

The remainder of this chapter proceeds in two sections. The first summarises major findings of the National Survey, and outlines some of their implications for future efforts at cost recovery, including discussions of the changes resulting from the national government’s adoption of a “free basic water” policy and municipal restructuring associated with the demarcation process. The second outlines the findings from the four case studies undertaken. A few concluding remarks follow.

6.2 MAJOR FINDINGS FROM THE NATIONAL SURVEY

This study has sought to disentangle the complex processes that influence cost recovery outcomes. By explaining why some municipalities are more successful than others, the findings can be used to inform the development of more effective cost recovery strategies. The main sets of causal factors or determinants considered were social and institutional context, service infrastructure, and billing and payment practices. The study identified several factors within the control of municipalities and their service-providing agents that substantially affect cost recovery. Simulation results showed that an otherwise typical municipality could improve its payment rate on the order of 36 percent and its debt ratio by about 27 percent by replacing specific “worst practices” with “best practices.” Most municipalities do not pursue “worst practices” across the board, and so they are not likely to achieve increases this dramatic. Yet the findings do show that cost recovery outcomes are not determined by forces of nature, but instead are highly sensitive to decisions and actions taken in particular municipalities. At the same time, the findings identify and quantify formidable constraints on successful cost recovery — particularly constraints related to poverty and socio-economic inequality. An unfortunate conclusion was that — although much can be done to improve cost recovery — the extension of basic services to poor consumers will almost always worsen cost recovery outcomes (all else being equal). A strategy of redressing the legacy of inequitably distributed water services premised on successful cost recovery from direct beneficiaries therefore seems to rest on very shaky empirical ground.

Perhaps the defining characteristic of successful cost recovery is the strict imposition of service restrictions to penalise non-payment. Simulation results showed that a municipality that does not currently penalise non-payment can improve its payment rate by about 14 percent and its debt ratio by about 13 percent simply by implementing a policy of restricting services to defaulters within 90 days of their accounts becoming overdue. The credible threat of restricted services apparently exerts the expected effect of encouraging consumers to keep their accounts up to date — as reflected in superior payment rates. Service restrictions have an additional favourable effect with respect to debt ratios, since they prevent chronic defaulters from continuing to consume above a very basic level.

The effectiveness of penalties for non-payment depends partly on characteristics of service infrastructure. The broadest distinction is between private connections and public taps. Private connections allow penalties to be targeted at defaulting households — penalties which may include severe flow restrictions or even disconnection (legal only if other basic water services are available to the household). Restricting services to consumers who use public taps to penalise non-payment is more problematic. Some consumers using a particular tap may pay while others do not. Flow restrictions or disconnections would, in such cases, penalise payers and non-payers indiscriminately. Water committees or other local organisations might be able to restrict access to taps selectively, but the statistical results showed that municipalities with higher proportions of private (and metered) connections generally achieve better cost recovery outcomes (all else being equal).

In a typical South African municipality, approximately one in five water consumers lacks a private or metered connection. By upgrading infrastructure so that all consumers have private, metered connections, the simulation results showed that payment rates and debt ratios for the municipality as a whole could be improved by about 5 percent.

Several billing and payment practices were also shown to influence cost recovery. Three whose effects were considered together were introducing a progressive tariff schedule, providing payment facilities at supermarkets, and running an active Masakhane campaign. Progressive tariff schedules mitigate affordability constraints by charging larger (and usually higher-income) consumers higher unit prices than smaller (and usually lower-income) consumers. Providing payment facilities at supermarkets (though not an equally feasible option for all municipalities) makes payment more convenient, especially for those who work during office hours and have limited access to formal banking services such as cheque accounts and debit orders. Masakhane campaigns offer collective exhortation and incentives for payment. Together, the introduction of these three billing and payment “best practices” raised expected payment rates by roughly 19 percent, with more modest effects on debt ratios of 8 percent. Although these practices induce significant behavioural changes in encouraging a “culture of payment,” on financial grounds alone their benefits only amount to about half those associated with imposing strict penalties for non-payment.

The main constraints on cost recovery highlighted by the analysis are related to the impact of poverty and the infrastructural characteristics associated with basic service delivery. Consumer poverty alone has negative effects on cost recovery, as it increases the likelihood that affordability considerations will discourage payment. Expanding services to the poor worsens the poverty profile of the consumer base. Meanwhile, it is also generally characterised by increasing reliance on public and unmetered connections and puts greater strain on those who administer billing and payment systems. Unfortunately — but predictably — the practice of extending basic services to the poor is strongly associated with declining cost recovery outcomes. Simulation results showed that a typical municipality initiating basic services to poor consumers equal to one tenth its existing consumer base would generally produce a decline of about 5 percent in its payment rate and 3 percent in its debt ratio. A strategy of financing the expansion of basic services through successful cost recovery from the direct beneficiaries is thus based on empirically suspect foundations.

In summary, this study’s findings provide an informed basis for understanding the effects of a range of municipal characteristics on cost recovery outcomes. Although the simulation results assumed a generic “typical” municipality, the findings could be “customised” to reflect an infinite number of social and institutional, infrastructural, and administrative profiles. The findings thus serve as a valuable guide to assessing current cost recovery performance or for developing effective cost recovery strategies for the future. Two major changes in the policy and institutional environment in which attempts at cost recovery take place make such information particularly crucial — the adoption of a policy of “free basic water” for the poor by the

national government, and municipal restructuring through the demarcation process. Most municipalities will be forced to do thoroughgoing reviews of their approaches to cost recovery in response to these two changes, and they therefore need to be able to formulate informed expectations about the implications of various measures for cost recovery.

6.2.1 Implications for Meeting the Cost Recovery Challenge

This study began by seeking to explain why some municipalities achieve more successful cost recovery than others, and it has moved toward offering practical prescriptions for the development of more effective cost recovery strategies. The single factor most central to achieving higher payment rates and more favourable debt ratios is the strict use of service restrictions to penalise non-payment. Complementary measures include upgrading service infrastructure to private, metered connections (particularly where consumers are willing to contribute financially to the cost) and adopting various billing and payment “best practices” — such as progressive tariff schedules, offering convenient payment facilities, and pursuing collective campaigns such as Masakhane. Implementing these measures is costly, and the challenge for individual municipalities is to choose the mix that will deliver the most cost recovery with the least cost. What the study offers is a set of informed expectations about the likely effects of a wide range of municipal characteristics on cost recovery outcomes. These will be particularly valuable as municipalities seek to adapt to a new environment, in which the national government has recently adopted a policy of “free basic water” for the poor and the new municipal structures created by the demarcation process have just become operative.

6.2.1.1 “Free basic water” for the Poor

An important challenge currently faced by municipalities is to implement the new policy of “free basic water” for the poor. Although national government initiated this policy, responsibility for its implementation falls firmly on the shoulders of municipal governments. The policy represents the sharpest break yet with a cost recovery framework in which each household is expected to pay the costs of the services it consumes. The 1994 DWAF white paper provided some flexibility by allowing “lifeline tariffs” requiring the poor only to pay recurrent (operation and maintenance) costs — with the implicit subsidy being carried by consumers paying the “normal” tariff.⁶² The “free basic water” policy goes much further — first by suggesting that poor consumers pay nothing (rather than a subsidised rate) for basic services, and second by creating an apparent obligation for municipalities to implement some policy of “free basic water” (rather than merely giving them the option of doing so).

A draft framework for the implementation of “free basic water” prepared for DWAF seems to indicate that municipalities will be left some discretion even to define some

⁶²DWAF, “White Paper on Water and Sanitation,” 22.

key concepts — such as what service is regarded as “basic” (and therefore free). However this discretion is exercised, almost all municipalities will need to make substantial changes to their approaches to cost recovery in order to implement “free basic water.” The most direct requirement will be adopting a more progressive tariff schedule — a necessity as, with an average unit price of zero assigned to a “basic service,” average unit prices will have to be greater for consumption above “basic.”

What are the implications of this study for the implementation of “free basic water”? There is some good news. First, the study has shown that adopting a progressive tariff schedule may lead to an improvement in payment rates and debt ratios. Municipalities that until recently had regressive tariff schedules — typically in rural areas that levy a monthly service charge in addition to consumption-based charges — are the most likely to benefit in cost recovery charges, as progressivity tends to mitigate the adverse effects of affordability constraints on consumers. Second, the study has confirmed that cost recovery for basic services is already quite poor, so the actual cost of making those services free is much lower than it would be if current payment rates were high. If, as it appears, roughly 30 percent of households without private connections pay their water bills regularly, adopting a “free water” policy for this category of consumers costs only 30 percent as much as it would if all households were currently paying. Moreover, making such services free saves the cost of administering billing and payment systems for these consumers.

Far from making cost recovery irrelevant, a “free basic services” policy places even greater priority on achieving high rates of payment from those consuming more than basic services. Fortunately, the behaviour of this segment of consumers comprise those less likely to fall below the poverty line and more likely to have private and metered connections — tends to be more sensitive to the imposition of penalties for non-payment and other billing and payment “best practices.” Meanwhile, there is a danger that a “free basic services” policy will further discourage cash-strapped municipalities from extending services to the poor. This study has shown that even without such a policy, the extension of basic services is strongly associated with worsening cost recovery outcomes. Yet without any prospect of revenue generation, the net cost of extending services will be even greater. National policies to reward the extension of basic services to the poor may need to be developed to counter the opposing tendencies created by the “free basic services” policy.

The matter of operationalising the “free basic water” principle within the recently demarcated new municipalities and their detailed implications for cost recovery will be addressed in more detail in a follow up study by Sigodi Marah Martin. This has already been commissioned by the Water Research Commission (WRC).

6.2.1.2 Municipal Restructuring (Demarcation)

A major process of municipal restructuring was initiated with the promulgation of the Municipal Demarcation Act and the Municipal Structures Acts of 1998. A thrust of this process was to reduce the number of municipalities from more than 800 to less than 300. Many boundaries were redrawn, and existing municipalities were

amalgamated into larger units, which came into existence to coincide with the municipal elections of December 2000. A result of the process has been to create new municipalities with more socially and institutionally diverse legacies than their predecessors.

With the introduction of new municipal units, cost recovery strategies will have to be reviewed — especially as multiple inherited billing and payment systems are integrated into more unified ones. What are the relevant implications of this study? First, it makes it possible to estimate the effects of changing social and institutional contexts on cost recovery outcomes — valuable information as municipal officials take on the task of administering new units. Second, it provides some insights into the likely consequences of the increased size of most of the new municipalities. One rationale for restructuring was to improve administrative efficiency and effectiveness through greater centralisation of municipal governance. Yet one of this study's findings suggests that this favourable outcome should not be taken for granted. Under the previous structures, larger municipalities tended to suffer significantly worse cost recovery outcomes than their smaller counterparts (all else being equal) — possibly reflecting the heavier burden of managing and administering larger billing and payment systems.

Whether the larger size of the new municipalities ultimately helps or harms administrative performance, it is likely to facilitate the intra-municipal cross-subsidisation required to implement “free basic water” policies — since it broadens the municipal “pools” across which redistribution can take place. However, even the implementation framework prepared for DWAF recognises that some municipalities will still lack the financial capacity to provide “free basic water” without national-level financial assistance. The quite restrictive notion of cost recovery embodied in the 1994 DWAF white paper has been replaced by a more expansive one in which intra-municipal cross-subsidisation is endorsed and an enhanced system of supra-municipal financial transfers is probably required if “free basic water” is to be provided countrywide. With the combination of municipal restructuring and “free water” hitting almost simultaneously, municipalities will have to think in very innovative ways about how best to recover the costs of providing water services to their residents.

6.3 MAJOR FINDINGS FROM THE CASE STUDIES

A number of very interesting similarities have emerged from the case studies which suggest a basis for a code of best practice. These are:

6.3.1 *Preliminary Phase*

Community perceptions with regard to cost recovery are a very important factor in successful cost recovery. These perceptions will be strongly influenced by the conduct of the municipality over a period of time. The example of Mogale (Krugersdorp) is very interesting in this respect: before introducing pre-paid meters

the Council adopted a policy of enforcing cost recovery, and implemented it strictly. This resulted in many households having their water cut off. This created a situation in which people welcomed a system which did not allow debts to get out of hand: the use of pre-paid meters was such a system. Therefore the new meters were either welcomed, or if not, tolerated, by the residents as a system that was obviously fair and easy to understand.

Secondly, the Council demonstrates its good faith by making investments in infrastructure and upgrading plumbing. Examples of this are that, in Durban, reticulation was replaced where high water losses were being experienced, and individual connections installed. In Krugersdorp, the council embarked on a similar exercise, also repairing internal plumbing and replacing outdated WC cisterns so as to reduce water losses. At the same time, residents were told about the importance of attending to leaky taps etc if they wanted to keep their water bills low.

6.3.2 Community Involvement

Such a carrot and stick approach must be supported by community interaction. Municipalities must provide dedicated and well-trained staff to communicate with the communities, and act as a go-between between them and the municipality. They should assist residents to be aware of how a council operates: what rules are being used, how water consumption is measured, the different ways of paying for water, budgeting and the like.

It is not unusual for people to confirm their acceptance of a new way of doing things only to change their mind later. This means that a campaign cannot be considered to have been completed unless a certain time has elapsed. During this time individual households must be visited and the situation explained, but the community must also be involved through its leaders and through public meetings.

There are many examples of one approach being adopted but subsequently rejected. For example in Durban recently where people were being asked to change from flat-rate payment to metered billing, individual households confirmed that they were willing, but later retracted as the matter had not been agreed at the community level.

Durban has a comprehensive public relations programme to make information readily available. However, it must be pointed out that information is not always enough. There are cases where perceptions of unfairness and/or incompetence override information and lead to strong protests. People must have a person to go to, preferably in a local office, with any question or problem, and must have the sense that that person will take up their case.

6.3.3 *Billing*

The following applies only to schemes where pre-paid meters are not used, and is based on a compilation of the experience from Durban, Adelaide and Middelburg.

Water is only one of the services supplied to municipalities, and it is normal to include other charges in the water account. These are typically refuse removal, sewerage and assessment rates. The popular conception is that the water bill is only for water, and some people have difficulty accepting that, for example, where they are not using water they are still liable to pay for other services. The situation is further complicated by the principle of free basic services. Furthermore, where a consumer does not pay, it is generally considered unconstitutional to cut off the water supply totally.

For this reason it is generally considered desirable for electricity to be linked to the water account, and for both services to be billed together. This is the practice in parts of Durban, and in Adelaide. However, problems occur when the account is not paid in full: the customer may perceive that payment to be for water or electricity, whereas the municipality may put it down to assessment rates (as is the practice in Durban).

These problems are mitigated by linking electricity to the water account. By so doing, if the account is not paid a utility that is highly prized, but not essential for life, namely electricity, can be cut off. Such action results in a quick response from the consumers.

