Local Management of a Global Tension:
Cost Recovery and Social Equity in Urban Water and Sanitation Provision in Durban, South Africa

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ABSTRACT

Conventional wisdom in the water and sanitation sector holds that it is difficult to make simultaneous headway towards both cost recovery and serving the poor. The case of Durban, South Africa, is often held to be one of the few examples where significant progress towards both of these ends has been achieved. This thesis asks, to what extent Durban has actually been able to recover costs and meet the needs of the poor and examines how gains in these areas, if any, have been achieved.

This thesis indicates that eThekwini Water Services (EWS), the Durban water and sanitation service provider, has had mixed success in achieving cost recovery. The agency's Water Department has moved towards improved cost recovery since 1994/95. Cost recovery for water supply in Durban is on par with benchmarks set by top-tier African providers but still remains well below standards established by American private sector providers. In the Wastewater Department, however, growing annual deficits have been recorded in every year from 1994/95 to 2002/03.

This thesis shows that the technological and policy innovations implemented by EWS have increased water and sanitation coverage for the poor in Durban. Durban's free basic water policy, in which each household receives 6 kL of water free per month, has been in part responsible for these gains. At the same time, while connectivity has increased, the rate of service disconnections has risen over the period 1994/95 to 2002/03. As well, tariffs have risen for levels of consumption above 6 kL per month. Both of these factors negatively affect poor households, especially those that are large, and temper the gains otherwise made in connectivity.

The dynamic relationship between EWS' cost recovery strategies and efforts to serve the poor is central to understanding the Durban case. The agency recognized from an early point that it was financially prudent not to charge for low volumes of water. This recognition, combined with a need to make cost recovery palatable to the public and elected representatives, made provision of the 6 kL lifeline volume an extremely attractive policy option for EWS. However, the fact that EWS' efforts to achieve cost recovery are so intimately connected with the agency's strategies for serving the poor is the primary reason that the gains EWS has achieved are contested. Furthermore, the fact that the Durban model for achieving cost recovery and serving the poor is so dependent on local administrative capacity and efficiency limits its application more widely. The case should be instructive, however, for advocates for the poor who wish to understand how the rhetoric and complex politics of cost recovery and serving the poor are becoming ever more entwined.

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"Water, thou hast no taste, no color, no odor; canst not be defined, art relished while ever mysterious. Not necessary to life, but rather life itself, thou fillest us with a gratification that exceeds the delight of the senses."

Saint-Exupéry, Wind, Sand, and Stars (1939), 8, Trans. Lewis Galantiére

"The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses."

General Comment 15 (2002)
United Nations Committee on Economic, Social and Cultural Rights

- CHAPTER ONE -

A Conceptual Model for Cost Recovery and Serving the Poor in the Urban Water and Sanitation Sector

1.1 Introduction

Over the past several decades, the diverse constellation of actors working on water and sanitation issues in the developing world has increasingly been resolved into two groups. The first of these groups advocates for cost recovery through user fees as a means to sustainable service delivery while the second emphasizes the need for universal water and sanitation service as an essential poverty alleviation strategy. This chapter presents the genesis of these two very different approaches to service delivery and examines the reasons for the growing divide between the two. The Chapter also serves as the departure point for an in-depth case study of Durban, South Africa. The case study examines a radically different model for meeting the water and sanitation needs of the urban poor in a city that has attempted to chart a course beyond the cost recovery / serving the poor debate.

Experience shows that urban water and sanitation service providers have tended to focus on the achievement of either financial self-sufficiency or equity goals in their overarching approach to service delivery. Broadly speaking, since the development of modern urban water and sanitation delivery systems, providers have made the transition from an early focus on financial self-sufficiency towards increased attention to fulfilling equity goals through intensive state intervention and back again towards a focus on cost recovery. There are two principal reasons for this largely dichotomous approach to service delivery. The first is that the bulk of world experience indicates that it is difficult to make substantial progress towards achievement of both of these ends simultaneously. It seems that service providers consider it better to focus on doing one of these things and doing it well. The second reason for this bipolar approach to urban water and sanitation provision is the large, and growing, gulf between the different groups that support each of these aspects of service delivery. Both cost recovery and serving the poor are promoted by increasingly vociferous and entrenched groups that see themselves as supporting opposing and mutually exclusive interests.

In order to gain a clearer understanding of how cost recovery and meeting the needs of the poor are balanced in urban water and sanitation service delivery, it is critical to define these terms. The following sections present prevailing conceptions of cost recovery and pro-poor service delivery and review the theoretical bases upon which

advocates argue their importance to developing-country water and sanitation planning.

1.2 Cost Recovery

Since the late 1980s, the water and sanitation sector has seen a gradual shift towards greater emphasis on cost-recovery in both developed and developing countries. This transition is part of a broader change in how the state's role in providing services is conceived and reflects the strong influence of neo-liberal economic principles on public sector reform efforts of the past twenty years (Haughton, 2001). Adding to the global push for cost recovery is an increasing recognition of the economic value of water and a realization that, with the withering of the welfare state, public funds to subsidize service will not be available indefinitely (Bond, 1999).

In principle, the concepts underlying cost recovery are simple. Cost recovery entails the recovery of all, or as much as possible, of the costs that are incurred by a service provider in providing a service (McDonald, 2002). For practical purposes, these costs include three major components for the water and sanitation sector: 1) the cost of providing infrastructure, 2) the cost of connecting an individual household to the system, and 3) the cost of operating and maintaining the system (Komives and Prokopy, 2000). While some providers collect fees to cover infrastructure, the greatest emphasis is placed on covering operation and maintenance costs. There are also differences in what cost recovery entails for public and private actors in the water and sanitation sector. Cost recovery for private sector providers generally entails a surplus above and beyond the cost of production to allow for profit. For public sector providers, this may or may not be the case. In both cases, however, the objective is the recovery of the full costs of production.

Beyond recovering the straight-forward financial costs of operation, maintenance and capital expenditure, full cost recovery also implies recovery of the costs associated with the use and depletion of resources (Raftelis, 1989). In the case of water and sanitation service provision, for example, there are often high environmental costs associated with wastewater disposal. In the developing world it is not uncommon for

untreated wastewater to be discharged to lakes, rivers, and streams, with dramatic consequences for the quality of recipient waters. There are also often environmental costs associated with the use of water resources to serve as sources of drinking water. Withdrawal from surface bodies of water may place aquatic species at risk and damage habitat while withdrawal of water from aquifers may lead to salt-water intrusion or physical subsidence of the ground. There are also costs associated with depletion of water resources. These depletion costs reflect the fact that once a natural resource, such as water stored in a watershed, is tapped for use, it is no longer available for alternate uses and is no longer part of the hydrologic cycle of the catchment area. To achieve truly full cost recovery, these environmental and depletion costs should also be reflected in prices charged to consumers (Harris and Tate, 2002).

1.2.1 Implementing Cost Recovery

While the principle underlying cost recovery might be relatively straightforward, its implementation is more challenging and complex. For services that can be measured volumetrically, such as the provision of metered water, cost recovery will be best achieved by charging consumers the full short-run marginal cost of production plus a portion of long-term operating and maintenance costs (McDonald, 2002). Although there are a number of ways of calculating these costs (Dinar, 2000), most models involve a downward sloping marginal cost curve where, as a result of economies of scale, high-volume consumers are charged less per unit of consumption than low-volume consumers.

It is critical to note, however, that many services, such as unmetered household water, cannot be measured volumetrically. Here, cost-recovery models generally rely on the average fixed and variable costs of the service applied as either a flat-rate charge or as a component of the general rates (McDonald, 2002). In practice, long run average cost is also applied to the pricing of metered water provision. Since the engineering pricing techniques adopted by most service providers focus on historic sunk costs as opposed to the future capital costs which are needed to apply marginal cost pricing, long run average cost generally serves as the practical default (McNeill and Tate, 1990).

Whether based on volumetric or flat charges, cost recovery models for water and most other services rely on the concept of "ring-fencing". This concept involves the identification and isolation of all costs and revenues associated with a given service and the removal of subsidies to and from that sector. Ring-fencing means that resources, both human and financial, are not shared between service sectors, unless they are paid for on a cost recovery basis to the sector that provided them (McDonald, 2002). Ring-fencing ensures that providers know all of the fixed and variable costs associated with service delivery. In theory, once these costs are known they can be isolated and charged to the consumer-base.

In reality, however, the actual costs of service provision in the water and sanitation sector are rarely known. Costs to providers are tremendously complex and change frequently due to the "lumpy" nature of infrastructure investment (McDonald, 2002). As well, there are often joint costs that are difficult to divide between sectors, and methods of accounting for externalities are rarely adequate (Renzetti, 2000). At best, then, cost recovery models are approximations of real costs and, instead of full cost recovery, it is *fuller* cost recovery that most service providers seek to achieve. In practical terms, most providers attempt to achieve fuller cost recovery by charging prices that are as close as possible to marginal cost in the short term, and to average cost in the long term, with the eventual aim of achieving full cost recovery (McDonald, 2002).

1.2.2 Benefits of Cost Recovery

Knowing what cost recovery is in economic terms, though, is only part of the equation. It is also important to understand exactly why it is considered to be so important. The central argument for cost recovery is that, if consumers pay enough to cover the costs associated with a service, there will be an increase in the financial and social sustainability of service delivery. Proponents of cost recovery maintain that water and sanitation service delivery is improved both quantitatively and qualitatively when service providers engage in efforts to recover costs (Kalbermatten and Listorti, 1984). There is, however, considerable debate over the degree to which this is true in practice.

The most commonly cited arguments for cost recovery are fiscal. According to the World Bank (1998), the most important reason for applying cost recovery is the need to "balance the books" as a "matter of good public fiscal practice". By applying cost recovery, governments can reduce tax burdens to better attract and retain human and financial capital and redirect limited government resources to funding other services, such as health and education. The strength of competitive pressures means that cost recovery, as a mechanism for reducing cross subsidization from industry and high-income households, is an attractive option for many local governments and service providers (McDonald, 2002). In an era of steadily declining central government transfers, municipal governments are under increasing pressure to reduce tax and tariff rates in order to attract firms and investment and compete for investment and increasingly mobile flows of private capital (Kerf and Smith, 1996). It is not surprising, then, that governments are increasingly pushing cost recovery as a way to secure the funds needed for infrastructure investment and expansion.

Proponents of cost recovery also contend that it is a vital means for sustaining services on a long-term basis. Without cost recovery, many developing countries will not have the funds to invest in future service and infrastructure needs or the capital necessary to finance upgrades or extensions in service (Komives and Prokopy, 2000). Since, in the developing world, investment in capital construction is often emphasized over operation and maintenance, cost recovery through user fees is seen as a means of securing funds for these vital, but under-funded, activities. As well, cost recovery through user fees can provide the additional money needed to fund expansion of service to otherwise unprofitable areas, which tend to be poor. Because cost recovery provides a means for financing further improvements in service and expansion it is often considered a necessary step to ensure that poorer, marginal areas remain connected (Brook and Locussol, 2002). In an era of considerable cut-backs in inter-governmental transfers to local governments, the need for cost recovery to secure the financial resources needed for system improvements is more vital than ever.