In many areas, however, this is not possible, either because the electricity is supplied by Eskom, or is supplied through pre-paid meters. The response in Middelburg, where pre-paid electrical water meters are in use, has been that if a person is in arrears for the water bill, then a block is put on that person's electricity account so that he or she cannot buy more electricity.

If possible water and electricity should therefore be included in the same bill, so that electricity can be cut off instead of water. If this is not possible a link should be made between electricity and water so that a defaulter runs the risk of both being terminated.

6.3.4 *Administration*

The quality of administration makes a large impact, and the municipalities included in the case studies share a commitment to good administration. This has a number of qualities. It must be:

- **Responsive**
A responsive administration is one that takes the concerns of all consumers seriously, and does not ignore anyone, no matter how troublesome or

ignorant that person may seem to be. The seeds of defiance and confrontation are often sown by apparently small incidents, such as the rudeness of a staff member.

In a responsive administration, if matters appear to be going wrong, the plan will be changed to respond to the situation. Krugersdorp and Durban both faced massive protests due to incomplete commitment by the community to a course of action. Both municipalities then stopped implementation, and renewed community consultation. Several months were so lost, but the long-term benefits gained by community co-operation outweighed the short-term difficulties.

- **Convenient**
Opening payment facilities at times when working people can pay and allowing payment through the post office, banks or supermarkets make it much easier for people to pay.
- **Clear**
All administrative actions must be understood by the consumers: it is not enough to get someone to sign a form and expect them to read the small print. Even well educated people rarely do so: how much more unrealistic is it for illiterate or semi-literate people to do so.

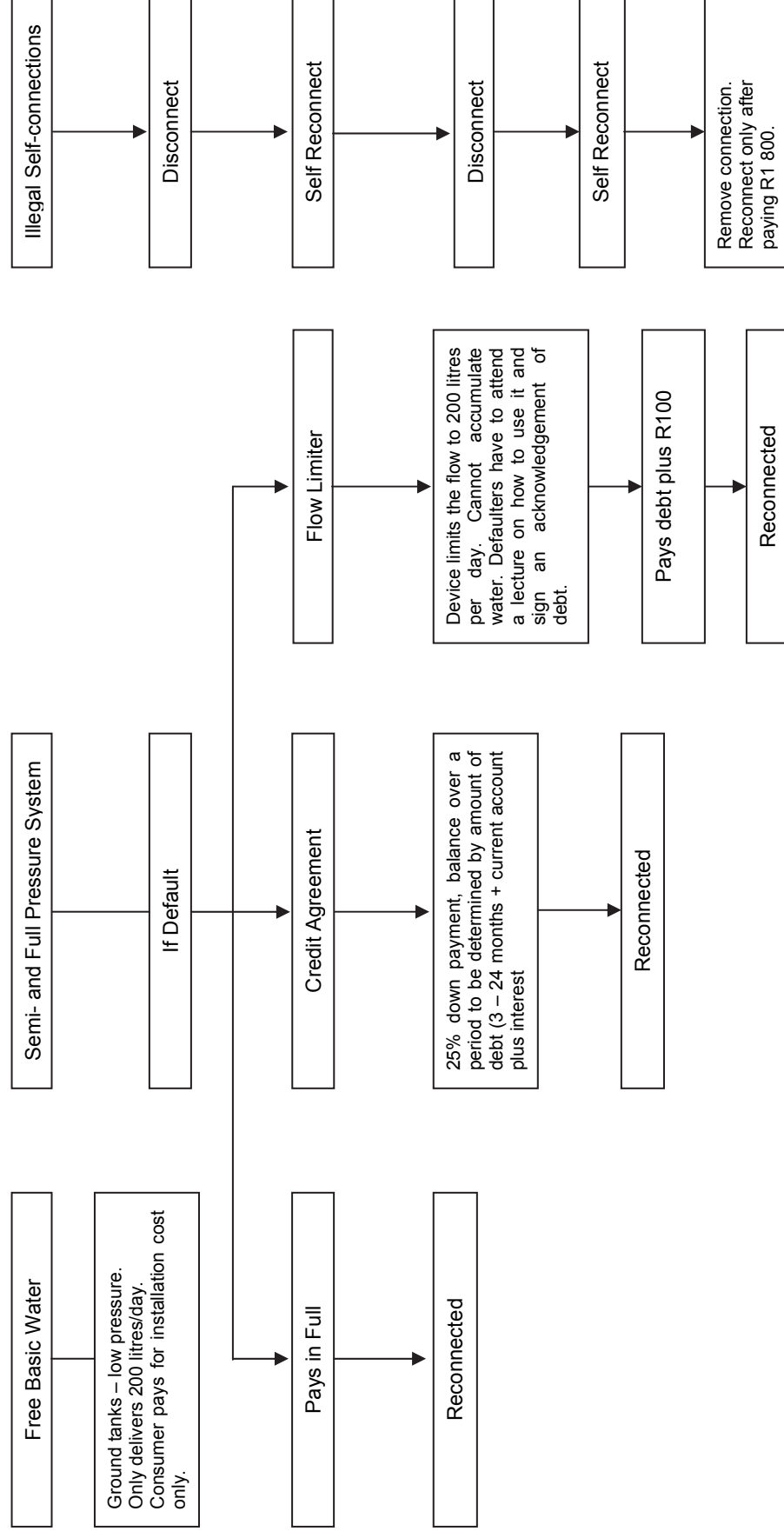
Therefore whenever a new system is being introduced, or people are signing agreements to obtain a service, the system must be explained in their own language, and they must be given an opportunity to ask questions. It seems that Durban has been particularly good in this respect, but it must be made clear that communication is not done only through formal channels: informal ones are also important. Thus community meetings in which nothing is exchanged in writing may be more efficient at communicating information than written material such as leaflets.

A useful example of the process which is followed in Durban is given on the following page.

- **Consistent and unified**
The starting point of consistency is that policies must be fully developed and clearly set out before implementation begins. Secondly, consistency communicates itself through good training of the staff. In this way, all members of staff communicate the same message, which is one which will be respected. It is essential that there is also consistency between the information provided by the Councillors and the staff.

It is therefore essential that all persons involved agree on the policy objectives and practice. Any differences between council, the staff and the contractors will quickly impact on the rate of cost recovery. It is notable that in all four cases, Councillors were prepared to make tough decisions in terms of enforcement, and backed firm administrative action.

Figure 6.1: eThekweni Water Services: Procedures for Dealing With Defaults and Illegal Connections



- **Fair**
Fairness is the keynote for all good administration. Unfortunately perceptions of what is fair may differ from the perspective of the Council and the consumers. For Council staff, fairness will often begin and end with setting up rules and following them: fairness in this context means “We’ve shown you the rules. You have signed an agreement to abide by them. If you break the rules, it is fair for us to follow the rules and impose penalties on you”. For the consumer, fairness will more likely mean that someone listens to their situation, and responds, even if it means that they *break* the rules. For example, when Durban agreed to accept payments for the current month only, and put aside the long-term debts for the time (but not forgiving them), this may have been an example of fairness from the perspective of the consumers.
- **Prompt**
Promptness in dealing with problems, whether physical problems such as leaks, or disputed bills shows respect to the consumer and is repaid by positive attitudes from the public.

6.3.5 *Treatment of Defaulters*

We have noted above the need for fair and consistent administration. In this section we examine the specifics of good practice.

- **Deposit**
All consumers should pay a deposit for their water connection. In most cases this is fairly small, say R50, but is sufficient to indicate a commitment to pay. It also acts as a modest insurance policy for the municipality, though in most cases is not sufficient to cover normal cases of default.
- **Personal contact**
Water or electricity cut-offs are the most effective tool for getting consumers to take action: the first step is for them to go to a municipal office and complain. At this stage there are three options:
 - the person pays the account in full, and the connection is re-instated
 - the municipality agrees to re-connect under conditions
 - the person cannot pay and cannot meet the conditions: therefore the cut-off remains in force.

The important aspect here is that the people at the municipal offices must be trained to listen to the individual’s problems, and offer solutions that are acceptable to both sides. If the defaulter leaves the encounter feeling in some way obliged to (or in the debt of) the municipality, the chances of the consumer breaking the agreement are much reduced.

- **Second chance**
The second option above is the norm in three of the case studies referred to above (in Krugersdorp, with pre-paid meters the situation only arises where the meter has been tampered with or bypassed).

The normal procedure is for the person to be given an option of either paying off the whole amount, or paying something and agreeing to have the remainder added to the monthly account in installments spread over a period. This is usually acceptable to most people, who feel that their problems have been listened to.

However, as so often with installment agreements, sometimes meeting the extra costs is easier said than done. In this case the normal practice is to cut off the full water supply, and replace it with a flow restrictor which allows only a trickle through the pipes. This is a great inconvenience to the household, but at least gives them access to clean water for basic requirements of hygiene and cooking.

In Durban there is a graduated system which allows a person who cannot afford a specific service to accept a lesser one: e.g. to change from roof tanks and ground tanks (where such options are available), which allows even more room for negotiation.

One of the common complaints by consumers when faced with large bills is that they did not use so much water. When they come to raise such complaints, the municipality can offer to check the house for leaks (a service that Krugersdorp offers), and if such leaks are found may even offer to charge at a lower tariff (e.g. not the highest marginal rate). They can also offer either to repair the leaks (in Middelburg the council offers this service) or recommend authorised plumbers.

- **Willingness to take strong action**
All municipalities concerned are willing to take strong action if the defaulter reneges on an agreement, or vandalises or bypasses the meter (as discussed below). In such cases, in Middelburg the water is cut off completely. In Durban, after due warning, a flow restrictor is placed on the pipe and only a trickle of water results (as described above). In Krugersdorp, a letter is sent giving a last chance: if no payment is made, a contractor removes the meter and blocks the connection. To get re-connected, the consumer must pay all arrears and a reconnection fee.

6.3.6 *The Problem of Vandalism and Illegal Connections*

Inevitably, one of the responses by consumers is to try and bypass the meters. This is most likely in two situations: prepayment meters and after disconnection. No clear incidences of preferential treatment were either offered by officials in the national

survey or picked up during case study discussions. However, that is not to conclude that such actions did not take place.

- In the case of prepayment meters, they may try to tamper with it: for example in the earlier versions of the Conlog meter used in Krugersdorp it was possible to stop the meter deducting money from the card by inserting a clothes peg. The municipality can monitor expenditure on every household, and it is quite easy to see if the pattern of consumption changes dramatically. If so, a field check can be used to determine what has been done. In such situations it is essential that the consumer knows that there are heavy penalties for tampering (R750 in Krugersdorp), and that failure to pay that penalty will result in the connection being discontinued altogether.
- In cases where the supply has been restricted due to failure to pay an account, the obvious temptation is to get a plumber to remove the flow restrictor. Alternatively where a household finds the water bill too high, to bypass the meter. In such cases the municipality should be able to detect the illegal tampering by monitoring accounts, and/or by field checks of households that have been placed on restricted flows. It then imposes a fine.

Vandalism is a different situation. It is sometimes difficult to prove who is responsible for damage to meters. In Krugersdorp, this problem has led the municipality to change its practice from installing meters at the road frontage of the property to having them close to the house, or inside it. However, if it can be reasonably deducted that meters have been vandalised, then the householder must pay a replacement fee of R1400.

In Durban defaulters have developed an ingenious system which causes the municipality great difficulties. They exchange meters from one stand to another. Because of this the meter readings cannot be properly logged, and the data system gets corrupted. Obviously such matters can be corrected, but they cause the administration many headaches.

6.3.7 *Technology*

In this section we discuss two aspects: pre-paid meters (as used at Krugersdorp) and flow limiters.

- **Pre-paid meters**
In one sense, Krugersdorp has paid the price of pioneering: the meters which they installed suffered from a number of faults which the manufacturer and the municipality have had to correct. These have included problems with the batteries, vulnerability to rain (which closed down the supply on occasion), and the potential for tampering. These problems have not been disastrous, but have been an unfortunate irritant for the consumers, and a cost for the manufacturers and municipality. It appears that the majority of these problems have been solved, but there is no doubt that the

sophisticated nature of the system means that it will always be vulnerable to technical problems.

As the technology matures, however, so can its electronic capabilities be more fully used. These include real-time readings which can be read centrally, and indicate the amount of water being sold. By comparing this with the bulk meter readings it is easy to check for major leaks and other unaccounted for water usage.

- **Flow limiters**
The technology of a flow limiter as used in Durban is also quite sophisticated. It is timed to open at 5 a.m. every day, and remain open until a total of 200 litres of water have been used. If less than that quantity is used in a day that surplus cannot be carried forward to the next day, but typically the limit is reached quite early.

However, problems have been experienced in terms of reliability and tampering, and the municipality is considering replacing them with simple restrictors placed on the pipe, which are far cheaper and have a similar effect, although in the long run they can deliver more than 200 litres per day.

6.3.8 Data

As systems become more and more sophisticated, data collection becomes easier. This allows monitoring of individual accounts as well as overall water use and income levels etc. While there is room for congratulation in terms of the recovery of current debts which is an important step forward for many municipalities, there remains a substantial minority of non-payers. Detailed age analysis of the accounts helps to focus the attention of the municipality on such cases, and target resources at those cases. This allows a better definition of which households are truly indigent and which are simply evading payment.

6.3.9 Overall legislative situation

An important point to note is that legislation regarding both water supply and local government has been introduced which limits the rights of Council to

- interfere with administration and/or
- introduce low tariffs for political purposes.

Interference

Under the Municipal Structures Act, 1998, Schedule 5 (Code of Conduct), section 11:

A councillor may not, except as provided by law-

- (a) interfere in the management or administration of any department of the municipal council unless mandated by council;

- (b) give or purport to give any instruction to any employee of the council except when authorised to do so;
- (c) obstruct or attempt to obstruct the implementation of any decision of the council or a committee by an employee of the council; or
- (d) encourage or participate in any conduct which would cause or contribute to maladministration in the council.

Unfortunately, enforcement of the Code must be done by the Council, and there remains the possibility for complicity in breaches of it.

Tariffs

The Water Services Act, 1997 includes the following:

Norms and standards for tariffs

10 (1) The Minister may, with the concurrence of the Minister of Finance, from time to time prescribe norms and standards in respect of tariffs for water services.

(2) These norms and standards may-

- (a) differentiate on an equitable basis between
 - (i) different users of water services
 - (ii) different types of water services, and
 - (iii) different geographic areas
- (b) place limitations on surplus or profit
- (c) place limitations on the use of income generated by the recovery of charges, and
- (d) provide for tariffs to be used to promote or achieve water conservation

(3) In prescribing the norms and standards, the Minister must consider, among other factors

- (a) any national standards prescribed by him or her;
- (b) social equity;
- (c) the financial sustainability of the water services in the geographic area in question;
- (d) the recovery of costs reasonably associated with providing the water services
- (e) the redemption period of any loans for the provision of water services;
- (f) the need for a return on capital invested for the provision of water services; and
- (g) the need to provide for drought and excess water availability.

No water services institution may use a tariff which is substantially different from prescribed norms and standards.

Municipal Systems Act, 2000

The most important aspect of this Act within the present context is section 74: tariff policy.

74 (1) A municipal council must adopt and implement a tariff policy on the levying of fees for municipal services provided by the municipality itself or by

way of service delivery agreements, and which complies with the provisions of this Act and with any other applicable legislation. . .

- (d) tariffs must reflect the costs reasonably associated with rendering the service, including capital, operating, maintenance, administration and replacement costs, and interest charges.

75 (1) A municipal council must adopt by-laws to give effect to the implementation and enforcement of its tariff policy.

81 (3) The municipal council has the right to set, review, or adjust the tariffs within its tariff policy. The service delivery agreement may provide for the adjustment of tariffs by the service provider within the limitations set by the municipal council.

In summary the legislation requires Water Services Authorities to recover the full costs of the water they supply. The elements of the tariff are in accordance with the items discussed above.

6.3.10 Conclusion

There can be no shortcut to successful cost recovery. It must be a broad-brushed approach involving technical, financial and community aspects. It must be implemented with a unity of purpose between the political and administrative arms of the municipality. Finally it must be seen as a sustainable means by which the standard of service delivery to the public can be enhanced.

These conclusions tie in closely with the evidence from the national survey. Predictors of success are individual water meters (in whatever form), prompt and firm response to non-payment, progressive tariffs, good community relations and convenient payment facilities.

6.4 CONCLUDING REMARKS

This study has sought to contribute to the understanding of the cost recovery challenge confronting the South African water sector. By identifying the main determinants of success and failure and quantifying their effects, it has contributed practical information to assist the development of more effective cost recovery strategies. It began with an analytical framework built on previous international and South African research, added a unique dataset collected for a large sample of municipalities through a national survey and linked to relevant census information, and used multivariate statistical analysis to estimate the effects of a range of factors that influence cost recovery outcomes. Moreover, the study was conducted at an opportune time, coinciding with the initiation of two major changes in the environment in which improvements in cost recovery are being sought — the national government’s announcement of a “free basic water” policy, and the municipal restructuring process associated with demarcation.

Yet while a major goal of the study has been to provide answers to key questions crucial to understanding and improving cost recovery in South Africa, in answering some of them it has also raised new questions for further research. Two areas are particularly promising. The first is to move beyond the abstraction of a generic “typical” municipality to use the statistical estimates in this study to inform more detailed analyses of cost recovery in specific, “real-life” municipalities. There is a tradition of case-study research on cost recovery in South Africa (and internationally), but such research has often proceeded without a clear picture of the broader empirical regularities that can be discerned much more precisely and reliably through statistical analysis. With this perspective, future case studies can be more focused — and hopefully contribute to the improved conceptualisation of subsequent statistical studies. The second area in which further research is likely to be fruitful is in continuing to track trends in cost recovery. This study is essentially a detailed “snapshot” of processes that are changing at a rapid rate. It will serve as a valuable “baseline” for comparisons with similar studies carried out in the future. For example, it will soon be possible to begin tracking the effects of developments such as municipal demarcation and the implementation of “free basic water” on cost recovery.

CHAPTER 7: SYNTHESIS OF NATIONAL SURVEY AND CASE STUDIES

7.1 PROJECT AIMS AND OBJECTIVES

The purpose/aim of the project is to identify the main causes (determinants) of successful cost recovery for water services in South Africa and to use this information in the development of practical strategies to overcome obstacles to cost recovery. The project objectives are to;

- i) conduct a countrywide audit of successful cost recovery examples of water services provision;
- ii) establish the institutional, social, economic and political contributions necessary for successful water service provision;
- iii) identify examples of successful cost recovery programmes that show the way forward;
- iv) conduct a synthesis of these findings and formulate guidelines for the water service sector, and;
- v) develop strategies for use by local authorities and other service providers to overcome the obstacles in achieving cost recovery.

7.2 MODUS OPERANDI

Diagram 30 illustrates the approach adopted by the project team in undertaking this project. With reference to Diagram 30, as Step 1, a concept paper was prepared to outline the field within which all discussions and investigations concerning cost recovery should take place. Issues such as costs, tariffs, incomes, equity, sustainability, administration, maintenance, responsibility and efficiency were all examined. Running parallel with the development of the concept paper was the detailed literature review shown as Step 2 in Diagram 30. A key question that was addressed was what specific costs have to be recovered and this involves a measurement of the quantity of water consumed and the tariffs to be applied to ensure that affordability considerations are satisfactorily met. Step 3 involved the establishment of the methodological approach to the project in terms of the proposed modus operandi. This was to ensure that a measure of consistency and rigour was applied to all the steps created in the modus operandi. Having agreed upon the modus operandi, a series of consultations took place between the project team and key stakeholder parties including the Department of Provincial Affairs and Local Government (DPLG), the Department of Water Affairs and Forestry (DWAF), SALGA and selected local authorities to confirm the logic and rigour applied to the modus operandi.

Step 4 involved the project team conducting a National Survey to establish an extensive database of experience. This database provided the project team with the opportunity to interrogate the interplay between the respective socio-political and institutional contexts, the selection of services infra-structure and the influence of billing and payment practices on cost recovery.

The questionnaire compiled for the national survey comprised some 30 questions of which 16 had structured (“multiple choice”) response options. Care was taken in the construction of the questionnaire to ensure that responding municipalities would provide meaningful information about cost recovery outcomes. In this specific regard lessons derived from the DPLGs project viability surveys were applied to this national survey questionnaire with some success. Respondents were requested to provide the best estimates wherever exact information was either unavailable or inaccessible. This resulted in the collection of at least one meaningful indicator of cost recovery outcomes for every responding municipality.

During November of 2000, questionnaires were sent out to all 830 municipalities that directly or indirectly provided water services to household consumers at that time. The first round of mailings yielded some 200 responses. A follow-up mailing in December delivered an additional 100 responses and when the survey was closed during mid-February 2001, the realised sample stood at 310. This represents 37,35% of the 830 municipalities, but 60,2% of the 515 self-administering municipalities. Overall, this represents more than 40% of all households receiving municipal water in South Africa.

The geographic and socio-economic composition of the sample is generally quite closely aligned with that of the national population. The social composition of the sample to a certain degree tends to support an observation held that municipalities serving higher levels of African and other poor groups of consumers were less likely to complete the survey questionnaire than those with larger percentages of white, coloured, Asian and racially unspecified households above the poverty line. This partly explains the Western Cape’s over representation of 21,94% of responses and the Limpopo’s 4,19% under-representation.

The National Survey focussed on three sets of primary determinants that influence cost recovery and these are the socio-economic and institutional context in which a municipality is situated, the service delivery characteristics in operation and the billing and payment arrangements and practice in use.

Originally the National Survey was conceived of as a “descriptive audit” of cost recovery practice. However, developments such as the changes to the institutional and policy environments including the intention by government to introduce “free basic water”, the amalgamation of municipalities resulting in the reduction of 830 municipalities to 237 and the overwhelmingly positive response to the postal survey by municipalities enabled the project team to embark upon a more ambitious and explanatory analysis of the data collected.

By extending the study, important insights were now possible regarding the development of strategies both for effective cost recovery in the new municipalities and for the financially sustainable provision of free basic services at the national level. It was accepted that statistical estimates of the determinants of cost recovery outcomes for the pre-demarcation municipalities could be used to establish informed

baseline expectations for cost recovery in the new municipalities while also identifying key interventions capable of improving performance. It was also considered that this would be particularly useful to municipal officials who will increasingly find themselves confronted with a greater measure of social, institutional and infra-structural diversity than before municipal restructuring took place.

Once the detailed analysis of the data had been completed and correlations made between the major clusters of determinants of successful cost recovery, it was decided to move on to Step 6. This entailed a more detailed explanatory analysis of the causal relationships between suspected determinants and their effects. Comprehensive detailed municipal profiles from the 1996 Census were merged with the extensive dataset collected during the National Survey to capture the diverse social and institutional contexts in which municipal cost recovery takes place. A multivariate statistical causal model was used to measure the effects of each individual cause (or “determinant”) of cost recovery while statistically controlling the effects of the others. Identifying such patterns contributes to the understanding of why some municipalities achieve better cost-recovery outcomes than others.

The findings show that much of the variation in municipal cost recovery outcomes, that is the differences in payment rates and debt ratios between successful and unsuccessful municipalities, can be explained by straightforward differences in the social and institutional context, service infrastructure characteristics and billing and payment practices.

Importantly, the results demonstrate that factors within the control of municipal officials can have a substantial effect on cost recovery success or failure.

7.3 MULTIVARIATE CAUSAL MODEL

By conducting the Causal Model the project team was able to make the following three important contributions to the broader understanding of cost recovery in South Africa:

- i) this new data set constitutes a most valuable descriptive picture of cost recovery just prior to the municipal restructuring of December 2000. No previous work has generated such a broad based hands-on empirical source of data drawn from such a diverse range of municipalities
- ii) the Causal Model also makes it possible to isolate causal relationships between numerous sets of determinants and
- iii) the use of statistical simulations clearly indicates that the results of fairly detailed analyses can be presented in an easily understandable manner.

The results generated by the simulations showed that possibly the most important factors that tend to improve cost recovery are firstly, the strict imposition of service restrictions to penalise non repayment. Secondly, municipalities with higher proportions of private (and metered) connections generally achieve better cost-recovery outcomes and thirdly, several alternative billing and payment practices

have been shown to improve cost recovery rates. These include a progressive tariff schedule, providing payment facilities at supermarkets and conveniently located situations and the use of an active Masakhane campaign.

Amongst the main constraints to successful cost recovery as highlighted by the simulations are those related to poverty and infra-structural characteristics. Consumer poverty alone impacts quite severely on cost-recovery as does the practice involving the provision of un-metered connections.

7.4 SELECTION OF THE FOUR CASE-STUDIES

Simulations from the Causal Model have isolated those various factors that exert an influence on effective cost recovery and these have in turn been used in the selection of the four case studies. Applying these factors together with the selection criteria referred to previously on page...? to the broad based sample of municipalities that responded to the National Survey, a group of four case studies illustrating successful cost-recovery practices were selected for follow-up detailed examination. The procedure adopted enabled the project team to search for a situation where for example the simulated prognosis for successful cost recovery was predicted via simulations within the Causal Model to be poor and evidence from the national survey of a reasonably good level of cost recovery in fact being experienced. Detailed follow-up discussions in that municipality provided additional insights concerning those specific reasons why cost recovery was being achieved.

The four case studies selected represent a range of size of municipality and composition of the socio-economic characteristics of its inhabitants; alternative service delivery (technology) features; past history of cost recovery practices; housing typologies present, and alternative reasons for successful cost recovery.

7.5 RELATIONSHIPS BETWEEN FINDINGS OF THE CAUSAL MODEL AND FEEDBACK FROM THE FOUR CASE STUDIES

Arising from a series of simulations conducted, three sets of simulations have been highlighted in that they are of significant importance since they focus on those factors that municipal decision-makers can conceivably influence, namely the upgrading of services infrastructure, introducing penalties for non-repayment and other selected billing and payment practices. An additional factor relating to a national policy imperative concerning the delivery of basic services to the poor has also been highlighted.

Simply stated, these simulations highlight the effects on payment rates and debt ratios by changing one or more of the features of a typical South African municipality. Differences between outcomes in “before” and “after” simulations are interpreted as the expected effects of the specific actions adopted to achieve cost-recovery. A typical municipality is a hypothetical one in which all characteristics are set to their sample means. Although these simulations could be run to match the

characteristics of any municipality, the use of the “typical” case helps illustrate general patterns of probable outcomes.

7.5.1 Simulation 1: Upgrading services infrastructure

The first set of simulations illustrate the effects of upgrading services infrastructure for the roughly one in five group of households to be found in a typical municipality without private metered connections (Census 1996). The “before” simulations assume a typical situation in which 82% of consumers have private connections and 78% have meters. Expected payment rates and debt ratios for such a municipality are computed to be in the order of 64% and 19% respectively. The “after” simulations assume that all household consumers have private metered connections. The average percentage improvement is estimated to be 5.2% and the debt rates increase is predicted to be 4,5%.

Decision makers in such a typical municipality could therefore expect that by upgrading one in five consumers to private metered connections would, all things being equal, its payment rate would increase by 5,2%.

Overall, it is argued that by upgrading services infrastructure alone, an increase in cost recovery can be expected without changing basic billing and payment practices. However, one will need to consider such a finding against the acute affordability situation prevailing in each respective municipality.

7.5.2 Simulation 2: Penalties for non-repayment

A second set of simulations illustrates the effects of using service disruption procedures to penalise non-repayment. Such penalties are often regarded as evidence of a municipality’s will and capacity to take unpopular action to improve cost recovery.

The “before” simulations assume an otherwise typical municipality that does not apply penalties for non-repayment, while “after” simulations assume that services are restricted after 90 days of the agreed upon payment date. An average increase in payment by 14,4% and an average increase in debt ratio of 12,9% is computed via the simulations using the Causal Model.

It is therefore suggested that any municipality that does not already penalise non-repayment can reasonably expect quite substantial increases in cost recovery by imposing penalties.

7.5.3 Simulation 3: Alternative billing and payment practices

The third set of simulations illustrates the combined effects of introducing three billing and payment practices, namely, the application of progressive tariffs, an active

Masakhane campaign and the use of payment facilities situated in supermarkets or other conveniently located facilities.

The “before” simulation here assumes an otherwise typical municipality without any of these practices in use, and the “after” simulations assume that all these practices are in implementation.

Interestingly, the impact of these practices on repayment is computed to be on average an increase of 16,7%, an increase even greater than that relating to the imposition of penalties for non-repayment. The predicted change in debt ratio as a result of these three practices is somewhat smaller in the order of 7,5%.

These figures differ more markedly in this simulation, because it is suggested that these three practices tend to impact more heavily on those households with smaller than average water accounts, than they do on those households with large accounts, with most probably high consumption levels together with those households that are chronic defaulters.

7.5.4 Simulation 4: Combined effects of three sets of best practice interventions

Simulations 1-3 embrace those actions that any municipality can decide to employ to improve cost recovery. Since these three groups of actions are not entirely independent of one another it is important to consider the combined effects of employing “best practice” interventions in those areas where “worst practice” actions are being used. This will involve the simultaneous introduction of services infrastructure upgrading initiatives, imposing penalties for non-repayment and applying those billing and payment practices referred to previously.