Another important set of arguments for cost recovery take their root in political and civic considerations. The line of reasoning underlying these arguments is that if people have a "right" to receive water service, then they also have a "responsibility"

to pay for it (McDonald, 2002). Considerable work, on the part of international, national, and local agencies, has gone into promoting the notion of civic responsibility through educational programs and literature focused on encouraging citizens to pay bills for water and other services. A related argument is found in the extensive "willingness to pay" literature. The rationale of this work is that most people accept their duty to pay the full cost of service delivery as long as service is reliable, affordable, and of high quality. This is especially true of poor households who, research shows, often pay considerably more per unit volume of water than well-off households in payments to private water providers or in investments of their own time in securing alternate sources of water (Whittington, Briscoe, and Mu, 1990). Additionally, willingness-to-pay research reveals that households who do not have access to municipal networks often pay more for water and sanitation service, for example to private vendors, than they would pay for the full cost of a connection to the municipal system (Bakker, 2002).

There are also strong environmental arguments advanced to promote the cause of cost recovery. Subsidization, it is argued, promotes wasteful consumption of environmentally sensitive resources. This is of special concern in many developing nations, especially on the African continent, where urban water supply is severely limited due to innate environmental conditions. Since the "correct" value is not reflected in the price, there is little financial incentive to limit consumption of water or other publicly provided services (Serageldin, 1994). In short, subsidization engenders waste while cost recovery encourages conservation. The World Bank, for one, argues that price signals should be sent through rising block tariffs in order to curb over-consumption by the rich (World Bank, 1994). With downward sloping cost curves for many services, these rising block tariffs are considered essential if conservation is to be achieved through pricing signals.

Building on the commonly cited environmental arguments for cost recovery, it is also often argued that it is only through paying the full cost of a service that a consumer can appreciate its full "value". Receiving a service for free, or having it heavily subsidized, distorts not only its exchange value but also its use value (McDonald, 2002). According to the World Bank (1999), only "a fee reflecting the costs will encourage users to correctly value the service they receive". Charging a fee will "help reverse the 'entitlement mentality' that has been the historical result of

subsidizing public services". And by extension, users who pay for a service tend to have a vested interest in seeing that the service is reliable and of reasonable quality. Users who pay for service generally take an ownership stake in that service and are more likely to make demands of their service provider, thus driving improvements in responsiveness and accountability that are often lacking in developing-country agencies. Cost recovery is said to improve performance on the part of service providers by giving customers an interest in seeing service that meets their expectations.

The final benefit attributed to cost recovery is that it promotes efficiency, accountability, and transparency by giving providers an easy indicator of performance – a surplus spells success, while a deficit spells failure. By the same logic, subsidies, by ignoring the bottom line, are seen to contribute to governmental mismanagement and promote inefficiency. The application of cost recovery in urban water and sanitation service provision is, therefore, fundamentally connected to the introduction of business principles into the sector. The introduction of cost recovery is also a key component of a larger drive to commercialize public services, particularly in the developing world, by applying business concepts to public sector, ring-fenced agencies. By forcing managers to think about the bottom line, it is thought that cost recovery engenders creativity, leads to transparency, and provides an incentive to improve service delivery (McDonald, 2002).

1.3 Meeting the Needs of the Poor

As is the case with the provision of any service with distinct public characteristics, there are substantial equity considerations associated with access to water and sanitation. In the past, disparities in coverage between rich and poor were traditionally dealt with through subsidization of service to low-income households (Bond, 1999). However, as the result of a global decline in the disbursement of public funds for subsidization of service delivery, there are growing concerns that the poor are facing inordinate increases in rates, declining levels of service, or loss of service altogether (McDonald, 2002). This is especially true in the developing world, where the decline in public spending has been most abrupt. In concert with this decline in the availability of public funds, concerns have increasingly arisen over the

degree to which the push for cost recovery has further compromised the poor's access to water and sanitation and slowed expansion of service to the underserved.

Advocates for serving the poor argue that there are strong health and economic arguments for ensuring that all urban residents receive water and sanitation services. These individuals argue that there are strong economic multipliers associated with providing the poor with access to water and sanitation services (Bond, 1999). Adequate water and sanitation services are seen as necessary preconditions for economic development. Likewise, the strong positive and negative health–related externalities associated with water and sanitation are seen to militate for serving the poor. If the poor are healthy, there are positive externalities that accrue to the rest of society. If the poor are unhealthy, then there are strong negative externalities that can likewise have profound ramifications for the rest of the population. For these reasons, many consider it prudent to ensure that the poor have access to some minimum level of water and sanitation services that can ensure basic levels of both health and productivity. In fact, experience in the United States shows that, since the early 20th century, investments in water and sanitation services for densely populated, low-income communities are seen as a form of health insurance for wealthier neighboring communities.

At the international level, the needs of the poor and the responsibilities of service providers are quite clear. The World Health Organization, World Bank, and USAID, for instance, have all established clear benchmarks for the level of water and sanitation service that is required to meet basic needs (Gleick, 1996). These standards all call for a basic allotment of 20-40 liters of water per person per day. These international standards seek to ensure that the poor, or other typically underserved populations, receive some basic level of coverage that meets daily requirements needed for health and subsistence. However, international standards, such as those laid out by the World Health Organization, are often beyond the capacity of many developing nations to meet in the short term. Since the definition of "poor" and "underserved" varies considerably across countries and governments vary widely in their willingness and ability to address the challenge of serving these groups, the result has been a hodge-podge of national standards and policies that have left dramatic gaps in coverage, especially in the poorest of nations.

The statistics on access to water and sanitation in the developing world are undeniably grim -- 3.4 million people, mostly children, die annually from water-related diseases, 2.4 billion people lack access to basic sanitation, and 1 billion people lack access to even improved water sources (United Nations, 2003). Given the scope of the challenge faced in the rapidly growing cities of the developing world especially, a number of approaches have been developed at the international, national, and local levels to meet the water and sanitation needs of the poor.

The traditional approach to addressing equity concerns that arise from the pricing of volumetrically-measured services has been to implement increasing block-tariffs that ensure that poor, low-volume consumers do not subsidize wealthier, higher-volume consumers. These block tariffs make initial levels of consumption more affordable by charging higher than marginal cost prices at upper levels of consumption. The increased revenues gained from high volume customers are then used to subsidize low volume, and hopefully, poor customers. As mentioned, increasing block tariffs have two important progressive benefits: 1) they provide consumers with a level of subsidized consumption and 2) work to curb consumption by high-volume consumers. In the case of services that cannot be measured volumetrically, equity concerns are often dealt with through the use of differential rates, determined according to household income through a means test or through some form of property valuation.

There are several critical problems with the use of standard increasing block tariffs as a means of addressing equity concerns in water and sanitation delivery. Typically, for example, the blocks that constitute the tariff schedule are poorly devised. As a result, a very large number of households often fall in the first or second block of the tariff and thus end up receiving heavily subsidized water. Since, with an increasing block tariff, consumers face a low volumetric per-unit price up to a specific quantity or block, households perceive additional water within a block to be cheap (Whittington, 2002). Since block tariffs fail to reflect the real economic cost of water and water is often in limited supply, many households use all the water they can get from the distribution system. Under water-scarce conditions, such behavior may lead to water shortages and households may turn to water storage tanks to take advantage of the ensuing lack of reliability. Increasing block tariffs may also disadvantage the poor in circumstances where multiple households share a

connection. When poor households share connections and water bills are calculated on the basis of a block tariff that was designed for single households, the bill will reflect a higher average cost of water. As a result, poor households sharing a connection under increasing block tariff conditions typically pay higher average per-unit costs than middle and upper income households (Whittington, 1999).

Advocates of cost recovery have presented full cost recovery as an alternate means of addressing the challenge of serving the poor and underserved in the water and sanitation sector. Rather than attempt to secure increasingly scarce funds to pursue the traditional path of subsidization, advocates of cost recovery propose that the poor's lot can be best improved through application of the cost recovery model. Since research indicates that the poor actually pay more for water and sanitation than the rich in many cases, they too can benefit from introduction of a strict cost recovery model (Komives *et. al*., 2001). By giving the poor an option other than private water vendors, service providers can save the poor valuable money that can then be applied to other household needs. Advocates of cost recovery argue that the strong inverse relationship between income and the amount paid for water means that cost recovery is in itself an effective pro-poor policy.

Cost recovery is, however, only one of a number of novel techniques and policies that have been advocated over the past several decades as a means of improving service to the poor. Other common approaches to addressing the needs of the poor with regard to water and sanitation service include the development of flexible technical standards for service delivery in developing countries (World Bank, 2002). The rationale underlying this approach is based on the fact that standards for delivery adopted in the poorest nations are often perversely rooted in developed country experience and have little relevance to the unique conditions of developing world cities. For this reason, advocates have lobbied to reduce standards and introduce semi-pressure water delivery systems, tanker trucks that fill local cisterns and household tanks, condominial sewers, and new varieties of modern but inexpensive latrines. All of these approaches focus on lowering the cost of service to improve affordability. By providing less expensive service options to the poor, it is hoped that they will be able to gain access to basic services on financial terms that are more suited to their incomes.

Increasingly, however, a more dramatic approach to meeting the water and sanitation needs of the poor has been broached. The provision of free water is a policy option that is attracting a growing number of proponents (WHO, 2003). Often the rationale underlying this approach to service delivery is rooted in a human rights framework (Gleick, 1999). In the same way that other human rights, including the right to health, have been enshrined in a number of international conventions and declarations, advocates of the poor have increasingly called for a human right to water. Indeed, some have said that the Universal Declaration of Human Rights of 1948 (United Nations, 1948), which guarantees all people a right to a standard of living adequate for their health and well-being, has long provided the grounds for declaring access to water a human right.

In the past several years, however, it has no longer been necessary to look to the 1948 declaration to find a basis for a contemporary human right to water. This is because provisions for a human right to water were given stronger support in 2000, when the United Nations Committee on Economic, Social and Cultural Rights, adopted a General Comment on the right to health. This General Comment interprets the right to health as an inclusive right that extends not only to timely and appropriate health care but also to those factors that determine good health (WHO, 2003). These factors include access to safe drinking-water and adequate sanitation. In 2002, the Committee further recognized that water itself was an independent right. Drawing on a range of international treaties and declarations, it stated: "the right to water clearly falls within the category of guarantees essential for securing an adequate standard of living, particularly since it is one of the most fundamental conditions for survival" (United Nations, 2002).

Regardless of their available resources, all states have an immediate obligation to ensure that the minimum essential level of a right is realized. In the case of water, this minimal level includes ensuring people's access to enough water to prevent dehydration and disease (WHO, 2003). There is, however, no strict enforcement of this type of right. Instead there is a recognition that the realization of human rights is dependent on local resources and is subject to the principle of progressive realization. This principle mandates the realization of human rights within the constraints of available resources and creates a constant and continuing duty of states to move quickly and effectively towards the full realization of a right. Steps

towards the full realization of rights must be deliberate, concrete, and targeted as clearly as possible towards meeting the human rights obligations of a government (WHO, 2002) and may include legislative, administrative, financial, educational, and social measures or the provision of remedies through the judicial system.

A rights-based approach to meeting the needs of the poor has implications for a range of actors concerned directly or indirectly with water issues. Governments, as primary duty-bearers, must take concrete steps to respect, protect, and fulfill the right to water, and ensure that anyone operating within their jurisdiction does the same (WHO, 2003). Approaching development from a rights perspective is held to have the added benefit of informing people of their legal rights and entitlements, and empowering them to achieve those rights. Rather than seeing people as passive recipients of aid, the rights-based approach puts the individual at the centre of development. Furthermore, proponents contend that a rights-based approach will deliver more sustainable solutions because decisions are focused on what communities and individuals require, understand and can manage, rather than what external agencies deem is needed.

1.4 Relationship Between Cost Recovery and Serving the Poor

It has been proposed that the extensive "hollowing out of the state" that has transformed the water and sanitation sector over the past two decades, and the push for cost recovery that has followed in its wake, have forced service providers to sacrifice serving the poor in order to meet financial targets. But is it true that cost recovery is incompatible with achieving equity goals in water and sanitation service delivery? While not mutually exclusive, these two rationales certainly do not seem to be immediately compatible in their individual efforts to make water widely available (Jaglin, 2002). The fact that the water and sanitation sector throughout the world, and in the developing world in particular, has undergone great shifts in approach from one to the other, as opposed to engaging in any melding of the two, would seem to lend credence to the belief that cost recovery and satisfying equity goals do not lend themselves to each other. Critics of cost recovery and an increasing number of the developing-world poor themselves contend that cost recovery has not simply become a more important part of a balanced service delivery ethos, but has

rather become a fixation that has displaced prior models that emphasized subsidization. This has led to a sharp decline in state intervention on behalf of the poor and ultimately failed to satisfy the water and sanitation needs of the urban poor.

As we have seen, proponents of cost recovery have been quick to rebut the contention that there is a necessary tradeoff between cost recovery and serving the poor. They claim that a shift towards cost recovery does not necessarily mean an abandonment of the pursuit of equity or of serving the poor. Rather, they hold that the pursuit of cost recovery is, in itself, a pro-poor policy that serves to ensure greater levels of service to all consumers. In some cases they also maintain that a focus on cost recovery does not necessarily spell a complete end to subsidization and that targeted assistance and rising block tariffs may be helpful, if not essential, for meeting equity targets. As well, its advocates maintain that, in the face of the decline in public funds targeted directly towards the needs of the poor, cost recovery is an ever more powerful strategy for ensuring that the poor are guaranteed a minimum quality of service. By paying the full cost of water supply, users ensure that the service they receive is reliable, sustainable, and meets their needs. Ultimately, this is often cheaper than the expensive private options that the poor usually turn to when unsustainable subsidized services fail.

This complex dynamic between cost recovery and serving the poor is more than a theoretical disagreement, however. The tension between the two has had a considerable impact on the global community's ability to achieve water and sanitation goals at the international, national, and local levels. Critically, both cost recovery and meeting the needs of the poor are clearly stated goals for many water and sanitation service providers. Often, in an effort to satisfy advocates on both sides of the cost recovery/equity debate, strong legislation supporting both ends has been adopted with little consideration of how, in practice, they can be achieved side-by-side. As a result there has been considerable discussion in the literature and in policy circles regarding how to institutionalize and implement both cost recovery and equity goals in service delivery. Given the conflicts that appear to be inherent between these two ends, the result has been considerable confusion on how to meet international and domestic targets for the sector.

Tension between cost recovery and serving the poor - or, perhaps more accurately, the groups that support these approaches - has hindered the fulfillment of past goals for the water and sanitation sector at the global level. For instance, during the World Summit for Children in 1990, a commitment was made to secure universal access to safe drinking water by the year 2000 (UNICEF, 2002). Failure to achieve this goal may, in part, be attributed to the fact that the bodies charged with coordinating cost recovery and the achievement of equity goals failed to communicate and cooperate effectively. The World Bank, which sought to secure financing for projects which could help meet the goal, focused increasingly on cost recovery and privatization over this period. The United Nations WHO and other humanitarian agencies, on the other hand, while working to ensure that the poor and underserved in particular gained access to basic services, focused on a more traditional approach centered on aid, education, and subsidization. It seems undeniable that any success in bridging the divide between cost recovery and serving the poor will allow for great progress in fulfilling future targets in the water and sanitation sector.

1.5 Local Management of a Global Tension: Cost Recovery and Social Equity in Urban Water and Sanitation Provision in Durban, South Africa

This chapter has outlined the arguments for both cost recovery and serving the poor in urban water and sanitation service delivery. In South Africa, as elsewhere, the tension between the two is highly evident. However, the South African story, and that of the City of Durban in particular, departs from much of the body of international experience and is widely held to indicate that reconciliation between equity and cost-recovery objectives is possible. In contrast to the prevailing wisdom of water and sanitation practitioners, the Durban case suggests that, under certain circumstances, it is possible to make substantial, simultaneous progress towards both fuller cost recovery and improving service to the poor. Moreover, these gains have been made without privatization of the city's water and sanitation utility, a strategy that many donor agencies advocate as essential to building the political will needed for establishing cost-recovering tariffs. In the remaining chapters of this thesis, I investigate how eThekwini Water Services has seemingly moved towards achieving full cost recovery through user fees, while also extending services to low-income households. I also examine the arguments of those who contend that these

gains are not uncontested and have come at a price – particularly for the poorest of households in Durban. Finally, I will discuss the extent to which the lessons of the Durban case can be extrapolated to other municipalities in the developing world.

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"Hold a glass of pure water to the eye of the sun!
…. This is the nearest analogy to the essence of human life
Which is even more difficult to see.
Dismiss anything that you can see more easily;
It is not alive – it is not worth seeing."

Hugh MacDiarmid "The Glass of Pure Water" 1962

- CHAPTER TWO -

Water and Sanitation Provision in Durban, South Africa: Site Setting and Methods

2.1 Introduction

This chapter presents the setting for the Durban water and sanitation case study and introduces the methods that will be employed to address the central question of the thesis. The chapter begins with a presentation of the broad geographic, demographic, and political setting of Durban, a city that is widely held to be a role model in water and sanitation service delivery for its successes in achieving cost recovery and serving the poor. The chapter then introduces the specific context for water and sanitation service delivery in South Africa, first at the national level and then for Durban specifically. It then describes the Durban service area and summarizes extant conditions in the city regarding both water and sanitation coverage. The chapter concludes with a presentation of the methods that will be employed to determine to what actual extent, and how, Durban is able to recover costs and meet the needs of the poor with respect to urban water and sanitation.

2.2 Durban – Geographic, Demographic, and Political Setting

The largest settlement in the province of KwaZulu-Natal, Durban is a major port city on South Africa's eastern coast (30°20'00" S, 31°12'00" E) (Figure 2.1). Durban is also the second-largest industrial hub in South Africa, after Johannesburg, and is one of the country's fastest growing urban centers (Brocklehurst, 2001). With a population of approximately 3 million people, Durban's residents primarily live in free-standing low-cost housing units and, although the city has a number of upper-class suburbs, at least 1 million inhabitants live in informal peri-urban settlements (Roberts and Diederichs, 2002).

Figure 2.1 Geographical location of Durban, with respect to Southern Africa [Source: www.mapquest.com]

The transition from Apartheid rule to democracy in South Africa brought many changes in the way that the nation and its cities are run. Primary among these were changes in the size and composition of the country's largest metropolitan areas, including Durban. In Durban, an initial expansion of the city took place in 1996 that increased the size of the city from a municipal area of 300 square kilometers to a transitional area of 1,366 square kilometers, creating an assemblage known as the Durban Metropolitan Area (DMA). In 2000, the DMA was further enlarged to encompass a total area of 2,297 square kilometers (Roberts and Diederichs, 2002). These dramatic enlargements of the city are important since the inclusion of large areas of peri-urban, rural, and tribal lands within the city's boundaries radically redefined both the identity of the city and the responsibilities of local government. As a result of these changes, the contemporary city of Durban – now referred to as the eThekwini Municipal Area (EMA) - has a full 60% of its territory composed of land that is peri-urban or rural in nature (Roberts and Diederichs, 2002).

Prior to 1996, the racial structure of South African cities was enforced by local government systems that were expressly constituted on a racial basis. White local

governments controlled the city center, commercial and industrial areas, and the White suburbs. Subordinate bodies were established for Indian and Colored areas and nationally appointed boards administered the Black townships until the 1980s, when they were replaced by provincial authorities. In Durban, the system was further complicated by the existence of privately held Indian and Colored land and the involvement of local tribal authorities in land management. The result was a highly fractured and uncoordinated system of urban governance that resulted in gross inequities in the level of basic services delivered to citizens across jurisdictions. As an indication of the complexity of local government under Apartheid, before designation of the Durban Metropolitan Area in 1996, a combination of 52 individual authorities controlled different parts of Durban (Hindson and Ngqulunga, 2000).

The political and economic landscape of Durban has changed dramatically over the past decade in response to the fall of the Apartheid system and the institution of democratic systems of national and local governance. In 1989, under the leadership of President de Klerk, and through the continued activism of the African National Congress (ANC) and a host of other political groups, the Group Areas Act (1950) was repealed. This Act had long been a cornerstone of the Apartheid regime's policy of racial segregation and had served to control where people of different races could live and work. In 1990, the ANC itself was unbanned and, in 1994, South Africa held the first democratic elections of the post-Apartheid era.

In conjunction with the political changes that confronted Durban during the 1990s, the city also underwent an intense demographic change. Since 1990, Durban has experienced a period of rapid urbanization and population growth that is largely a result of increased rural to urban migration (Kayaga and Franceys, 2001). This migration can trace its origins to a number of distinct sources – including political violence, severe drought, and unemployment – that have all been exacerbated by the widespread socio-political changes that have swept the nation over the past decade.

Despite the fact that Durban is a relatively wealthy city by African, and even South African, standards, poverty is still a serious problem. The Durban Metropolitan Profile of November 1999 reported that 41 percent of the economically active

population of the DMA was not in formal employment and that 43 percent of households earned less than 1450 Rand[1] per month (Durban Metro Unicity, 1999).

As with many features of life in South Africa, incomes in Durban continue to reflect the biases of the Apartheid era. Despite having a diverse population composed of four principal racial groups - Blacks (61%), Indians (24%), Whites (13%), and Coloreds (2.9%) – Whites continue to have the highest average incomes, with Blacks lagging well behind both Indians and Colored citizens (Hindson and Ngqulunga, 2000). The Report on Poverty, Inequality, and Human Development (2000), taking 417.17 Rand per month as the benchmark of poverty, found that 67% of the Black population live in poverty, compared to 2% for Whites, 21% for Coloreds, and 21% for Indians.

2.3 Water Delivery in South Africa

With the election of the Government of National Unity in 1994, South Africa was faced with the enormous task of undoing decades of differential service provision across the races. According to statistics from that year, 56.7% of the Black population in South Africa, totaling 17.3 million people, did not have access to adequate water supply (DWAF, 1994). The situation for sanitation services was even worse in 1994, with 21 million people lacking access to adequate sanitation facilities (DWAF 1996).