Using an otherwise typical municipality employing “worst practice” behaviour, is computed to experience an average simulated payment rate of 47,1% while a municipality applying “best practice” behaviour can expect to achieve a payment rate of 83%. This improvement of 36% constitutes a substantial gain for the municipality concerned. Comparisons between the “worst” and “best” practices in terms of debt ratio result in a 26,5% gain (10,1% - 36,6%). These simulated results indicate that cost recovery outcomes are highly sensitive to those factors that fall within the operational jurisdiction of a municipality.

Externalities including poverty, historical institutional legacies and political interference are also important considerations that require the adoption of appropriate mitigation measures. However, they do not appear from the simulations to exert as strong a positive influence on cost recovery as the three previously discussed groups of interventions.

7.5.5 *Simulation 5: Introduction of basic services to poor households*

According to the 1996 census, approximately one in five (20%) of households in South Africa do not have access to basic water services. National, provincial and municipal development strategies have since the inception of the RDP placed particular emphasis on the delivery of basic water services to the poor. Clearly such a strategy has and will have several negative implications for cost recovery.

Demographically, the actual profile of any one group of consumers will comprise an increase in poor households. Furthermore, the very nature of cost effective strategies for the poor will focus on the introduction of communal taps for example, thereby altering quite dramatically the municipal profiles in some areas.

This means in practice, less households with connections possibly resulting in acts of vandalism, illegal connections and a reduction in the potential for cost recovery.

Simulations run for this specific policy imperative indicate that payment rates can be predicted to drop on average by 5,1%. A typical municipality with an expected payment rate of 64% will if basic services are introduced to one-in-five households experience a reduction in payment to 59%. This simulated finding tends to support the argument that the introduction of basic services to the poor will substantially reduce the financial viability of such a service. The recent adoption of a “free water policy” can be viewed as official recognition of the realities of addressing the basic water needs of poor communities. These issues are currently being examined in a follow-up project being funded by the WRC.

7.6 CASE STUDY FEEDBACK

The following constitutes a brief summary of how these simulation outcomes (from the Causal Model) compare with the reality on the ground in the four case studies.

7.6.1 *Adelaide, Nxuba Municipality Eastern Cape*

An interesting backdrop to this small rural town in the Eastern Cape is the fact that for the past ten years the municipality has been providing “free basic” water to its consumers. These consumers had only to pay for that amount that at that stage exceeded 5kl, and now is 6kl. The municipality is also the electricity service provider, a function that allows it to disconnect electricity supply when individual accounts get into arrears. A monthly availability fee of R17 is levied to each consumer and this covers refuse removal, sewage treatment and assessment rates. Contrary to the payment rate prediction for Adelaide, the municipality has a cost recovery rate of 62%. This rate varies from 85% in the town to 65% in the township.

The high degree of community involvement initiated by the municipality has reaped handsome rewards in achieving buy-in by the community in cost recovery practices. For example, not only are the consumers kept informed of any developments in the area but they are directly involved via their Ward Councillors in operating the billing

system. Ward Councillors also identify indigents and defaulters so that these can be recorded, records updated and corrective action taken. In addition, any form of vandalism or illegal connections is also reported. The reasons for default are also established at source and addressed in a win-win manner.

The short response-time by officials of the municipality to complaints is appreciated by consumers and this tends to build a solid relationship between consumers and the municipality.

An effective policy of no-pay-no-service has been adopted and enforced by the municipality via a service agreement that each consumer enters into. A service deposit, equivalent to at least 2 months supply for each service has to be paid by each consumer. A penalty system also accompanies the service agreement and this is implemented on a consistent basis.

Consumers are grouped geographically in manageable sections of the township and a “township supervisor” is identified for each geographic area. This supervisor becomes informed of both the affordability and the payment track record of each consumer and consequently alternative ways and means are found to resolve non-payment situations.

The socio-economic position of consumers does not augur well for the short-term planned intention of the municipality to introduce pre-paid water meters in the area. To eliminate water loss the municipality has introduced a new water management system to replace all standpipes with metered tanks with restricted flows.

A measure of leniency has been adopted by the municipality in addressing the issue of non-payment and this has resulted in the relatively low payment rate of 62% recorded but on the upside no political interference has been experienced.

7.6.2 Durban, KwaZulu Natal

Of all the Metro Councils, Durban is considered to be the pioneer in introducing innovative and responsive cost-recovery systems. Notwithstanding these initiatives, water service delivery is said to still run at a loss in spite of substantial tariff increases during 2001.

Three levels of service are currently being introduced, namely un-metered communal standpipes, ground tanks and semi-pressure roof tank systems.

By upgrading 30 000 sites in informal settlements to 200 litre ground tanks not only will the level of unaccounted for water be reduced but the cost recovery issue is avoided since the 200 litres a day allocation closely approximates the basic free water allowance provided by Durban Metro. One level up in the upgrading ladder is the 170 litre roof tank system that is connected to the municipal reticulation system and is monitored by a metered connection. This system has numerous advantages in terms of both lower installation and maintenance costs and a reduction in peak

demand. As this system has been introduced in 50 000 subsidy funded housing units and 30 000 units in existing townships, each homeowner can be metered, billed and his/her consumption monitored. Unaccounted for water losses of up to 80% have also been substantially reduced where such a system has been introduced.

Notwithstanding the commitment by the municipality to interact directly with the communities concerned in an ongoing manner this system tends to be abused by defaulters, that for a number of reasons do not pay for water consumed. One reason offered is that the roof tank system is perceived by consumers to be an inferior level of service.

Cause for concern reported at the time of the survey, was an increasing percentage (from 8,5% in 2001 to 8,9% in 2002) of consumers classified as bad debt risks.

Linked to the process of infra-structural upgrading is a set of customised penalties for non-payment. These are in turn linked to alternative options for payment including opportunities for consumers to make their monthly payment at any post office, township pay-point or municipal office.

The manner in which Durban administers its water cost recovery programme tends to confirm that in introducing factors/determinants that can result in improvements in cost recovery, a municipality needs to ensure that synergy exists between the mechanisms and procedures employed by the various best practice interventions. For example, Durban has introduced a set of carefully targeted incentives that complement and encourage consumer behavioural change.

7.6.3 Middelburg, Mpumalanga

Contrary to expectations, Middelburg, an industrial town offering a range of employment opportunities, experienced a 76% rate of non-payment from the black township areas in 1994.

Township residents constituted 78,57% of the population of Middelburg, and people were housed in formal township housing mostly with individual connections.

Establishing an effective system of involving the communities of Middelburg was considered a high priority by the municipality and the need for all its councillors to take unpopular decisions had to be established. This occurred at a time when divisions existed between councillors and the municipality and between the Council and SANCO. A detailed income survey was conducted to identify the indigent to ensure that they received basic services free of charge.

Services charges were being levied at a flat rate with no incentive for users to economise on water usage. Added to this was a high incidence of illegal connections to the electricity supply. In response to this the municipality conducted a survey to identify consumption patterns, incomes and other relevant information. It

subsequently elected to install the pre-payment meters. At this time no regulatory legislation was in place and Middelburg had to develop and adopt its own legislation.

Water meters were also introduced at about the same time to ensure the water and electricity consumed was metered, recorded and billed. Charges for water and sewerage treatment were adjusted to reflect the size of erf.

A progressive tariff system was adopted to incorporate a sliding scale to encourage careful use of water. This has since been adjusted to accommodate the delivery of 6kl of basic free water.

An innovative upgrading strategy was introduced to reward consumers who paid for their services with, for example, improved and tarred access roads.

The lessons learned by Middelburg have been applied with outstanding success in Hendrina, a small town now fully amalgamated into Middelburg. Prior to amalgamation Hendrina experienced a monthly income of R20 000 from its water and rates accounts. Within 6 months this amount increased to an amount of R80 000 to R1 million.

Middelburg has not established its approach to effective cost recovery in such a way that all interventions complement and support each other in an integrated manner. No individual intervention can be relied upon to achieve the desired level of success without synergy being established.

7.6.4 Mogale City, Gauteng

Kagiso is the main residential township in Krugersdorp and is populated mainly by low- income consumers. Interestingly, 70% of these residents are engaged in some form of employment. Formal housing accounts for 73% of all shelter types, with informal shelter the next most prevalent (26%) form of accommodation.

Prior to the amalgamation of municipalities many consumers were in arrears with their water payments and this coupled with an entrenched culture of non-repayment presented the new municipality of Mogale City with a daunting set of challenges. For example, the system of water reticulation was apparently in dire need of repair and overhaul and it consisted of a high number of un-metered water connections.

Mogale City has introduced an approach that recognises that only by focussing on an effective system of quality water service delivery, coupled with a sound system of metering, billing and accounting, could it enforce payment for water consumed.

By installing conventional meters to all water connections, including standpipes in the townships a high proportion of consumers (88%) were linked to a metering system.

A comprehensive and integrated approach to efficient water service delivery was adopted by the officials of Mogale City in full collaboration with its elected councillors. By involving the Council in the water cost recovery programme from its inception the municipality was able to introduce not only conventional metering but also a prepaid water metering system to all previously connected houses. This prepaid water metering system was installed free of charge.

At the time of installation, the technology for prepaid water meters had not reached a complaint free stage and consequently many complaints were registered concerning the various features associated with the electronics of the system, tampering and leakages.

Instrumental in the success of cost recovery in the Mogale City was the highly interactive strategy adopted by the Council in popularising the introduction of prepaid water meters. This strategy combined a rapid response service to complaints, incentives for first time consumers, the repair of pipe work and fittings to reduce water loss and workshops to highlight the advantages of the system.

Essential to any system aimed at increasing cost recovery is the commitment by the municipality to succeed. A factor reported as being important to the success of cost recovery was the fact that a high percentage of consumers are literate, employed and live in formal houses that have been fitted with the prepaid meters.

Linked to the strong participatory process adopted by Mogale City, is a progressive tariff system that inter alia allowed for 6kl of free basic water to be provided each month via a smart card to each household in both formal and informal housing units.

Through its comprehensive metering system the Mogale City municipality can terminate and restrict access to water for defaulters, prosecute for damage to meters, detect leakages and make more accurate projections concerning the water consumption pattern.

Mogale City constitutes a good example of a municipality that has combined a full set of interventions to address the cost recovery challenge.

CHAPTER 8: CONCLUDING COMMENTS

As this project is inextricably linked to an ongoing investigation that addresses the cost recovery implications that flow from the recently (2000) amalgamated 237 municipalities in the country, its findings will need to be linked to the outcomes of this follow-up study. This new study specifically addresses the practical implications of the policy imperative of “basic free water” within the newly amalgamated municipalities.

Notwithstanding recent changes in the policy and institutional environment, the findings from this study can be used to guide municipalities in addressing their specific challenges associated with cost recovery principles and practices. It is envisaged that the basic rationale that has emerged from this study will in all probability still be found to be relevant to the 237 amalgamated municipalities.

The National Survey itself has generated an extremely large sample of data provided by 237 municipalities in the country. Statistical analysis of these data has provided a series of base line positions in terms of cost recovery expectations from municipalities prior to their amalgamation.

Using these base line expectations of cost recovery performance, comparisons can still be made by the newly formed municipalities since the previous structures will still exist as a measurable component of the new amalgamated municipalities.

Using these data together with municipal profiles derived from the 1996 census the Causal Model has created the opportunity for simulations to be run using independent and group variables (interventions and procedures) that strongly influence cost recovery outcomes. These simulations can materially help inform the review of municipal cost recovery strategies.

Feedback from each of the four municipalities selected has reinforced the importance of those key determinants of cost recovery identified by the investigation. However, since each municipality has a different history of repayment, is situated in different urban/ rural settings, experiences different sets of employment opportunities and each experiences different institutional strengths and weaknesses, the manner in which each should address cost recovery will differ. What will remain constant for all municipalities will be a basic rationale together with the three sets of key factors that can influence improvements in cost recovery.

These three sets of factors include, private metered connections, strictly administered penalties for non-repayment and a combination of progressive tariffs, convenient located payment facilities and the application of relevant Masakhane principles and practices.

An important contribution made by this study is the possibility to simulate the effects of replacing “worst” with “best” practices in an otherwise typical South African municipality. In this way statistical orders of magnitude can be used to quantify the

extent to which improvements in cost recovery can be obtained by applying the recommended principles of best practice.

The rationale that has evolved from this study will in brief involve a municipality;

- Establishing its current level of cost recovery;
- Comparing this with a set of Causal Model derived statistical estimates of potential improvements in cost recovery;
- Determining a set of potential cost recovery targets against which a phased strategy of interventions by the municipality can be measured in its approach to improve cost recovery.

Each strategy to be applied by a municipality will in all probability need to address in some way the following factors that have been found to influence cost recovery;

- The existence of poverty and its related socio-economic implications;
- An inability of the poorer households to afford to pay the costs of services infrastructure and mortgage finance;
- A refusal to pay by a section of a community;
- Basic water loss caused through an inefficient water service delivery system;
- Vandalism, and illegal connections.

Central to all successful cost recovery strategies is an effective, inclusive and transparent ongoing process of community involvement in addressing the achievement of effective cost recovery via an incentivised set of structured interventions customised to meet the specific needs and conditions prevailing in each municipality.

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APPENDIX A: DEFINING COST RECOVERY, A CONCEPT PAPER

A1 INTRODUCTION

There are many layers and many issues within the subject of cost recovery. This paper is an attempt to outline briefly the area within which all discussions concerning cost recovery take place. It includes matters of costs, tariffs, incomes, equity, sustainability, administration, maintenance, responsibility and efficiency.

At the outset it is necessary to determine *what* costs have to be recovered, an issue which includes tariffs, the measurement of the amount consumed and affordability. Thereafter we examine in more detail the question *how* the money is recovered.

A1.1 *What is Cost?*

The problem of determining what costs should be recovered is a complex one, and one with many different dimensions. In the formulation of tariffs, from a basic one like buying diesel to operate a borehole pump, to the tariffs of a large urban area, which include the pooling of a multiplicity of costs, including capital, loan repayments, maintenance, bad debts and many other overheads, there are two important considerations.

The first is: are the costs objectively verifiable? The importance of this is that objectively verifiable costs are much easier to understand and therefore people are much more willing to pay them.

Secondly, are costs calculated on a sustainable basis? The question then becomes what tariff should be used to fund sustainable development? Should it cover only the historic costs of the development, or should it also be making provision for future development?

Some of these issues are covered in more depth in the appendix, which offers a number of scenarios to illustrate the difficulties of constructing tariffs which meet these criteria, and also unpacks the components of what is broadly known as cost.

Another pressing problem in South Africa is that of payments by the public. It would be an over-simplification to say that, no matter what the tariff, there are problems of collection, but there can be little doubt that although the amount to be collected is a factor, there are many other variables. Moreover, whereas the quantum is, in certain senses, fixed, the other variables are not. This paper therefore concentrates on the many other issues in cost recovery.