Urgent measures were clearly needed to address the water and sanitation crisis that faced the nation after the collapse of Apartheid. Among the most radical approaches taken to address the problem was the drafting of a new Constitution and Bill of Rights that guaranteed all citizens the right to a safe environment and access to sufficient water and food (South Africa, 1996). In order to realize the newly created rights that flowed from the new Constitution, a number of laws were drafted that have had a profound impact on water and sanitation service delivery. The Water Services Act (1997), the National Water Act (1998), and the National Environmental Act (1998) have all served to reorient the delivery of water services in post-

[1] Prices in this thesis are reported in South African Rand. The exchange rate as of 1 May 2003 was 1 $US = 7.295 ZAR. (www.economist.com/markets/currency/)

Apartheid South Africa towards fulfilling the obligations laid out in the new South African Constitution (Stein and Niklaas, 2002).

When the first government of post-Apartheid era came to power in 1994, a critical component of its agenda was the formulation and delivery of the national Reconstruction and Development Program (RDP). This program aimed to improve the quality of life of all South Africans, particularly those that had been excluded during the years of Apartheid. The RDP was intended to make real the promises outlined in the new South African Constitution, particularly with regard to basic services and infrastructure. The government was keenly aware of the importance that water and sanitation services would have in building a strong nation. In order to achieve their goals for the sector, a new Department of Water Affairs and Forestry (DWAF) was established in July 1994 to spearhead the efforts of the RDP. The objectives of this new department with regard to water and sanitation services were spelled out in November of the same year in a seminal White Paper. This paper clearly states that, "The goal of the new Department of Water Affairs and Forestry is to end the inequity in access to basic water supply and sanitation services" (DWAF, 1994).

The 1994 DWAF White Paper also outlines the financial approach that should be adopted by local authorities to ensure adequate water and sanitation service provision. In outlining the nation's cost recovery policy, the document states:

> *"The basic policy of the Government is that services should be self-financing at a local and regional level. The only exception is that, where poor communities are not able to afford basic services, Government may subsidize the cost of construction of basic minimum services but not the operating, maintenance, or replacement costs." (DWAF, 1994)*

For urban water services in particular, the 1994 White Paper clearly indicates that service providers should ensure all households receive a minimum level of basic service within a reasonable time frame (Kagaya and Franceys, 2001). Urban service providers are given responsibility for facilitating the provision of higher service levels through appropriate financing and tariff mechanisms, while also ensuring the financial viability of the water and sanitation sector at the municipal level. To help in areas with limited potential for economic sustainability, the DWAF White Paper states the national government's commitment to assisting cities through the fund of capital

costs for service extension (Kayaga and Franceys, 2001). In effect, the White Paper lays out the two guiding considerations that are to guide water and sanitation service providers in the post-Apartheid era: cost recovery and serving the poor.

The legal framework for implementing the 1994 DWAF White Paper is found in the Water Services Act of 1997. This Act reiterates the right of every citizen to basic water supply and sanitation and outlines the responsibility of all water service institutions to take appropriate measures to effectuate these rights. The Water Services Act dictates that, in setting water service tariffs, the responsible Minister may differentiate between users, different types and qualities of service, and by geographical area (DWAF, 1997). Furthermore, it calls for the Minister, in prescribing the norms and standards for tariffs, to consider, among other factors, social equity, as well as the recovery of costs reasonably associated with providing the water services (Kayama and Fraceys, 2001).

Section 4, subsection (3), part (c) of the Act gives the following conditions:

> *"Procedures for the limitation or disconnection of water services must - …(c) not result in a person being denied access to basic water services for non-payment, where that person proves, to the satisfaction of the relevant water services authority, that he or she is unable to pay for basic services". (DWAF, 1997)*

Ultimately, the varied documents and legislation that have been produced by the South African government since the fall of Apartheid lay out two clear principles by which the sector is to be governed. These two principles, of recovering costs and serving the poor, have been achieved with limited success by South African municipalities (Alence, 2002). Perhaps none, however, is thought to have had as much success at achieving both as Durban. It is clear that, if South African cities are to move towards fulfilling the broad commitments laid out for the sector at the national level, there will need to be deeper appreciation for how the most successful cities have worked to simultaneously achieve both of these ends.

2.4 Water Delivery in Durban

Water and sanitation service delivery in Durban is widely referenced in the literature as a sectoral success story and as a glimmer of light in the dark tunnel of public sector service provision in the developing world. One of the most important reasons

for Durban's widespread acclaim is that it is purported to have achieved something few other cities in the developing world, and the developed world, have managed – that is, to have simultaneously achieved cost recovery and met the needs of the poor.

Water and sanitation services in Durban are provided by eThekwini Water Services (EWS). EWS is the department of the eThekwini Municipality, as the city government is known, with responsibility for water supply, sanitation, and solid waste disposal. The agency adopted its name in 2001 to reflect the new title given to the Durban Metro Unicity. EWS replaces Durban Metro Water Services (DMWS), the name of the agency created by Act of Parliament in 1996 to provide water and wastewater services to the area under the jurisdiction of the Durban Metropolitan Council.

Both Durban and EWS are unique in many respects. For instance, Durban was the first urban jurisdiction in South Africa, and perhaps the world, to constructively recognize a human right to water. As the first urban center to act on the human right to water enshrined in the South African Constitution and Bill of Rights, Durban has effectively served as a template for other municipalities in the nation.

The means through which Durban has implemented the human right to water is particularly innovative, and has now been incorporated into national-level policy for the water and sanitation sector. In 1998, Durban instituted a policy of providing all households with 6 kL of water free per month. Provision of this "lifeline" volume of water to all households is the means through which the human right to basic water and hygiene is operationalized in Durban and is now the cornerstone of the national government's policy for fulfilling basic water needs.

Durban has also instituted a number of other frequently cited pro-poor services in the EWS service delivery area. These include the development of a number of different supply service levels that allow more affordable water to be sent to low-income households. As a result, three different water service options are now available within the EWS service area: (1) a conventional full-pressure water delivery, (2) a semi-pressure systems that operate with roof tanks, and (3) a low-pressure system that operate with ground tanks (Brocklehurst, 2001). Both the semi- and low-pressure systems can be installed at lower cost than conventional

systems since they use small-diameter, low-pressure pipes. The result of this innovative approach to service delivery is a system that responds effectively to consumer demand and maximizes the number of potential customers in the agency's service area.

A system of water bailiffs has also been introduced by EWS to operate standposts, from which they sell water to residents that do not have access to conventional systems, or either low-pressure option. According to the World Bank, this ensures that everyone has access to water supply of some sort (Brocklehurst, 2001). In some areas, automated standposts have also been established. These allow residents to use pre-paid cards to access the water distribution system.

EWS is also unique, not only for being at the forefront of efforts to meet the water and sanitation needs of the urban poor, but for its efforts to meet the second great demand placed on South African municipalities under the Water Services Act of 1997 – cost recovery. Durban was among the first South African municipalities to move towards full cost recovery through user fees for water and sanitation service provision.

2.5 Definition of EWS Service Area and Customer Base

The service area of EWS covers 100% of the eThekwini Municipality, an area known as the eThekwini Municipal Area (EMA). The EMA represents a total area of 2,297 square kilometers and is home to a population of approximately three million people (Roberts and Diederichs, 2002). There are seven operational areas within the EMA: Metro, Central, Inner West, Outer West, North, South, and Umkomaas. Figure 2.2 shows these operational areas as well as several transitional districts which are being absorbed into the EMA.

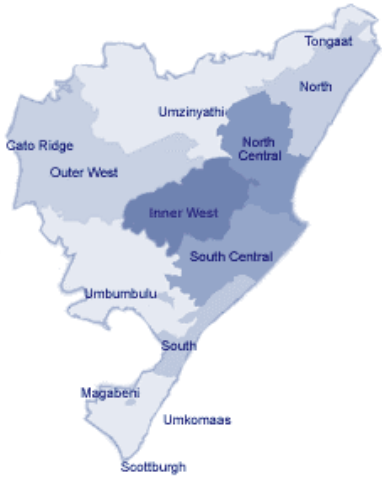

Figure 2.2 Map of EWS operational divisions within the eThekwini Municipal Area (EMA) [Source: eThekwini Municipality (2002)]

A selection of key geographic and service delivery parameters for the EMA is provided in Table 2.1. These figures provide an indication of the total dimensions of the service area and the human and geographic scale over which EWS operates.

Table 2.1 Geographic dimensions and service delivery parameters of the EMA

Parameter	Value
Total Population of Service Area	3,000,000 [+]
Total Number of Households in Service Area	674,419 *
Total Area (km^2)	2,297 [+]
Percent of Population in Formal Areas (%)	75
Percent of Population in Informal Areas (%)	25
Total Area – Urban (km^2) / (%)	934 / 41 [++]
Total Area – Rural (km^2) / (%)	1363 / 59 [++]

[+] (Roberts and Diederichs, 2002).
*Assumes average household sizes of 4.5 in formal areas and 4.3 in informal areas (Durban Metro Unicity, 1999).
[++] Calculated using figures from eThekwini Municipality (2002) and Durban Metro Unicity (1999).

As shown in Table 2.1, the major portion of the EMA actually consists of peri-urban and rural lands. The total population of the 3,000,000 of the EMA corresponds to 674,419 households, calculated using average household size figures reported by the Durban Metro Unicity (1999)

2.6 Current Water and Sanitation Coverage Levels

An understanding of overall water and sanitation coverage in Durban is an essential precursor to pinpointing where gaps in service exist and identifying those populations that face a particular need for improved access to services. The absolute number of connections and households served provides a comprehensive picture of the degree of connectivity that EWS has been able to achieve in the service area to date. These values are reported in Table 2.2.

Table 2.2 Water and sanitation connectivity in the EMA.

Water		
Household Connections	Households with metered water connections	352,000
	Households lacking Metered water connections	144,000[+]
Individuals Served	Municipal Water Service	2,500,000
Sanitation		
Household Connections	Households with waterborne sewerage	326,000
	Households lacking Waterborne sewerage	212,000[+]
Individuals Served	Total Sewerage	2,500,000
	Waterborne Sewerage	1,500,000
	VIPs and Septic Tanks	1,000,000

[+] (eThekwini Municipality, 2002)

As indicated in Table 2.2, there is considerable variation in the levels of water and sanitation service provided to Durban's residents. These services range from fully metered household water connections and waterborne sewerage to water collection from natural water bodies and pit toilets. As indicated in Table 2.2, municipally-provided water and sanitation services provide coverage for 2.5 million of Durban's 3 million residents.

While the total number of household connections appears relatively low, at 352,000, it is important to note that this likely underestimates the number of households served (Macleod, 2003). With formation of the EMA, large amounts of rural area were added to the municipality, and many rural-dwellers are known to source their own water from outside the city network through wells and boreholes (eThekwini, 2002). As well, many metered connections serve multiple households, as is the case

with the city's rapidly increasingly number of condominiums. After taking these factors into account, Durban's most recent estimates of the number of underserved households – that is, those that lack piped water and waterborne sewerage - are 144,000 for water and 212,000 for sewerage (eThekwini Municipality, 2002).

Water and sanitation coverage rates, calculated as the population with individual or shared water and sewerage connections divided by the total population of the service area, are reported in Table 2.3. These rates provide a comparative value against which historic levels of provision in Durban, and any future improvements, may be measured. The values reveal that waterborne sanitation (that is a sewerage system that carries waste via a water-flushed network) has yet to reach many households that do have access to piped water connections. As noted in Table 2.2, an estimated 68,000 households that have access to piped water still lack access to waterborne sewerage (eThekwini Municipality, 2002).

Table 2.3 Water and sanitation coverage rates for the EMA.

Service Type	Coverage Rates (% of Population with Service)
Total municipal water coverage rate	83%
Total sewerage coverage rate	83%
Waterborne sewerage coverage rate	50%
VIP and septic tank sewerage coverage rate	33%

[Source: eThekwini Municipality, 2002]

2.7 Methods

The objective of this study is to begin to understand to what actual extent, and how, Durban is able to achieve cost recovery and meet the needs of the poor in the urban water and sanitation sector. To meet this objective, an analysis of service delivery by EWS will be conducted with the aim of answering the following key questions:

1. To what extent are costs being recovered?
2. To what extent are the poor being served?

To come to an understanding of how, or under what conditions, Durban is able to achieve the levels of cost recovery and service delivery to the poor that it does, I will triangulate between information gleaned from:

1. A comprehensive literature review
2. An analysis of numeric data on the application of pro-poor and cost recovery strategies
3. Interviews with key players in the Durban water and sanitation sector.

2.8 Data collection techniques

Data for a wide variety of variables with relevance to cost recovery and serving the poor were collected from EWS over the Spring of 2003. Mr. Neil Macleod, Executive Director of EWS, kindly provided numeric data from the agency's records. These records relate to the agency's expenses and revenues, to customer billing, and to the implementation of both pro-poor and cost recovery strategies. This time-series data is compiled annually and covers the period from 1994/95 to 2002/03.

Numeric data provided by EWS will be used to calculate and compile a series of standard indicators for both the achievement of cost recovery and service delivery to the poor. The value of these indicators should provide a clear indication of the nature of service delivery in Durban in absolute terms and in comparison with benchmark values for the sector.

Interviews and correspondence with key players in the Durban water and sanitation sector - from the water provider itself, from non-governmental organizations, and from universities - were also undertaken in the spring of 2003.

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"In time and with water, everything changes."

Leonardo da Vinci

- CHAPTER THREE -
Cost Recovery for Water and Sanitation Service Provision in Durban

3.1 Introduction

This chapter presents a summary of the financial performance of eThekwini Water Services (EWS) between 1994 and 2003, with a particular focus on the agency's cost recovery efforts. It presents the annual operating revenue and expense profiles for the Water and Wastewater Departments of EWS and provides a summary of annual capital expenditures in both departments. The chapter also provides a detailed summary of financial and operational performance parameters for the Water Department. This includes a review of average water tariffs and supply costs and a summary of key indicators of the department's operational and financial performance.

In order to effectively evaluate the impact of the cost recovery measures adopted in Durban, as much data as possible was collected over a time series that captures both pre- and post-reform periods[2]. The overall duration of the time series over which most data presented here was gathered is 1994/95 to 2002/03, the full period of time that EWS has been in operation and the full duration for which South Africa has been a multi-party democracy[3].

It is clear from the data presented in this chapter that EWS has had mixed success in achieving cost recovery. In the Water Department, annual operating expenses outstripped revenues in five of the eight years between 1994/95 and 2001/02. In 2002/03, however, this trend is predicted to reverse itself. In 2002/03, for the first time in 4 years, it is predicted the Water Department will balance operating expenses and revenues. This general trend towards cost recovery in the Water Department is a victory of sorts. It means that Durban is making headway on the cost-recovery goals it has set for itself. Comparatively, the Water Department of EWS performs slightly below benchmark values for cost recovery, as documented for top-tier African providers, but well behind standards established by privately-owned American utilities.

[2] Data are presented in the form of the major variables used to understand cost recovery and financial performance in the water and sanitation sector. Emphasis in the chapter is placed on visual displays of findings, with the bulk of numeric data located in Appendices II-XII.

In direct contrast to the situation predicted for the Water Department, the year 2002/03 is not predicted to be a banner financial year for the Wastewater Department of EWS. Instead, operating expenses will exceed revenues for the department by an even greater margin than in any of the previous eight years. The Wastewater Department, unlike the Water Department, is not moving towards greater cost recovery, but instead has encountered increasingly large annual operating deficits in each year since 1994/95.

3.2 EWS Operating Revenues and Expenses

3.2.1 Water Department

3.2.1.1 Water Department Revenue Profile

The profile of annual operating revenues for the Water Department of EWS, which accounts for all sources of operating revenue to the department, indicates that operating revenues have risen significantly for the department over fiscal years 1994/95 to 2002/03[4]. A graph summarizing the Water Department's inflation-adjusted revenue profile in South African Rand[5,6] is shown in Figure 3.2. It is important to note that the 2002/03 revenues indicated in this profile are projected values.

[3] Unless otherwise cited, all data compiled in this chapter was provided in raw form by Mr. Neil Macleod, Executive Director of eThekwini Water Services, from current and historical agency records.
[4] Complete data describing this profile is located in Appendix III.
[5] Prices in this thesis are reported in South African Rand. The exchange rate as of 1 May 2003 was 1 $US = 7.295 ZAR. (www.economist.com/markets/currency/)
[6] All prices referenced in this chapter have been adjusted to 2003 values using an average inflation rate of 7.32% for the eight-year period between 1994 and 2002. This value was calculated using annual figures compiled from the quarterly reports of the South African Reserve Bank, Department of Finance Budget Review (South Africa, 1994-2002). For complete data on annual inflation values and for background on the calculation of the average rate used here, please refer to Appendix II.

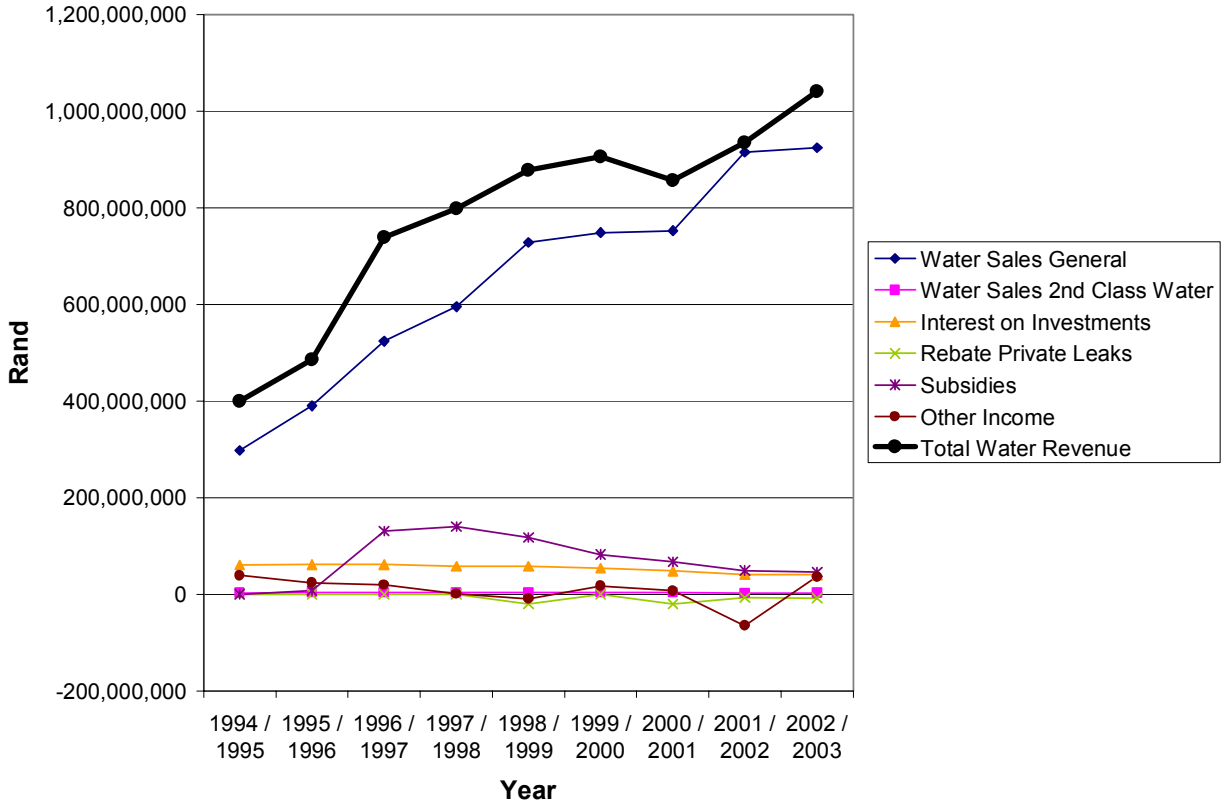

Figure 3.1 Complete profile of annual operating revenues (Rand) for the Water Department of EWS for each year between 1994/95 and 2002/03.

Figure 3.1 indicates that, although most revenue sources remained fairly constant over the period 1994/95 to 2002/03, revenues from "water sales general" more than doubled over this same period[7]. "Water sales general" refers to all funds taken in through tariffs and charges to consumers. The figure indicates that the Water Department has primarily boosted operating revenues by raising the amount taken in through water sales from consumers.

One revenue source of critical interest, subsidies, began in 1994/95 and 1995/96 with values of almost zero. In subsequent years, there was a substantial increase, with values reaching their peak in 1996/97. Since 1996/97, however, the amount of subsidies towards the operating revenues of the Water Department has decreased again. This likely reflects the decline in central to local subsidies that has

[7] Due to the accounting standards adopted by EWS, some financial flows reported as revenues are in fact negative in value. Rebates for private leaks are negative since they are paid out by

characterized public finances in South Africa since the country's macroeconomic reforms of the mid-1990s (McDonald, 2002). Due to the imposition of GEAR – the Growth, Employment, and Redistribution Program – central to local transfers declined 85% in real terms between 1991 and 1997 and an additional 55% between 1997 and 2000 (Financial and Fiscal Commission, 1997).

3.2.1.2 Water Department Expense Profile

The operating expense profile for the Water Department of EWS, which accounts for all of the operation and maintenance expenses of the department, also shows a strong upward trend over the period 1994/95 to 2002/03. A graphical representation of the full expense profile appears in Figure 3.2[8].