A2 DEMAND

The demand side of cost recovery also has many facets.

A2.1 Water Usage

At its most basic level, demand for water – which we here use as the example for study – is a basic human need. The RDP treats it as such and predicates a level of service of standpipes within 200 metres as satisfying that need. The typical consumption figure for standpipe usage is 25 litres per capita per day.

Taking the self-contained borehole as an example – as described in the scenarios in the appendix as an example of the most simple system – there is a direct connection between the amount of water used and the cost (namely the diesel oil used in pumping the water). In such circumstances the demand is based on the dual constraints of work (carrying the water between standpipe and home) and price.

Water piped directly to the house removes one of these constraints. If the water is charged at a fixed rate, the second constraint is also removed, and thus there is no theoretical limit to the demand.

In cost recovery it is clear that charging on the basis of volume consumed will have a substantial impact on demand. Demand is further influenced by price, which is, in turn, determined by the tariff.

There are many approaches to tariffs. The traditional approach was to use a basic fixed rate, no matter the amount consumed, or else to charge at a lower unit rate as consumption increases. This was based on the actual cost of installation and similar factors, loading overheads in the “front” portion of the tariff (i.e. that part which all consumers pay), and charging only the cost of water supplied in respect of additional consumption. Today, as discussed below, tariffs which penalise higher levels of consumption by higher unit costs are more common. These have the advantage of reducing unit rates for small consumers, and therefore for the poor.

An example of such a tariff structure:

- First 10 kilolitres per month R1,00 per kilolitre
- 10 - 40 kilolitres per month R3,00 per kilolitre
- 40 - 100 kilolitres per month R4,00 per kilolitre
- over 100 kilolitres per month R5,00 per kilolitre
- to which are added overheads to cover:
- Payment to cover the cost of reading the meter
- Payment to cover amortisation of the meter and connection
- Payment to cover overheads for billing, collection, bad debt etc.

A2.2 Affordability and Incomes

To what extent are affordability and incomes the major determinants of water consumption? The richer households consume 250 litres per capita per day or more: for purposes like gardening, swimming pools, bathing, laundry, dishwashing and sanitation. At this level, although pricing can have an impact on consumption – as discussed below – lifestyle is the largest determinant of consumption.

In a sense, the same applies at the bottom of the market. The poor have to carry water, and this limits consumption in terms of the volume of water used.

But although there is such a strong correlation between incomes and consumption, is price an important factor in determining consumption, and if so, how much? Part of the mantra in South Africa is that the poor cannot afford to pay, but if they could, would they budget their water in accordance with their means?

The answer is probably yes. Experiences with pre-paid meters for electricity confirm that many households which professed to be unable to pay, actually do so with pre-paid meters; moreover, they quickly learn how much they can afford and limit their consumption accordingly. Their frugality in this respect has surprised Eskom, and changed, we are told, some of their predictions in terms of energy supply. It is almost certain that the same will apply with water. An anecdotal account relating to the Isle of Wight in Britain is instructive here. The island's water supply was approaching the stage at which it was inadequate in dry years, and water rationing was becoming a regular feature. It was decided to construct a pipeline under the sea to bring water from the mainland, at enormous cost. This was done. At about the same time, the Water Board decided to introduce a new tariff, one which set the initial tariff low, but sharply escalated the price for higher consumption users. Consumption reduced so dramatically that within a year the island had once more become self sufficient, and the pipeline became redundant.

The same system can work anywhere, and there is little doubt that price does affect water consumption, and therefore, incomes.

A2.3 Cross Subsidy

Most authorities state that they do not cross subsidise. Indeed, the charging of different tariffs for different parts of the town has been declared unlawful. However, there are three ways to make different charges.

1. Residents within one part of the jurisdiction pay a flat rate, while those in another part pay for water consumed. Typically, flat rate payers pay for less than those who pay by the amount consumed.

2. Residents who do not pay for water, and are not penalised for failing to pay – a situation common in many parts of the country – are effectively being subsidised by those who do pay.
3. The last is to use tariffs to cross subsidise. As described above, a tariff structure which charges large users at a higher rate than low users, makes it possible for the poor to have water charged at a lower rate.

A3 BARRIERS TO DEBT COLLECTION

A3.1 Perceptions of Value and Cost

In introducing the matter of supply, and sketching scenarios in that connection, we referred to the concept of objectively verifiable cost. This is important because many people have a perception that they should not be paying for water, and resent some of the overheads that form an essential part of the cost. The vagueness of many typical tariff calculations makes it difficult for an authority to justify a specific figure. The weakness of their position has been illustrated by negotiations that take place in respect of water tariffs with communities in connection with Masakhane and similar campaigns. Such negotiations usually aim to agree on a figure that the residents will accept as fair, which also represents a meaningful commitment by the community to making payments.

A3.2 Equality and Fairness

Perceptions of inequality and unfairness are also a cause of non-payment, and a successful cost recovery system must deal with the problem of both real and imagined inequity. It is a fundamental difficulty in communal and flat rate schemes that, because there can be no distinction between the extravagant consumer and the frugal one, inequities inevitably result. The gap is comparatively modest in schemes where water must be hand carried from standpipes, but with household connections using the flat rate system the gaps can be substantial. If people feel that the rate they are paying is an average, then the frugal consumer must resent the extravagant one. This can lead to resistance to payment.

This is an important incentive to develop a consumption-based system. In some countries, the charges made in communal schemes are based on a volume basis – e.g. people pay per bucket used. The water is sold by a community member, either on behalf of the community or his or her own behalf. This system is especially useful in that it penalises non-payers, but it requires very strong social organisation to be effective. Examples include situations where the community employs a person to collect the tariff – which is a nominal charge per bucket – or a person does so as a business, and takes personal responsibility for collecting the charges, as well as paying the council. It is not inconceivable to have the fixed rate based on the number of users in the household, though we have not come across any examples of this in practice.

By way of a footnote at this juncture, there are several examples of successful cost recovery in the situation of standpipe supply, where the community appoints people to collect the charges on a monthly basis and ensure that only people who have paid are allowed to use the water. However, this poses several challenges in terms of the strength of social organisation, and the homogeneity of the community. Where it works it at least addresses the question of limited supply to payers only, if not the question of the distinction between extravagant and frugal users.

A3.3 Administration

There are many ways in which administration can make a positive as well as negative impact on cost recovery.

Cost recovery is affected by three fundamental factors in the administrative sense. There are incentives, penalties, and convenience.

Convenience is a concept that has come late to public administration. The essential point is whether workers can pay their bills when offices which receive the cash are open only during their own working hours. The situation was often worsened by long queues, and cash offices, like banks, opening for only a portion of the working day. Where all adults in a household are working – and this is a particularly acute problem with single parents – payment of bills can become a major obstacle, to the extent that willingness to pay is severely compromised by the hindrances in the way. For the better off this is solved by the use of cheques, direct debits and credit cards; but for the disadvantaged other arrangements are essential, such as opening cashier's offices over the week-ends and accepting payments through retail outlets.

A3.4 Incentives

A basic incentive to encourage payment is the issuing of bills. The cost of doing so should be weighed against the benefits in the case of flat rate payments, but even there we would argue that the information contained in a bill is important, especially when a consumer gets into arrears. In that the bill shows the cumulative amount of arrears, stipulates interest and other costs, it can act as a reminder of the extent of the debt, and one would hope, create an incentive to pay.

The approach propagated by the Masakhane campaign was to use the incentive of development to a community which pays its bills. Unfortunately the connection is seen as a tenuous one, and many communities responded by turning the tables: their argument was that unless the standard of services, especially those such as refuse removal and roads, was improved the residents had no incentive to pay. This is not to say that such incentives cannot work: there are examples in which communities which pay have benefited from investment, and demonstrably have received rewards for their efforts. If this message can be communicated effectively

to other communities and if the relevant authority is committed to making the investment, this approach has great importance.

There are also financial incentives. One system is to use a reduced rate for people who pay before a certain date, after which the full rate becomes payable. This can act as a simple and effective encouragement to pay promptly and pays for itself by reducing overheads incurred in dealing with defaulters.

Another method is to use a lottery or prizes. Under such a system (used by Durban Metro, among others) all those who are up to date in their payments are eligible for a monthly cash or other prize. Widespread publicity enhances the interest and stimulates people who may be in arrears to a limited degree to catch up and so have an opportunity to win.

A3.5 Penalties

The most important penalty is the disconnection of the water supply. Local Authorities which are also electricity suppliers usually include water and electricity on the same bill. Thus if the person is in arrears, it is the electricity which can be turned off. Some LAs do so on a Friday, so as to create the maximum inconvenience, so sending the strongest message to consumers to keep their payments up to date.

Where the LA is not the electricity provider, the problem is more difficult. Rather than cutting off water altogether (which can give rise to health problems unless there is an alternative source of supply) it is common for the LA to install a flow limiter in the pipe, instead of cutting off the water altogether. This means that the water supply is not totally cut off, but an extremely slow trickle of water is still available. This is very frustrating to the consumer.

When all other measures fail, the drastic scenario for dealing with defaulters is to use the courts to recover the debt by the sale of the house and/or contents. The process runs roughly as follows.

1. A bill is sent to the debtors.
2. If the account is not paid, the fact is recorded in the bill the following month.
3. After a certain period, say 90 days, the person is sent a letter of demand. The letter states that if payment is not received within a certain period, legal action will be taken against the debtor.
4. If no payment is received, the matter is turned over to attorneys.
5. Attorneys prepare a summons which is then issued by the court, and served by the Sheriff.
6. After the summons has been served, the debtor has only five days within which to enter an Appearance to Defend the action.
7. If no defence is entered, as is usually the case, the attorneys will lodge an application for a default judgement.
8. When judgement is granted, the Council (as creditor) issues a warrant of execution against the property, which is served by the Sheriff on the debtor.

9. The attorneys place advertisements regarding the time and place of the Sale in Execution, and describing the property, in local newspapers and the Government Gazette.
10. The property is then sold. Usually the only buyer is the Local Authority, or a bank if it had a bond on the property.

The debtor can halt the process at any time by paying the money due, though it should be noted that the amount due will include an increasing percentage of legal costs as the process develops.

There are other penalties.

In the rural areas these can include nothing worse than ostracism of those who do not pay. Traditional leaders can also indicate that they will no longer assist people who have not paid for their water.

In the urban areas, local authorities can also insist that they will not assist people whose accounts are in arrears.

A3.6 Illegal Connections

A problem that reduces the effectiveness of many campaigns is the flouting of the law by making illegal connections and by-passing or breaking water meters. (In the case of standpipe supplies, the incentive to make illegal connections is substantial as it raises the quality of service. This is a common problem in the rural areas, but is not central to the argument here.) An essential part of enforcement is disconnecting and preventing illegal connections. Many local authorities fine householders who make illegal connections. In addition they must also pay a connection fee to obtain a legal service, plus a deposit. These act as powerful disincentives to illegal connections, but are only as effective as the system that identifies and enforces them.

An important point in this connection is that municipalities cannot take such actions unless a legal framework exists for them to do so. This requires the formulation and proclamation of by-laws for the purpose, a field in which most municipalities lack the expertise.

A3.7 Pre-paid Meters

The use of pre-paid meters has already revolutionised the cost recovery of electricity. It has two major advantages. There are no overheads in terms of collection, court action etc; and the system is transparent for the consumer who quickly learns how much electricity costs, and how to budget for its use. Also, in some circumstances, where the cards can be bought from local retailers or similar outlets, payment becomes significantly more convenient. Pre-paid meters have also been devised for water, and it remains to be seen whether they will be sufficiently

reliable. But they may offer a major breakthrough in the field of cost recovery, although they are expensive.

Introducing pre-paid meters as a substitute for ordinary meters will undoubtedly create antagonism from consumers, unless they have genuinely consented to the idea. To obtain such consent will require careful and very effective community consultation. However, where consumers consent to their use as a trade-off whereby they obtain a higher standard of service (such as converting from standpipe supply to individual water supplies) such meters can be accepted more readily. Consumers are likely to be even more willing to accept them if the system can be shown to be cheaper than conventional ones.

A3.8 Historical Social and Political Obstacles

While the above factors are the most important ones, it is essential to be aware of other factors which enter into any cost recovery programme.

The first and most obvious is that the majority, due to their rural origins, perceive as free, to be taken from the shared well or the river. The common view is that it is a natural product, provided by God, and that it is not fair to charge for something that costs the sellers nothing. Experience has shown that, with time and information, these perceptions can be changed: consumers can change their attitude when they realise that pipes, treatment and other components of water supply systems do cost money.

The second, and more difficult, heritage is the homeland system. Different homelands had different policies but the effect has been broadly the same. The legacy is that (a) flat rates are charged, (b) these rates are no more than a token of the cost, (c) there is no effective collection system, (d) either there are no penalties for defaulters, or penalties are not enforced.

Lastly, an important consideration, especially in the urban areas, is the legacy of the rent boycotts. By using the ability to withhold rent, service charges or bond payments, township residents demonstrated the power of their money. While this had a clear political motive, it also had distinct economic advantages for the boycotters and people quickly stopped budgeting for payments. When the time came for citizens to display greater responsibility under the new government, they did not do so. They perceived that local government was comparatively powerless if people refused to pay, and even today this perception remains in many cases. The Masakhane campaign succeeded in changing attitudes but not to the extent that the majority started to pay their dues. Negotiations with communities usually centred on whether people should pay for services when standards of delivery were low. The second point was the quantum of payment. The levels at which payments should be made to achieve full cost recovery were so much higher than people were used to that compromises were sought. As a result, negotiations resulted in conditional agreements, often entered into in good faith by leaders. But the residents did not always accept the agreement and payments were not made.

Overcoming this history is a very slow and difficult process that plays an important part in the cost recovery equation.

A3.9 Communication and Community Involvement

The issues described above are at once complex and simple, simple in that paying for water can be understood quite easily; but complex in that the quantum includes the many factors discussed above.

Experience has shown that an understanding of the concepts by the consumers is an essential pre-condition to any successful cost recovery programme. The process used will vary depending on the level of education and sophistication of the consumers, but the end result is the same. Once this stage has been reached there is another very important step: consumers must accept the tariff as reasonable.

In the type of simple rural schemes described above, the communities are quite capable of setting their own tariffs, and frequently set them at a higher level than the minimum.

In the urban areas, however, it is much harder. Frequently the tariff is used as a political weapon, and communities feel that they have not “won” unless they have forced the Council to reduce the tariff substantially. It is submitted there that negotiations on this basis are fruitless: they make the Council the supplicant and give the community power to hold it to ransom for any minor problem. Too many cases to mention have shown that such negotiated tariffs do not achieve genuine acceptance.