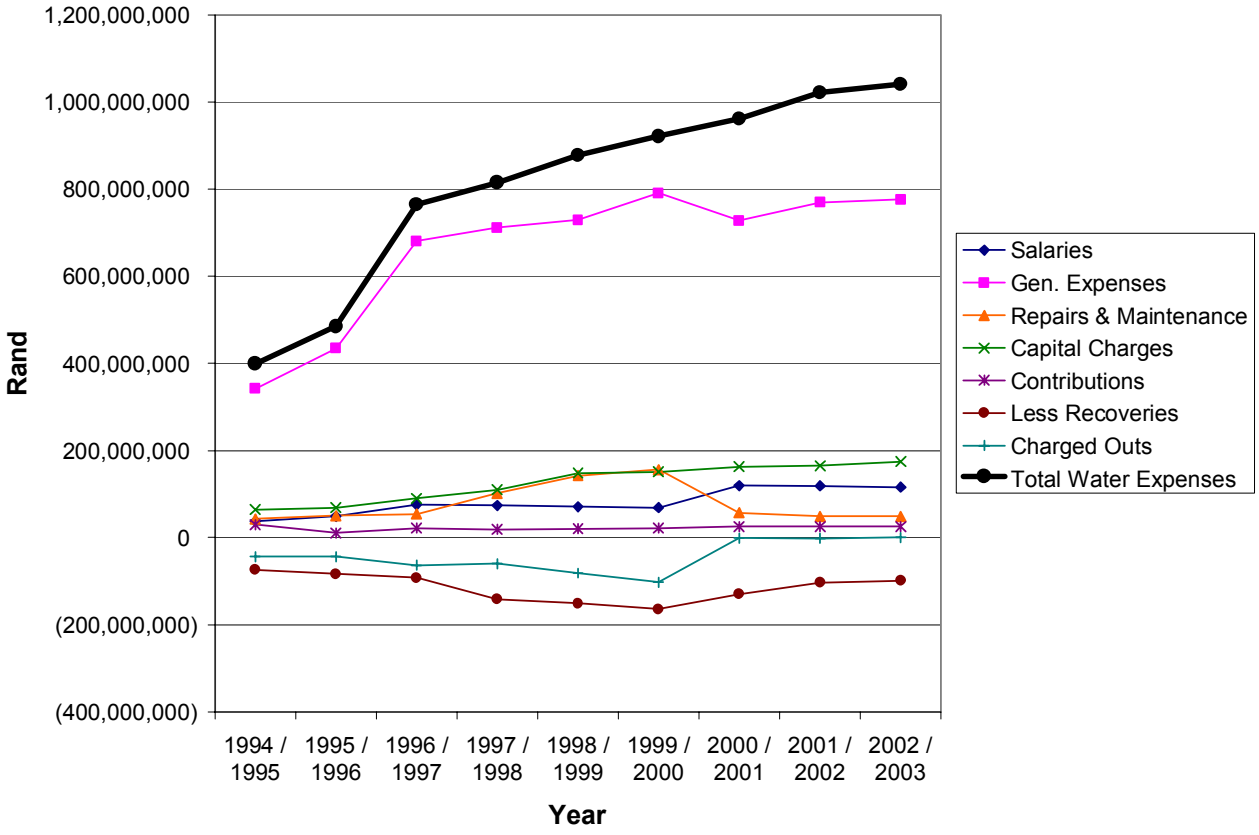

Figure 3.2 Complete expense profile (Rand) for the Water Department of EWS in each year between 1994/95 and 2002/03.

EWS to consumers who identify leaks that have led to overcharging. "Other income" also includes components that, in some years, may end up being charges to the agency.

[8] Complete data describing this profile are located in Appendix III.

On a scale similar to that observed for the department's revenue profile, total expenses for the Water Department more than doubled over the period 1994/95 to 2002/03. "General expenses" contributes to the greatest proportion of this increase[9]. This expense category incorporates over 115 subsidiary costs and includes such expenses as sundries, small tools, refuse removal, and contracts for the reading of meters[10]. Relative to the category "General Expenses", most other expenses incurred by the Water Department are relatively consistent for the period 1994/95 to 2002/03. The other expense categories that did show increases are repairs and maintenance, capital charges, and salaries, although the first of these falls off to zero in the last three years.

A number of costs within the broad category "General Expenses" show particularly striking increases over the study period. One of these is costs incurred annually by the agency for security. These are shown in inflation-adjusted terms, to 2003 values, in Figure 3.3.

Over the period 1994/95 to 2002/03, security costs for the Water Department have risen substantially. As Figure 3.3 indicates, costs for security have become higher in each year of the study period, with the highest values recorded in 2000/01. These rising security costs are primarily associated with the hiring of private security firms to oversee the disconnection policy of EWS. Due to growing anger directed at the agency, it has become increasingly necessary for EWS agents to be accompanied by armed guards or attack dogs when they carry out disconnection visits (McDonald, 2003).

[9] Figure 3.2 also shows that both "Charged outs" and "Less recoveries" register negative values in the expense profile. "Charged outs" refers to the process of charging out the costs associated with various services and supplies to internal units of an agency. Since these values are deducted from the sum of the full range of EWS' expenses before calculating total expenses, they appear as a positive cash flow in the figure. "Less recoveries" refers to those agency costs that have been recovered by EWS, and are therefore also recorded as positive cash flows.

[10] A complete breakdown of the expenses included under the heading "general expenses" is found in Appendix IV.

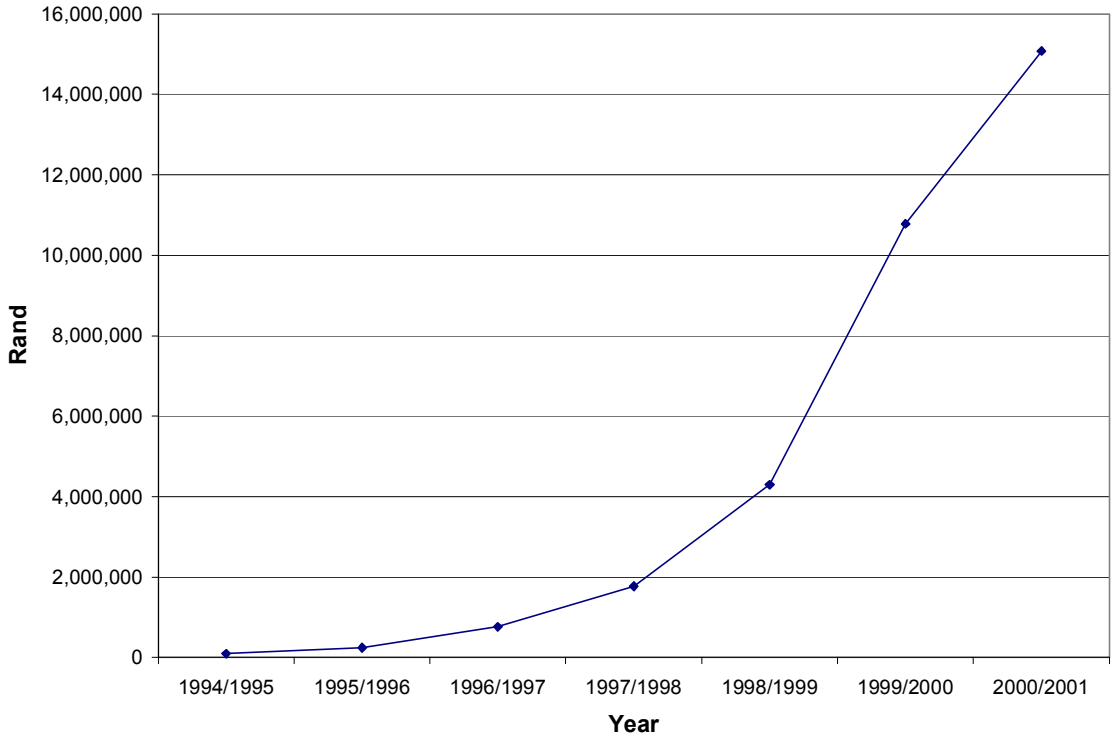

Figure 3.3 Annual inflation-adjusted (to 2003 values) security costs incurred by the Water Department of EWS, 1994/95 to 2000/01

3.2.1.3 Water Department Income Statements, Annual Operating Deficits, and Working Ratios

Total operating revenues and expenses and annual operating deficits for the Water Department of EWS, for each year between 1994/95 and 2002/03, are shown in Table 3.1. The table also presents annual working ratios, calculated as total operating expenses divided by total operating revenues, for each of these years. For a service provider that is covering costs, the working ratio should equal to, or less than, one. A working ratio of one indicates that operating revenues and expenses are equal in a given year.

Table 3.1 Total annual operating revenues, operating expenses, operating deficits, and working ratios for the Water Department of EWS.

Year	Total Operating Revenues (Rand)	Total Operating Expenses (Rand)	Annual Operating Deficit (Rand)	Working Ratio
94/95	227,016,635	227,017,830	-1,195	1.00
95/96	295,997,726	295,997,726	0	1.00
96/97	483,356,700	500,752,682	-17,395,982	1.04
97/98	560,319,364	572,415,786	-12,096,422	1.02
98/99	661,621,373	661,621,374	-1	1.00
99/00	732,807,257	745,433,511	-12,626,254	1.02
00/01	744,059,335	834,818,929	-90,759,594	1.12
01/02	871,092,891	951,939,198	-80,846,307	1.09
02/03	1,040,811,220	1,040,811,220	0	1.00

Since cost recovery in the water and sanitation sector is typically understood to refer to balancing operating expenses and revenues (as opposed to a more expansive definition that includes both operating expenses and capital investment as recoverable costs), it is essential to look at the balance of the two to understand the success of any cost recovery effort. When one does, as in Table 3.1 for the Water Department of EWS, one sees that the department has been within 20 million Rand of effective cost recovery in every year but two, 2000/01 and 2001/02 being the notable exceptions.

Annual changes in total operating revenues and expenses for the Water Department are examined in greater detail in Figure 3.4. This figure also shows the value of annual operating deficits incurred by the Water Department of EWS between 1994/95 and 2002/03.

Figure 3.4 indicates that the trajectories of operating revenues and expenses for the Water Department of EWS remained quite similar over the years 1994/95 to 1999/00. Over the next two fiscal years, however, total operating revenues fell below expenses considerably. That is, expenses grew more rapidly than revenues over this time period. It is projected that this gap will be fully closed in 2002/03.

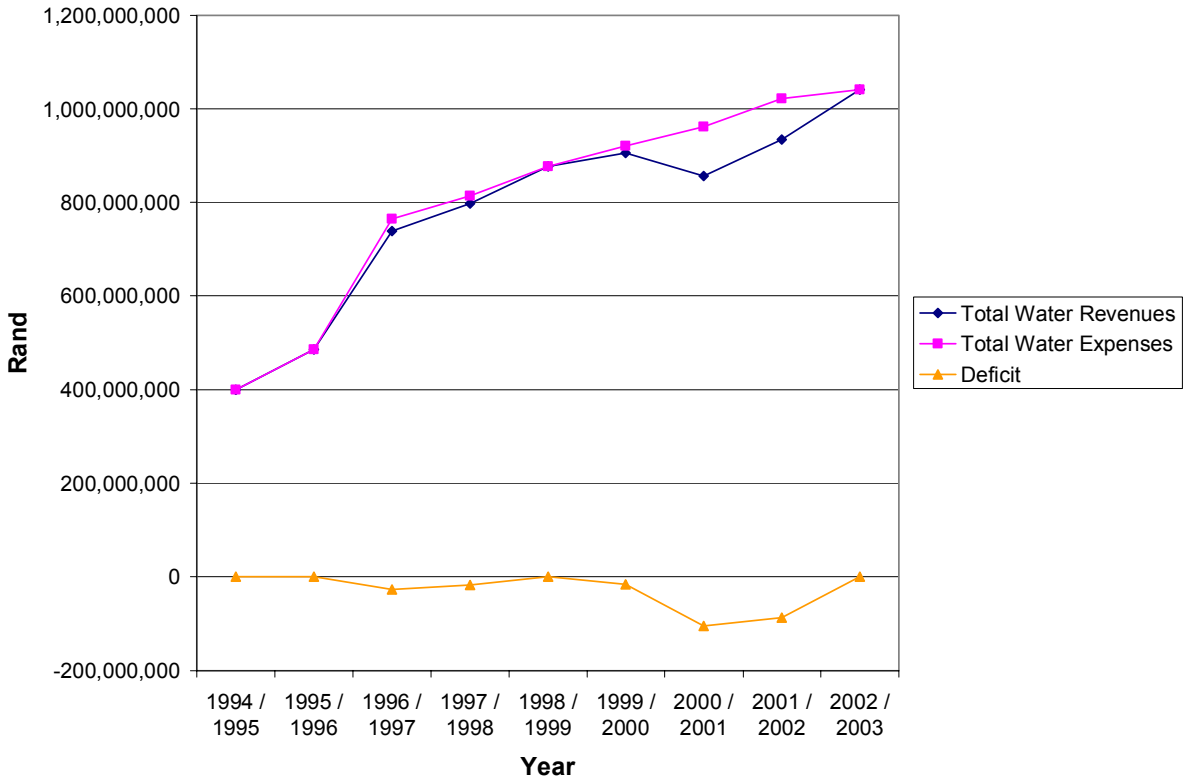

Figure 3.4 EWS Water Department total revenues, total expenses, and annual deficits, from 1994/95 to 2002/03 (Rand).

The working ratio is used as an indicator of cost recovery and is particularly useful in analyses of cost recovery efforts because it allows comparisons with benchmark values. As shown in Table 3.1, working ratios for the Water Department of EWS rose substantially between 1999/00 and 2001/02, as operating revenues experienced their greatest decline relative to expenses. While the predicted value for 2002/03 is exactly one, the last recorded working ratios, in 2000/01 and 2001/02, were among the highest in the history of the agency (Figure 3.5).

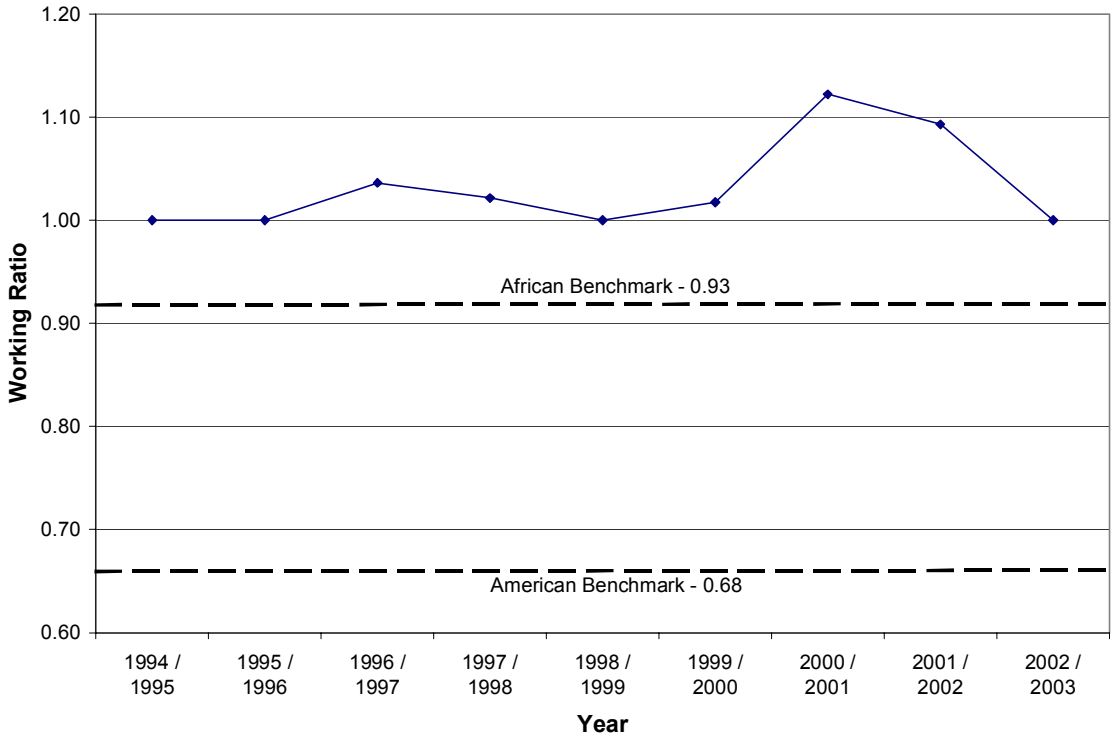

Figure 3.5 EWS Water Department annual working ratios, over years 1994/95 to 2002/03. Benchmark values for African and American service providers are indicated.

Figure 3.5 shows annual working ratios for the Water Department and reports two benchmark values for working ratios from other water and sanitation service providers. The two values reported are the weighted average working ratio for eight African service providers (0.93) and the weighted average working ratio for 89 privately owned American service providers (0.68) (World Bank, 2000). In the case of the African providers the subset of agencies is clearly in the top tier of water and sanitation utilities on the continent. However, this only makes the comparison with Durban more fitting, since Durban is one of the wealthiest cities in Africa and aspires to provide levels of service of an international caliber.

Comparison of the EWS Water Department working ratio with the Africa benchmark value reported by the World Bank shows that Durban has hovered just above the African average. Comparison with the American value further emphasizes that, while the utility has moved to better balance operating expenses and revenues, it remains quite far from achieving American private sector standards of cost recovery. Given that the benchmark values are less than one, it appears that, unlike EWS, at least

some of the providers on which these values are based have operating revenues that exceed expenses. The balances, in these cases, can then be allocated to capital costs and investments. This opens the possibility that these benchmark agencies, especially those from the United States, may have a more expansive definition of cost recovery that includes some or all of capital costs.

3.2.2 Wastewater Department

3.2.2.1 Wastewater Department Revenue Profile

In contrast to the detailed breakdown available for the operating revenues of the EWS Water Department, only total operating revenues are available for the agency's sanitation division[11]. A graph of these inflation-adjusted revenues appears in Figure 3.6.

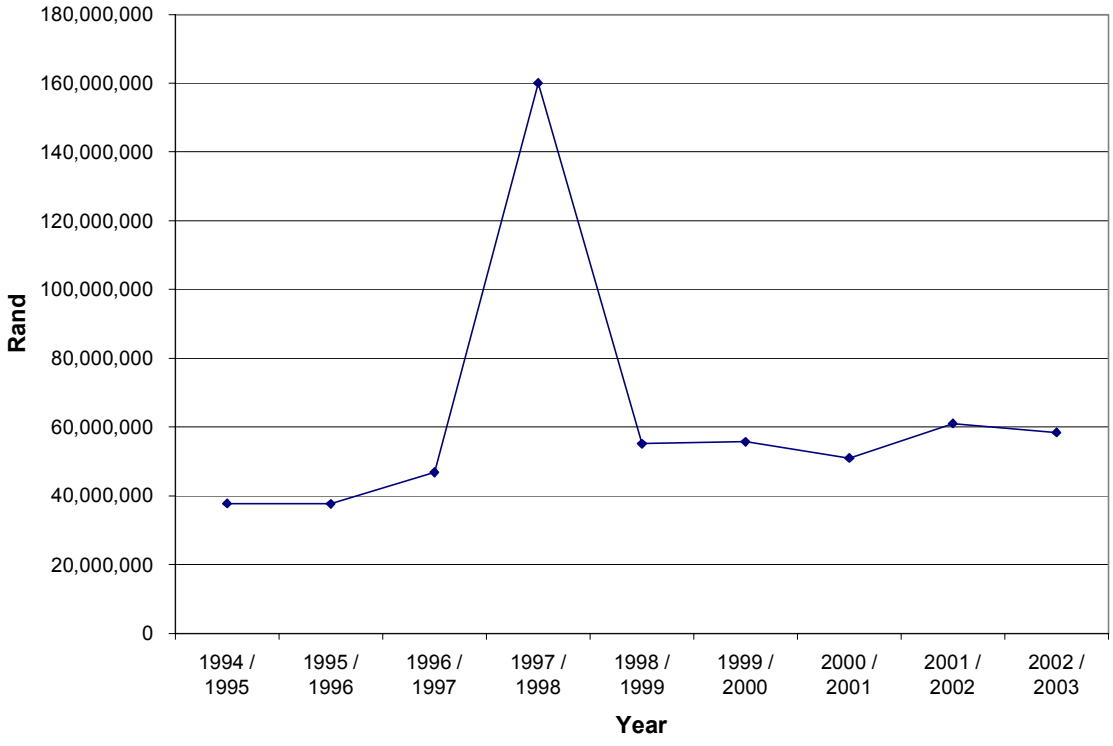

Figure 3.6 Total annual operating revenues, in Rand, of the EWS Wastewater Department, between 1994/95 and 2002/03.

[11] Tabular data on the annual values for Wastewater Department revenues are located in Appendix V.

With the exception of 1997/98, the revenues received by the Wastewater Department remained relatively steady at forty to sixty million Rand and do not show the continuously upwards trend evidenced in the Water Department. The year 1997/98 stands out, however, since in that year revenue more than doubled. Unfortunately, the breakdown of revenue sources for the Wastewater Department is unavailable and it is simply known that the department experienced a considerable revenue peak in this year.

3.2.2.2 Wastewater Department Expense Profile

The complete breakdown of inflation-adjusted operating expenses incurred by the Wastewater Department, and their sources, for all years between 1994/95 and 2002/03 is located in Figure 3.7[12].

[12] Full data on the operating expenses of the Wastewater Department are provided in Appendix V.

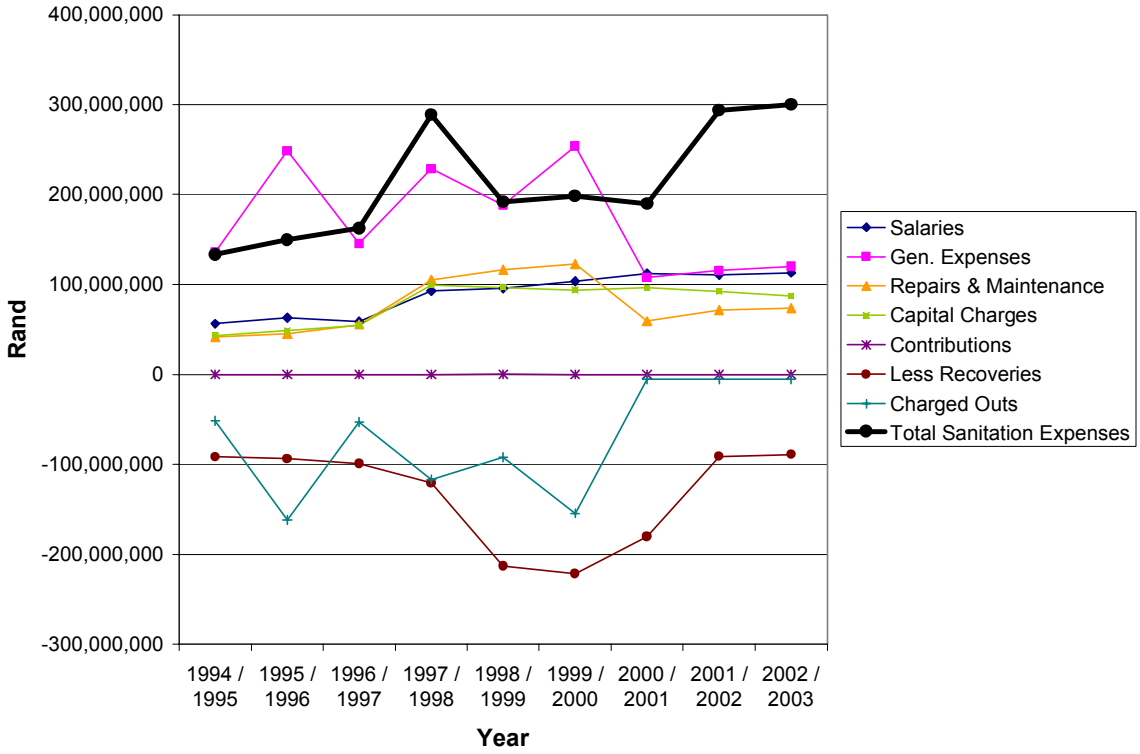

Figure 3.7 Annual operating expense profiles, in Rand, for the EWS Wastewater Department, over the period 1994/95 to 2002/03.