A4 CONCLUSIONS

The paper above has tried to describe the many dimensions of the issue of cost recovery. All the aspects mentioned above contribute either to the success or failure of cost recovery.

To date the experience has been very mixed and many schemes which looked promising have failed. Others have succeeded in spite of facing tremendous difficulties.

Identifying the key components of success will be difficult, but we have every hope that the study proposed will contribute to a better understanding of these matters.

A5 ADDENDUM: UNPACKING COSTS, ALTERNATIVE SCENARIOS

There is a large range of “costs” that can be included in the concept of cost recovery. It will be useful to start with the supply part of the equation when examining the elements of cost recovery.

To begin with there are costs that cover the cost of a good consumed. In the case of water, which is our concern here, this could be based on an estimate of nothing more than maintenance costs. For example, in a rural situation, it may cover the cost of the diesel oil required by the pump to extract water from a borehole. This is a simple concept for people to understand: if they do not pay for the diesel, the pump will not work and they will have no water. Thus, for them, the specific cost to be paid by the household will be the purchase price of diesel divided by the number of households using it. If more water is used, the diesel will have to be bought more frequently and thus the household water bill will rise, and vice versa. Sometimes the funds will be raised as and when required. Therefore there will be no regular payment but rather a house-to-house levy when required.

If the pump breaks down, a mechanic must be paid to repair it. His charge will probably be based on an estimate of the number of hours he will work during the year divided into the income he would hope to earn, to which he will add a transport cost, and the overhead costs of running his service. These could include the cost of his office staff, office rent, taxes, interest on bank loans and so on. However, as far as the community is concerned the invoice the mechanic submits is the cost, although the mechanic knows that there is a big difference between the charges he makes and his marginal costs. However, as far as the community is concerned, paying of his account is payment for visible goods and services, which to the members of the community are objectively verifiable.

Still using the borehole example, the cost of drilling the borehole is also included. A community based project might start with a house to house collection and/or undertake fund-raising, and thus pay the cost up front. Again, these costs are objectively verifiable as far as the community is concerned.

The issue changes immediately when overheads are added into the cost, for instance, the cost of collection. If a community member is paid an allowance to collect the funds from house to house, this will be perceived, once more, as objectively verifiable – assuming that the allowance has been agreed in a transparent way with community participation.

However, the situation changes immediately if a so-called “cost of collection” is added by an outside party. This will typically be more than the salary of the person: it will include overheads similar to those the mechanic includes in his rates: allowances for leave, public holidays, pensions, office space, administration and supervision, record keeping, transport and more.

Furthermore, if the cost is amortised over a period of many years, the situation immediately becomes harder to communicate, even though, to a banker, the cost of the transaction is unarguable in that interest and capital repayment are paid following clearly defined practice. Clearly parallels can be drawn with other bank loans, especially mortgage bonds, though even the principles by which these are calculated are very difficult to communicate.

If, to continue with the example of the single borehole, if the original borehole is inadequate for the whole community, and an additional borehole is required, those who are to benefit from the new borehole would be asked to pay for the installation. But if the cost of the new borehole is double the cost of the first one, is it fair that the people who receive the water should have to pay so much more, when the goods and service they are receiving are identical to that provided by the first one? Would it not be fairer to pool the costs so that each member of the community has paid the same amount for the service? But if so, we may imagine the outrage that the beneficiaries of the first borehole might express.

In due course reticulation is installed. If the work is done by a contractor, the cost is objectively verifiable in terms of a lump sum which covers the contractor's labour, materials, overheads and profit.

It is very unlikely that the community can pay for the reticulation, and therefore ways must be found for borrowing for it. The normal system is that central or local government funds the project and recovers the debt over a period of many years. Using this logic, if debt is to be recovered over a period of fifteen years, the charge should be reduced at the end of the period. However, as soon as our charges are based on projected costs over a period of several years, it is apparent that other matters have a major influence.

The first is the question of maintenance, and charges for it. Charges are now based on provision for future in terms of funding maintenance costs, whether undertaken by the water provider or by a contractor. These charges must be based on an expected amount of work and materials and the cost of managing that service.

Secondly there are other overheads to be factored into collection, such as the cost of collection – this includes the staff at pay points, the cost of the facilities they use and all the overheads associated with employment such as pensions, supervision costs etc.

Thirdly, provision must be made for the cost of cash handling, banking and accounting.

Lastly, provision has to be made for bad debt.

The complexity of this situation makes it impossible for the charges to be objectively verifiable, and there is fruitful ground for debate about how much should legitimately be charged for any of the components of the charge.

The situation is further complicated by the question whether tariffs should be standardised. When an existing scheme is expanded, inflation will typically make the costs of the second stage more expensive. Objectively verifiable costs, as described above, would dictate that the recipients of the stage 2 development would pay more. Under this logic, the costs to be recovered from each project would be different.

While this might be practicable in isolated rural communities, in urban areas it creates many difficulties, especially in terms of equity. The same level of service would be charged for at different rates, which could lead to absurd results such as neighbours, for historical reasons, paying totally different amounts even though the service is the same. However, before remarking that this is totally absurd, it must be noted that the practice in the housing industry is based exactly on that principle. For example, a house that is built in phase one of a project will be sold at the price prevailing at the time: a house built, for example, a year later will be sold at a different price even though the product is identical.

It has become standard practice, therefore, to charge a uniform tariff for all consumers. This further distinguishes the cost from the charge. A consumer living in a well established neighbourhood which has had no money spent on it recently will be indirectly paying for developments elsewhere in the area as annual tariff increases are introduced.

These scenarios illustrate the large number of factors that enter into the issue of establishing tariffs, the difficulty of justifying charges based on service levels, and the need, at one level, for the consumer to trust the authority making the charges.

APPENDIX B: TECHNICAL DETAILS OF STATISTICAL ESTIMATES

B1 INTRODUCTION

The statistical analysis was conducted as a two-stage process. The first involved multiple imputation of missing values in the original dataset, which was based on national survey and census data. Multiple imputation generated a set of ten “completed” datasets from the “incomplete” original dataset. The second stage of the analysis was to estimate the operationalised model of cost recovery using each of the ten “completed” datasets and combining the results statistically. Under virtually all conditions, multiple imputation is superior to more common approaches to missing data — which involve dropping observations, dropping variables, or inserting single “guesstimates” in place of missing values.⁶³ The first (multiple imputation) stage of the analysis required at least all variables to be used in the second (model estimation) stage, and a few additional variables were added to improve the quality of the imputations. Specialised software was used to generate the multiply-imputed datasets and again to combine the results of model estimates from each of them.⁶⁴ Stata (a commercial statistical software package) was used to estimate the operationalised model for each of the imputed datasets.

The remainder of this appendix presents technical details of the analysis. The first section describes the variables used the multivariate statistical analysis. The second section gives details of the multiple imputation stage. The third section presents the details of the model estimation stage.

B2 VARIABLES USED IN THE MULTIVARIATE ANALYSIS

Table B1 contains all of the variables used in the multivariate analysis. All of the variables listed were used in the multiple imputation stage, while only those above the dotted line were used in the model estimation stage. Most variables’ source is the national survey, with the exception of a few items calculated from census data — the demographic profile variables (*white*, *col/ind*, *african*, and *poor*), a variable to distinguish urban, rural and mixed area types (*areacat*), and a variable to measure the number of likely water consumers, based on reported service types. The two dependent variables were the payment rate for household consumers (*payrate*) and debt ratio for water services (*waterdebt*). Three variables — *penstrong*, *penweak*, and *pennone* — are indicator variables capturing the use of service restrictions to

⁶³For an extended discussion, see Gary King, James Honaker, Anne Joseph, and Kenneth Scheve, “Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation,” unpublished paper, Harvard University, 2000.

⁶⁴The multiply-imputed dataset were created using James Honaker, Anne Joseph, Gary King, Kenneth Scheve, and Naunihal Singh, *Amelia: A Program for Missing Data*, Windows version 1.05 (Cambridge: Harvard University, 1999). The combination of the multiple-imputation results was done using “MI” procedures written by Kenneth Scheve to run within the commercial Stata statistical software package.

penalise non-payment. (*Pennone* does not appear in the model estimates, as it is treated as the excluded base category.) Four variables — *white*, *col/ind*, *african*, and *poor* — are compositional variables to capture the municipal income and racial profiles. (*Poor* does not appear in the model estimates because it is treated as the excluded base category.) The descriptions of the other variables above the dotted line are straightforward, and the rationale for their inclusion in the operationalised model is discussed in the main text of the report. The variables below the dotted line were included only to improve the quality of the multiple imputations. *Totaldebt* is closely related to *waterdebt* and was available for many more municipalities in the sample. *Logn_cen* was closely related to the survey-based *logn*, and therefore helped inform imputations for the number of household consumers in municipalities. *Province* and *areacat* add some geographical information to the multiple imputations.

Table B1: Description of Variables Used in Multivariate Statistical Analysis

Variable	Description	Source
payrate	Payment rate for household consumers	National survey
waterdebt	Debt ratio for water services	National survey
privcon	Proportion of households with private connections	National survey
flatrate	Proportion of household consumers paying flat rate	National survey
penstrong	Service restriction to penalise non-payment, 90 days or less overdue	National survey
penweak	Service restriction to penalise non-payment, more than 90 days overdue	National survey
pennone	Service restriction not used to penalise non-payment	National survey
white	Proportion likely household consumers, white and not poor	1996 census
col/ind	Proportion likely household consumers, coloured/ Indian/unspecified and not poor	1996 census
african	Proportion likely household consumers, African and not poor	1996 census
poor	Proportion of likely household consumers, poor (all race categories)	1996 census
logn	Natural logarithm of number of household consumers	National survey
supmkt	Dummy variable to indicate availability of payment facilities at supermarkets	National survey
progtariff	Dummy variable to indicate a substantially progressive tariff	National survey
masakhane	Dummy variable to indicate an active Masakhane campaign	National survey
totaldebt	Debt ratio on consolidated household accounts	National survey
province	Categorical variable to indicate province	-
areacat	Categorical variable to indicate predominantly urban, predominantly rural, and mixed area types	1996 census
logn_cen	Natural logarithm of number of likely water consumers, based on service types	1996 census

Note: 'National survey' refers to the national survey of municipal cost recovery conducted for this study; '1996 census' refers to the South African census conducted in 1996. Variables below the dotted line were used only in the multiple-imputation model.

B3 DESCRIPTION OF THE MULTIPLE-IMPUTATION STAGE

The multiple-imputation stage assumes that variables follow a joint multivariate normal distribution. To approximate this assumption, it was necessary to transform some of the variables to make their distributions more nearly symmetric and unbounded. The transformations used are summarised in table B2. Several of the variables — including both dependent variables — are proportions bounded by definition to values between zero and one. These variables included *payrate*, *waterdebt*, *privcon*, and *flatrate*. A logistic transformation was used to improve the fit of the distributional assumptions:

$$lt(x) = \ln\left(\frac{x}{1-x}\right)$$

Another group of variables are compositional proportions (*white*, *col/ind*, *african*, *poor*), and a related log-ratio transformation was used. This transformation requires the arbitrary selection of one variable as the “base,” and *poor* (x_b) was used for this purpose. The transformation for the remaining proportions ($x_i \in \{x_w \text{ (white)}, x_c \text{ (col/ind)}, x_a \text{ (african)}\}$) is:

$$lr(x_i) = \log \frac{x_i}{x_p}$$

The two variables for number of consumers (*logn* and *logn_cen*) were already subject to a standard logarithmic transformation and did not require any further alterations. The remaining variables were dummy variables (*supmkt*, *progtariff*, and *masakhane*) and categorical variables (*penstrong/weak/none*, *province*, and *areacat*). There is no benefit to transforming the values of such variables.

Table B2: Non-linear Transformations in the Multiple-imputation Model

Variable	Transformation
payrate	Logistic
waterdebt	Logistic
privcon	Logistic
flatrate	Logistic
pen: strong/weak/none	Entered as ordinal variable
white	Log ratio (base category: poor)
col/ind	Log ratio (base category: poor)
african	Log ratio (base category: poor)
logn	No additional transformation
supmkt	None
progtariff	None
masakhane	None
province	Entered as a categorical variable
areacat	Entered as a categorical variable
logn_cen	No additional transformation

Note: Multiple-imputation model was run using James Honaker and others' "Amelia: A Program for Missing Data," Windows version 1.05. Cambridge: Harvard University, 1999.

B4 STATISTICAL ESTIMATES OF MODELS OF COST RECOVERY

The model of cost recovery was estimated separately with two different dependent variables — municipal payment rates and debt ratios. Each of the two versions of the model were estimated for the ten multiply-imputed datasets using multiple regression, and the results for each version were then combined. The standard errors are heteroskedasticity-adjusted, and thorough sensitivity analyses were conducted on the model specification reported. The dependent variables in both versions are logistic transformations, to improve the fit with the distributional assumptions of conventional multiple regression. Because of the transformations, the coefficients are not directly interpretable in the original scale of payment rates and debt ratios. (In contrast, the simulations presented in the main text of the report are based on results converted back to the original scale.) Tables B3 and B4 present the combined estimates for each version of the model, along with those for each imputed dataset. Although the uncombined results may help give an intuitive feel for the range of variation from imputed dataset to imputed dataset, the combined estimates — which incorporate variance within and across datasets — are the main focus.⁶⁵

Table B3 contains the estimates for the version of the model focusing on municipal payment rates. Of the eleven variables, the coefficients for nine differ from zero at the 95 percent level in the combined results, while five are also significant at the 99 percent level. Only *supmkt* and *masakhane* fall short of the 95 percent level. The signs on all coefficients are consistent with expectations. All of the “race” coefficients (against a base category of the proportion below the poverty line) are significant, reflecting the tendency for municipalities with larger proportions of consumers above the poverty line to achieve higher payment rates. Differences among the “race” coefficients reflect the expected pattern, ordered so that groups more privileged under the apartheid system are expected to have higher payment rates. This can be accounted for by institutional and socio-economic factors discussed in the main text. The R^2 statistics for the imputed datasets range from 0.42 to 0.49, with an average of 0.45.

⁶⁵The simulations presented in the main text were based on 10,000 simulations each — a combination of 1,000 from each of the imputed datasets.

Table B3: Parameter Estimates for Model of Municipal Payment Rates

$N = 310$

Independent variables	Dependent variable: logistic transformation of payment rate [$\ln(p/(1-p))$]										
	Combined estimates	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
housecon	0.76** (0.27)	0.71** (0.25)	0.52* (0.22)	0.73** (0.23)	0.72** (0.23)	0.78** (0.23)	0.96** (0.25)	0.83** (0.24)	0.90** (0.24)	0.72** (0.23)	0.77** (0.23)
flatrate	-0.42* (0.21)	-0.49* (0.20)	-0.32 (0.19)	-0.48* (0.19)	-0.48* (0.19)	-0.35 (0.19)	-0.33 (0.20)	-0.43* (0.19)	-0.47* (0.20)	-0.39* (0.19)	-0.46* (0.19)
penstrong	0.60** (0.17)	0.66** (0.16)	0.54** (0.16)	0.64** (0.16)	0.59** (0.17)	0.52** (0.17)	0.57** (0.17)	0.58** (0.16)	0.65** (0.17)	0.67** (0.16)	0.59** (0.16)
penweak	0.44* (0.21)	0.53** (0.20)	0.41* (0.20)	0.50* (0.20)	0.37 (0.21)	0.41* (0.20)	0.41* (0.21)	0.41* (0.19)	0.43* (0.21)	0.50** (0.19)	0.46* (0.19)
white	4.62** (0.79)	5.07** (0.76)	5.24** (0.68)	4.77** (0.72)	4.13** (0.59)	4.48** (0.57)	4.65** (0.68)	4.57** (0.64)	3.85** (0.63)	4.82** (0.60)	4.58** (0.68)
coll/ind	1.99** (0.64)	1.75** (0.44)	2.76** (0.41)	1.63** (0.46)	2.39** (0.42)	2.22** (0.44)	1.80** (0.43)	2.29** (0.44)	1.43** (0.44)	2.14** (0.42)	1.43** (0.43)
african	1.15* (0.57)	1.05* (0.50)	1.71** (0.47)	0.77 (0.50)	1.21* (0.47)	1.38* (0.54)	1.12* (0.45)	1.22* (0.51)	0.76 (0.49)	1.16* (0.48)	1.14* (0.54)
logn	-0.26** (0.05)	-0.29** (0.05)	-0.28** (0.05)	-0.24** (0.05)	-0.26** (0.05)	-0.27** (0.04)	-0.26** (0.05)	-0.25** (0.05)	-0.23** (0.05)	-0.29** (0.05)	-0.26** (0.05)
supmkt	0.35 (0.18)	0.41* (0.17)	0.38* (0.16)	0.36* (0.17)	0.24 (0.18)	0.35* (0.17)	0.38* (0.17)	0.25 (0.18)	0.34 (0.19)	0.42* (0.16)	0.38* (0.17)
progtariff	0.36* (0.14)	0.42** (0.13)	0.31* (0.13)	0.26 (0.13)	0.37** (0.13)	0.38** (0.13)	0.36** (0.13)	0.37** (0.13)	0.38** (0.13)	0.42** (0.13)	0.36** (0.13)
masakhane	0.17 (0.11)	0.19 (0.11)	0.18 (0.11)	0.15 (0.11)	0.18 (0.11)	0.19 (0.11)	0.19 (0.11)	0.15 (0.11)	0.19 (0.12)	0.15 (0.11)	0.14 (0.11)
constant	0.24 (0.42)	0.45 (0.40)	0.28 (0.39)	0.27 (0.40)	0.25 (0.38)	0.19 (0.39)	0.10 (0.41)	0.09 (0.40)	0.13 (0.41)	0.41 (0.38)	0.25 (0.41)
root MSE	□	0.95	0.92	0.95	0.95	0.94	0.96	0.94	0.98	0.92	0.96
R ²	□	0.45	0.48	0.45	0.45	0.47	0.45	0.45	0.42	0.49	0.43

Heteroskedasticity-adjusted standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$

Table B4 presents the estimates for the version of the model focusing on municipal debt ratios. Only three of eleven variables are significant at the 95 percent level, and two are significant at the 99 percent level. The R^2 statistics are correspondingly lower — ranging from 0.22 to 0.34, averaging 0.27. There are two possible explanations for this poorer fit, compared with the model of payment rates. First, debt ratios — which reflect financial outcomes “accumulated” over time — may simply be more difficult to explain using a set of municipal characteristics measured in the present. Second, it is likely debt ratios are measured with substantially greater error than payment rates. Measurement error alone tends to increase standard errors and bias coefficients toward zero. While the first reason for the poorer fit should not be discounted, the second is probably the dominant one — particularly since a large proportion of debt ratios in the datasets are the product of multiple imputation. If this is the case, the effects those variables whose coefficients remained highly statistically significant — *housecon*, *penstrong*, and *logn* — should be regarded as particularly robust. However, those that fall short of 95 percent significance should not necessarily be written off as unimportant, since there is a good chance they would appear more impressive if the dependent variable was subject to less measurement error.

Table B4: Parameter Estimates for Model of Municipal Debt Ratios

$N = 310$

Independent variables	Dependent variable: logistic transformation of debt ratio [$\ln(d/(1-d))$]										
	Combined estimates	Estimates for each imputed dataset									
housecon	1.14* (0.50)	0.71* (0.30)	0.88** (0.31)	1.03** (0.35)	1.20** (0.31)	0.81** (0.28)	1.85** (0.34)	0.83** (0.31)	1.14** (0.29)	1.24** (0.30)	1.67** (0.31)
flatrate	-0.26 (0.32)	0.07 (0.25)	-0.41 (0.25)	0.04 (0.25)	-0.26 (0.25)	-0.38 (0.23)	-0.24 (0.28)	-0.34 (0.27)	-0.38 (0.24)	-0.47 (0.27)	-0.27 (0.28)
penstrong	0.96** (0.30)	0.78** (0.19)	1.21** (0.21)	0.64** (0.24)	1.02** (0.22)	0.88** (0.21)	0.93** (0.23)	0.82** (0.21)	1.05** (0.20)	1.33** (0.21)	0.93** (0.22)
penweak	0.54 (0.29)	0.46* (0.21)	0.69** (0.24)	0.40 (0.27)	0.42 (0.27)	0.43 (0.23)	0.62* (0.28)	0.54* (0.26)	0.78** (0.25)	0.65** (0.24)	0.38 (0.25)
white	1.99 (1.13)	2.88** (0.82)	1.87* (0.86)	3.05** (0.86)	2.23* (0.89)	1.60 (0.87)	1.74 (1.01)	2.53** (0.93)	1.03 (0.84)	1.61 (0.83)	1.33 (0.95)
coll/ind	0.78 (1.02)	1.82** (0.53)	1.14 (0.60)	1.09 (0.63)	1.36* (0.59)	0.71 (0.64)	0.76 (0.64)	1.20 (0.63)	-0.17 (0.55)	0.76 (0.61)	-0.90 (0.62)
african	1.70 (1.28)	3.43** (0.61)	2.31** (0.79)	2.49** (0.67)	1.59* (0.73)	2.45** (0.67)	1.75* (0.77)	1.40* (0.65)	0.20 (0.73)	1.06 (0.67)	0.34 (0.83)
logn	-0.30** (0.08)	-0.36** (0.06)	-0.36** (0.06)	-0.36** (.07)	-0.33** (0.07)	-0.29** (0.07)	-0.29** (0.07)	-0.27** (0.07)	-0.25** (0.06)	-0.26** (0.06)	-0.26** (0.07)
supmkt	0.33 (0.27)	0.49* (0.22)	0.50* (0.23)	0.27 (0.23)	0.21 (0.26)	0.39 (0.25)	0.37 (0.24)	0.16 (0.23)	0.41 (0.22)	0.14 (0.23)	0.31 (0.23)
progtariff	0.01 (0.24)	-0.11 (0.17)	-0.11 (0.20)	0.27 (0.18)	-0.05 (0.17)	0.04 (0.18)	-0.05 (0.18)	-0.03 (0.19)	-0.01 (0.18)	0.28 (0.17)	-0.10 (0.18)
masakhane	0.09 (0.19)	0.24 (0.14)	0.12 (0.12)	0.06 (0.15)	0.08 (0.15)	0.17 (0.15)	0.19 (0.16)	0.06 (0.14)	-0.14 (0.14)	0.14 (0.14)	-0.01 (0.15)
constant	-1.56 (0.65)	-1.42** (0.50)	-1.25* (0.51)	-1.38* (0.55)	-1.46** (0.56)	-1.56** (0.51)	-2.32 (0.58)	-1.49 (0.58)	-1.25* (0.53)	-1.98** (0.53)	-1.51** (0.55)
root MSE	□	1.21	1.26	1.30	1.27	1.31	1.35	1.29	1.24	1.23	1.31
R ²	□	0.28	0.30	0.23	0.29	0.22	0.28	0.23	0.24	0.34	0.26

Heteroskedasticity-adjusted standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$

APPENDIX C: ALPHABETICAL LIST OF MUNICIPALITIES IN THE REALISED SAMPLE

Municipality	Province
Adelaide TLC	Eastern Cape
Albertinia TLC	Western Cape
Alberton TLC	Gauteng
Aliwal North TLC	Eastern Cape
Allanridge TLC	Free State
Amersfoort Ezamokuhle TLC	Mpumalanga
Ashburton TLC	KwaZulu-Natal
Ashton TLC	Western Cape
Badplaas TLC	Mpumalanga
Barrydale TLC	Western Cape
Bathurst TLC and Rural TRC	Eastern Cape
Beaufort West TLC	Western Cape
Belfast TLC	Mpumalanga
Belvidere Estate TLC	Western Cape
Benoni TLC	Gauteng
Bitterfontein Nuwerus TLC	Western Cape
Blaauwberg MLC	Western Cape
Bloemfontein TLC	Free State
Bloemhof TLC	Northwest Province
Blue Horizon Bay LC	Eastern Cape
Boksburg TLC	Gauteng
Bophirima DC	Northwest Province
Bothaville Kgotsong LGCC	Free State
Botshabelo TLC	Free State
Brakpan TLC	Gauteng
Brandfort TLC	Free State
Brandvlei TLC	Northern Cape
Bredasdorp TLC	Western Cape
Brits TLC	Northwest Province
Brokhorstspuit TLC	Gauteng
Bultfontein Phahameng TLC	Free State
Burgersdorp TLC	Eastern Cape
Caledon TRC	Western Cape
Calvinia TLC	Northern Cape
Careletonville TLC	Gauteng
Carolina TLC	Mpumalanga
Cathcart TLC	Eastern Cape
Cedarville TLC	KwaZulu-Natal
Central Cape Town MLC	Western Cape
Centurion MLC	Gauteng
Ceres TLC	Western Cape
Chrissiesmeer TLC	Mpumalanga

Municipality	Province
Citrusdal TLC	Western Cape
City Council of Pretoria MLC	Gauteng
Clocolan TLC	Free State
Colenso Nkanyezi TLC	KwaZulu-Natal
Concordia TLC	Northern Cape
Cool Air TLC	KwaZulu-Natal
Cradock TLC	Eastern Cape
Creighton TLC	KwaZulu-Natal
Danielskuil TLC	Northern Cape
Dannhauser TLC	KwaZulu-Natal
Darling TLC	Western Cape
Davel TLC	Mpumalanga
De Aar TLC	Northern Cape
De Doorns TLC	Western Cape
Deben TLC	Northern Cape
Delareyville TLC	Northwest Province
Delmas Botleng TLC	Mpumalanga
Delportshoop TLC	Northern Cape
Dendron RLC	Northern Province
Deneysville TLC	Free State
Dewetsdorp TLC	Free State
Dolphin Coast TLC	KwaZulu-Natal
Dundee TLC	KwaZulu-Natal
Eastern Johannesburg MLC	Gauteng
Edenvale Modderfontein MLC	Gauteng
Edenville TLC	Free State
Elim Tshitale Hlanganani RLC	Northern Province
Elliot TLC	Eastern Cape
Ellisras TLC	Northern Province
Empangeni Ngwelezane TLC	KwaZulu-Natal
Ermelo TLC	Mpumalanga
Fauresmith TLC	Free State
Ficksburg TLC	Free State
Fochville TLC	Northwest Province
Frankfort TLC	Free State
Franschhoek TLC	Western Cape
Friemersheim TLC	Western Cape
Gansbaai TLC	Western Cape
Gariep TRC	Northern Cape
Gariepdam TLC	Free State
George TLC	Western Cape
Giyani RLC	Northern Province
Glencoe TLC	KwaZulu-Natal
Gouritz TLC	Western Cape
Graaff Reinet Rural TRC	Eastern Cape
Graaff Reinet TLC	Eastern Cape
Grahamstown TLC	Eastern Cape

Municipality	Province
Greater Hermanus TLC	Western Cape
Greater Plettenberg Bay TLC	Western Cape
Greyton TLC	Western Cape
Groblersdal TLC and TRC	Mpumalanga
Groot Brakrivier TLC	Western Cape
Grootvlei TLC	Mpumalanga
Hangklip Kleinmond TLC	Western Cape
Hanover TLC	Northern Cape
Harding TLC	KwaZulu-Natal
Harrismith TLC	Free State
Hartbeespoort TLC	Northwest Province
Hartswater TLC	Northern Cape
Hazyview TLC	Mpumalanga
Heidelberg TLC	Western Cape
Heilbron TLC	Free State
Helderberg MLC	Western Cape
Hertzogville TLC	Free State
Highveld DC	Mpumalanga
Highveld Ridge TLC	Mpumalanga
Hilton TLC	KwaZulu-Natal
Hobhouse TLC	Free State
Hoopstad TLC	Free State
Hopefield TLC	Western Cape
Howick TLC	KwaZulu-Natal
Indwe Rural TRC	Eastern Cape
Indwe TLC	Eastern Cape
Jacobsdal TLC	Free State
Jagersfontein TLC	Free State
Jamestown TLC	Eastern Cape
Jan Kempdorp TLC	Northern Cape
Joubertina TLC	Eastern Cape
Kakamas TLC	Northern Cape
Kamieskroon TLC	Northern Cape
Kareedouw TLC	Eastern Cape
Kathu TLC	Northern Cape
Kenhardt TLC	Northern Cape
Kimberley TLC	Northern Cape
King Williams Town TLC	Eastern Cape
Klawer TLC	Western Cape
Klerksdorp TLC	Northwest Province
Knysna TLC	Western Cape
Komatipoort TLC	Mpumalanga
Komaggas TLC	Northern Cape
Komga TLC	Eastern Cape
Koster TLC	Northwest Province
Kroonstad TLC	Free State
Kwadukuza Stanger TLC	KwaZulu-Natal

Municipality	Province
Lady Grey TLC and Rural TRC	Eastern Cape
Ladybrand TLC	Free State
Ladysmith Emnambithi TLC	KwaZulu-Natal
Lamberts Bay TLC	Western Cape
Langebaan TLC	Western Cape
Lebowakgomo RLC	Northern Province
Leeu Gamka TLC	Western Cape
Leeudoringstad TLC	Northwest Province
Levubu Shingwedzi RLC	Northern Province
Lichtenburg TLC	Northwest Province
Lindley TLC	Free State
Loeriesfontein TLC	Northern Cape
Lothair Silindile TLC	Mpumalanga
Louis Trichardt TLC	Northern Province
Louwsburg TLC	KwaZulu-Natal
Luckhof TLC	Free State
Lusikisiki TLC	Eastern Cape
Lutzville TLC	Western Cape
Mafikeng TLC	Northwest Province
Mandeni TLC	KwaZulu-Natal
Marble Hall TLC	Mpumalanga
Marloth Park TLC	Mpumalanga
Marquard TLC	Free State
Marydale TLC	Northern Cape
Mashae Fourie TLC	Free State
Masizakhe TRC	Northern Cape
Matatiele TLC	KwaZulu-Natal
Mautsendal TLC	Free State
Mbibane TLC	Mpumalanga
Melmoth TLC	KwaZulu-Natal
Memel TLC	Free State
Messina TLC	Northern Province
Middelburg TLC	Eastern Cape
Middelburg TLC	Mpumalanga
Midrand Rabie Ridge MLC	Gauteng
Mkobola TLC	Mpumalanga
Montagu TLC	Western Cape
Mossel Bay TLC	Western Cape
Mount Frere TLC	Eastern Cape
Mtunzini TLC	KwaZulu-Natal
Naboomspruit TLC	Northern Province
Napier TLC	Western Cape
Nelspruit TLC and TRC	Mpumalanga
Newcastle TLC	KwaZulu-Natal
Niekerkshoop TLC	Northern Cape
Nieu Bethesda TLC	Eastern Cape
Nieuwoudtville TLC	Northern Cape

Municipality	Province
Nkwazi Zinkwazi TLC	KwaZulu-Natal
Noupoort TLC	Northern Cape
Nylstroom TLC	Northern Province
Odendaalsrus TLC	Free State
Olifantshoek TLC	Northern Cape
Oostenberg MLC	Western Cape
Orania TRC	Northern Cape
Oranjeville Metsimaholo LGCC	Free State
Ottosdal TLC	Northwest Province
Overberg DC	Western Cape
Paarl TLC	Western Cape
Paterson TLC	Eastern Cape
Perdekop TLC	Mpumalanga
Petrusburg TLC	Free State
Philippolis TLC	Free State
Phuthaditjhaba TLC	Free State
Piet Plessis TRC	Northwest Province
Piet Retief TLC	Mpumalanga
Pietersburg TLC	Northern Province
Piketberg TLC	Western Cape
Pongola TLC	KwaZulu-Natal
Port Alfred TLC	Eastern Cape
Port Elizabeth TLC	Eastern Cape
Port Shepstone TLC	KwaZulu-Natal
Porterville TLC	Western Cape
Postmasburg TLC	Northern Cape
Potchefstroom TLC	Northwest Province
Prieska TLC	Northern Cape
Prince Albert TLC	Western Cape
Prince Alfred Hamlet TLC	Western Cape
Pudimoe TLC	Northwest Province
Queenstown TLC	Eastern Cape
Reddersburg TLC	Free State
Reivilo TLC	Northwest Province
Richards Bay TLC	KwaZulu-Natal
Richmond TLC	KwaZulu-Natal
Richmond TLC	Northern Cape
Richtersveld TLC	Northern Cape
Ritchie TLC	Northern Cape
Robertson TLC	Western Cape
Rustenburg TLC	Northwest Province
Sannieshof TLC	Northwest Province
Saron TLC	Western Cape
Sasolburg TLC	Free State
Seaview LC	Eastern Cape
Sedgefield TLC	Western Cape
Sentrale Karoo DC	Western Cape

Municipality	Province
South Cape DC	Western Cape
South Central Durban MLC	KwaZulu-Natal
Southern DC	Northwest Province
Southern Johannesburg MLC	Gauteng
Southern Peninsula MLC	Western Cape
Springbok TLC	Northern Cape
Springs TLC	Gauteng
St Francis Bay TLC	Eastern Cape
Standerton TLC and TRC	Mpumalanga
Stanford TLC	Western Cape
Steelpoort Burgersfort TLC	Mpumalanga
Steinkopf TLC	Northern Cape
Stella TLC	Northwest Province
Stellenbosch TLC	Western Cape
Steynsrus TLC	Free State
Stilbaai TLC	Western Cape
Stilfontein TLC	Northwest Province
Strydenburg TLC	Northern Cape
Sutherland TLC	Northern Cape
Swellendam TLC	Western Cape
Tabankulu TLC	Eastern Cape
Thabazimbi TLC	Northern Province
Theunissen TLC	Free State
Touws River TLC	Western Cape
Tsomo TLC and Rural TRC	Eastern Cape
Tulbagh TLC	Western Cape
Tweeling TLC	Free State
Tweespruit Kopano TLC	Free State
Tygerberg MLC	Western Cape
Tzaneen TLC	Northern Province
Ugie TLC	Eastern Cape
Ugu RC	KwaZulu-Natal
Uitenhage TLC	Eastern Cape
Ulundi TLC	KwaZulu-Natal
Umzinyathi RC	KwaZulu-Natal
Upington TLC	Northern Cape
Uthukela RC	KwaZulu-Natal
Utrecht TLC	KwaZulu-Natal
Vanderkloof TLC	Northern Cape
Vanrhynsdorp TLC	Western Cape
Vanstadensrus TLC	Free State
Vanwyksdorp TLC	Western Cape
Vanzylsrus TLC	Northern Cape
Velddrif TLC	Western Cape
Ventersdorp TLC	Northwest Province
Verkeerdevlei TLC	Free State
Victoria East TRC	Eastern Cape

Municipality	Province
Victoria West TLC	Northern Cape
Villiers TLC	Free State
Villiersdorp TLC	Western Cape
Virginia TLC	Free State
Volksrust TLC	Mpumalanga
Vrede TLC	Free State
Vredendal TLC	Western Cape
Vryheid TLC	KwaZulu-Natal
Wakkerstroom TLC	Mpumalanga
Warrenton TLC	Northern Cape
Wartburg TLC	KwaZulu-Natal
Weenen TLC	KwaZulu-Natal
Welkom TLC	Free State
Wellington TLC	Western Cape
Wepener TLC	Free State
West Coast Peninsula TLC	Western Cape
Western Gauteng RSC	Gauteng
Western Region DC	Eastern Cape
Western Vaal MLC	Gauteng
Westonaria TLC	Gauteng
White River TLC	Mpumalanga
Wilderness TLC	Western Cape
Winburg TLC	Free State
Windsorton TLC	Northern Cape
Winelands DC	Western Cape
Winterton TLC	KwaZulu-Natal
Witbank TLC	Mpumalanga
Wolmaranstad TLC	Northwest Province
Worcester TLC	Western Cape
Yzerfontein TLC	Western Cape
Zastron TLC	Free State
Zeerust TLC	Northwest Province

APPENDIX D: THE NATIONAL SURVEY QUESTIONNAIRE

Cost Recovery for Water and Other Municipal Services

A Survey Conducted for the Water Research Commission by Sigodi Marah Martin, Development Consultants

This questionnaire focuses on cost recovery for water and other services in your municipality. Your responses will inform the development of effective cost-recovery strategies that reflect the diversity of social and institutional challenges faced by municipalities countrywide. The study will NOT be used to evaluate the performance of specific councils.

We have designed the questionnaire to minimize inconvenience. We appreciate the most accurate information you can provide. However, WHERE EXACT INFORMATION IS UNAVAILABLE OR INACCESSIBLE, PLEASE GIVE YOUR BEST ESTIMATES, RATHER THAN LEAVING ANSWERS BLANK.

Thank you for your assistance with this important research!

Office use
only.

1. **DOES YOUR MUNICIPALITY ISSUE CONSOLIDATED CONSUMER ACCOUNTS THAT INCLUDE BOTH ELECTRICITY AND WATER** (and possibly other services and rates)?

Please tick the appropriate box:

G Yes
G No

2. **DOES YOUR MUNICIPALITY HAVE FORMALLY APPROVED CREDIT CONTROL POLICY AND PROCEDURES?**

Please tick the appropriate box:

G Yes
G No

3. **WHAT IS YOUR BEST ESTIMATE OF THE PERCENTAGE OF INDIVIDUAL CONSUMERS** (that is, excluding business and public-sector consumers) **WHO REGULARLY PAY THEIR ACCOUNTS ON TIME?**

Please give your best estimate: _____ per cent of individual consumers

4. **WHAT IS YOUR BEST ESTIMATE OF THE PERCENTAGE OF INDIVIDUAL WATER CONSUMERS** (that is, excluding business and public-sector consumers) **WHO ARE CHARGED A FLAT RATE FOR WATER?**

Please give your best estimate: _____ per cent of individual consumers

5. **WHAT IS YOUR BEST ESTIMATE OF THE PERCENTAGE OF INDIVIDUAL WATER CONSUMERS** (that is, excluding business and public-sector consumers) **WHO RECEIVE PIPED WATER INSIDE THEIR HOMES?**

Please give your best estimate: _____ per cent of individual consumers

PLEASE BREAK DOWN **TOTAL CONSUMER ACCOUNTS RECEIVABLE (including water, electricity, rates, sewerage, and other services) BETWEEN CURRENT AND ARREARS DEBTORS**, FOR THE MOST RECENT MONTH POSSIBLE:

Please enter the approximate rand value of TOTAL CONSUMER ACCOUNTS RECEIVABLE on the lines below (estimate if necessary):

- | | | |
|----|--|--------|
| 6. | CURRENT DEBTORS (30 DAYS AND LESS) | R_____ |
| 7. | ARREARS DEBTORS (BETWEEN 30 AND 60 DAYS) | R_____ |
| 8. | ARREARS DEBTORS (60 DAYS AND LONGER) | R_____ |

IF WATER ACCOUNTS CAN BE DISTINGUISHED FROM ACCOUNTS FOR OTHER SERVICES, PLEASE BREAK DOWN **CONSUMER ACCOUNTS FOR WATER BETWEEN CURRENT AND ARREARS DEBTORS**, FOR THE MOST RECENT MONTH POSSIBLE:

Please enter the approximate rand value of CONSUMER ACCOUNTS RECEIVABLE FOR WATER on the lines below (estimate if necessary; mark "NA" if water accounts cannot be distinguished):

- | | | |
|-----|--|--------|
| 9. | CURRENT DEBTORS (30 DAYS AND LESS) | R_____ |
| 10. | ARREARS DEBTORS (BETWEEN 30 AND 60 DAYS) | R_____ |
| 11. | ARREARS DEBTORS (60 DAYS AND LONGER) | R_____ |

The next few questions focus on PENALTIES FOR NONPAYMENT AND INCENTIVES FOR PAYMENT in your municipality.

12. ARE CONSUMERS WHO DO NOT PAY FOR WATER **PENALIZED BY DISCONTINUING (OR RESTRICTING) WATER SERVICE?**

Please tick the appropriate box:

G	Yes
G	No

13. ARE CONSUMERS WHO DO NOT PAY FOR WATER **ALSO PENALIZED BY DISCONTINUING OTHER SERVICES, LIKE ELECTRICITY?**

Please tick the appropriate box:

G	Yes
G	No

14. IF CONSUMERS WHO DO NOT PAY THEIR WATER BILLS ARE PENALIZED BY DISCONTINUING (OR RESTRICTING) ANY OF THEIR SERVICES, **HOW FAR ARE THEY TYPICALLY IN ARREARS BEFORE THIS PENALTY IS USED?**

Please tick the appropriate box:

G	Between 30 and 60 days in arrears.
G	Between 60 and 90 days in arrears.
G	Between 90 and 120 days in arrears.
G	More than 120 days in arrears.
G	Consumers are not penalized by discontinuing services.

15. ARE CONSUMERS ENCOURAGED TO PAY THEIR WATER BILLS USING **FINANCIAL INCENTIVES**, such as discounts or lottery prizes for those who pay on time?

Please tick the appropriate box:

G Yes
G No

16. DOES YOUR MUNICIPALITY HAVE AN ACTIVE **MASAKHANE CAMPAIGN** OR OTHER INITIATIVE THAT LINKS PAYMENT RATES TO IMPROVEMENTS IN MUNICIPAL SERVICES?

Please tick the appropriate box:

G Yes
G No

17. HOW **OFTEN ARE WATER METERS TYPICALLY READ** IN YOUR MUNICIPALITY?

Please tick the appropriate box:

G Monthly.
G Every 2 to 3 months.
G Irregularly.
G Never.

18. HOW **OFTEN ARE ELECTRICITY METERS TYPICALLY READ** IN YOUR MUNICIPALITY?

Please tick the appropriate box:

G Monthly.
G Every 2 to 3 months.
G Irregularly.
G Never.

The next three questions ask about **CHARGES FOR WATER** in your municipality.

19. WHAT WOULD THE TOTAL MONTHLY WATER BILL BE FOR A TYPICAL HOUSEHOLD CONSUMING **10 KILOLITRES PER MONTH** IN YOUR MUNICIPALITY (excluding once-off installation charges)?

Please enter the figure on the line below (estimate if necessary):

R_____ per month.

20. WHAT WOULD THE TOTAL MONTHLY WATER BILL BE FOR A TYPICAL HOUSEHOLD CONSUMING **40 KILOLITRES PER MONTH** IN YOUR MUNICIPALITY (excluding once-off installation charges)?

Please enter the figure on the line below (estimate if necessary):

R_____ per month.

21. HOW MUCH ARE **INDIGENT (VERY POOR) CONSUMERS** CHARGED FOR WATER IN YOUR MUNICIPALITY?

Please tick the most appropriate box:

G The same rates as otherwise comparable, non-indigent consumers.
G A subsidized or flat rate lower than the rate paid by non-indigent consumers.
G Nothing (no charge).

For each of the following **PAYMENT FACILITIES**, please tick the appropriate box to indicate whether it is available or unavailable to **WATER CONSUMERS** in your municipality.

		AVAILABLE	NOT AVAILABLE
22.	PAYMENT AT MUNICIPAL OFFICES.	G	G
23.	PAYMENT AT POST OFFICES.	G	G
24.	CHEQUE PAYMENTS BY MAIL.	G	G
25.	PAYMENT BY BANK DEPOSIT.	G	G
26.	PAYMENT AT SUPERMARKETS.	G	G
27.	PREPAID METERS (FOR SOME CONSUMERS)	G	G

28. IF **OTHER PAYMENT FACILITIES** ARE WIDELY USED IN YOUR MUNICIPALITY, PLEASE DESCRIBE THEM BRIEFLY BELOW.

29. DO YOU HAVE ANY **PERSONAL SUGGESTIONS OR INSIGHTS ON DEVELOPING EFFECTIVE COST-RECOVERY STRATEGIES** THAT YOU WOULD LIKE TO SHARE? IF SO, PLEASE USE THE SPACE BELOW OR ENCLOSE AN ADDITIONAL SHEET. WE APPRECIATE YOUR INPUT.