Again, unlike the situation observed for the Water Department, the profile of operating expenses for the Wastewater Department does not show a continuous upwards trend. Instead, overall expenditures for operation and maintenance have fluctuated in the past nine years, with peaks in 1997/98 and again in 2001/02. In the same manner observed for the Water Department, "less recoveries" and "charged outs" record negative values to reflect the fact that they represent costs either successfully recovered or charged internally to the agency.

The great annual variation in operating expenses and revenues for the Wastewater Department make it difficult to get an intuitive sense of how the two are balanced and how the department has fared in terms of cost recovery. What is clear from these figures is that the Wastewater Department lacks the consistency in finances that appear to characterize the Water Department. To evaluate the department's success in cost recovery, working ratios for each year are calculated in the following section.

3.2.2.3 Wastewater Department Income Statements, Annual Deficits, and Working Ratios

Inflation-adjusted annual operating deficits for the Wastewater Department of EWS, between 1994/95 and 2002/03, as well as working ratios, calculated as total operating expenses divided by total operating revenues, are shown in Table 3.2.

Table 3.2 Annual total operating revenues and expenses, operating deficits, and working ratios for the Wastewater Department of EWS.

Year	Total Operating Revenues (Rand)	Total Operating Expenses (Rand)	Annual Operating Deficit (Rand)	Working Ratio
94/95	21,462,586	75,732,954	-54,270,368	3.53
95/96	22,976,171	91,192,653	-68,216,482	3.97
96/97	30,635,094	106,193,687	-75,558,593	3.47
97/98	112,429,642	202,780,247	-90,350,605	1.80
98/99	41,591,582	144,646,915	-103,055,333	3.48
99/00	45,045,650	160,297,253	-115,251,603	3.56
00/01	44,282,167	164,715,638	-120,433,471	3.72
01/02	56,914,431	273,525,127	-216,610,696	4.81
02/03	58,435,500	300,081,700	-241,646,200	5.14

As Table 3.2 indicates, the Wastewater Department of EWS has experienced growing operating deficits in each of the past nine years. Although the working ratios for the department have not declined in every year, the overall trend is decisively downwards over the period. To adequately cover costs a working ratio of one would have to be recorded for each year. The current situation in the Wastewater Department, with working ratios ranging from 1.8 to 5.14, is one of radical and increasing departure from cost recovery and one towards financial instability.

A graph presenting annual deficits and working ratios for the Wastewater Department is shown in Figure 3.8.

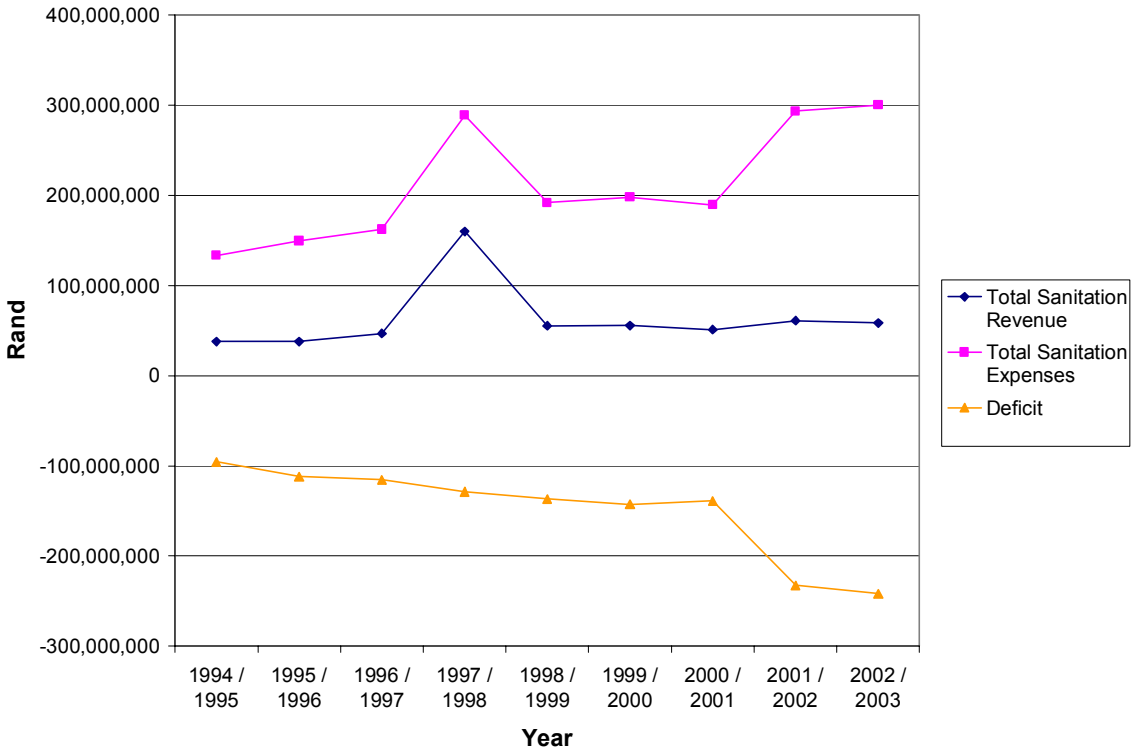

Figure 3.8 Total annual operating expenses, operating revenues, and annual deficits, in Rand, for the Wastewater Department of EWS, between 1994/95 and 2002/03.

Figure 3.8 clearly indicates that, for the Wastewater Department, total operating revenues have fallen short of expenses in every year for which records exist. Furthermore, the gap between the two has grown larger in each year between 1994/95 and 2002/03. The scale of this growing gap is reflected in the increasing deficits recorded for each year.

In themselves, the working ratios for the department show an increasing failure to recover costs, especially over the past 5 years. The notable exception to the history of declining cost recovery is in 1997/98, when a large one year boost in revenues brought the working ratio below two. Figure 3.9 shows a graph of annual working ratios for the Wastewater Department. The weighted average working ratios for subsets of African and American providers are indicated.

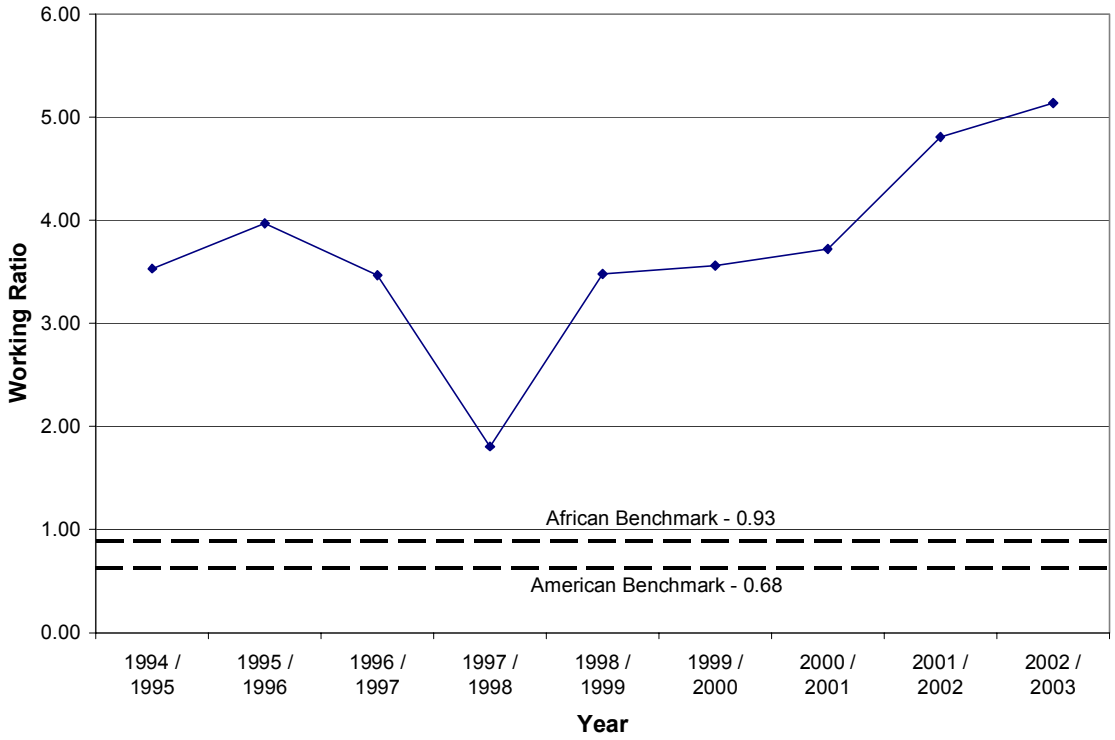

Figure 3.9 Annual working ratios for the Wastewater Department of EWS, over the period 1994/95 to 2002/03. Benchmark values for African and American service providers are indicated.

As mentioned, the working ratios reported in Figure 3.9 show that the Wastewater Department has had declining success in cost recovery with each passing year between 1994/95 and 2002/03, with the exception of 1997/98 when a solitary increase was registered. In comparative terms, the working ratios for the department are extremely poor in comparison with weighted average working ratios for both African and American service providers. The best performing year for the Wastewater Department, with respect to cost recovery, still failed to register a working ratio near average African values.

3.3 Capital Expenditure

3.3.1 Water Department

Capital expenditures in the water and sanitation sector are often funded through central government transfers and are typically not considered in the calculus of cost recovery as practiced by local governments. However, capital costs are important to consider in any analysis of costs recovery efforts, since they may displace revenues, especially subsidies, away from other spending and influence overall cash flows. Figure 3.10 provides a summary of capital expenditures made by the Water Department of EWS on both plant and equipment and assets for all years between 1994/95 and 2002/03[13]. In the case of EWS, as with most service providers, the budget for capital costs is separate from that for operation and maintenance and the expenses associated with capital investment are recorded outside those for recurrent costs.

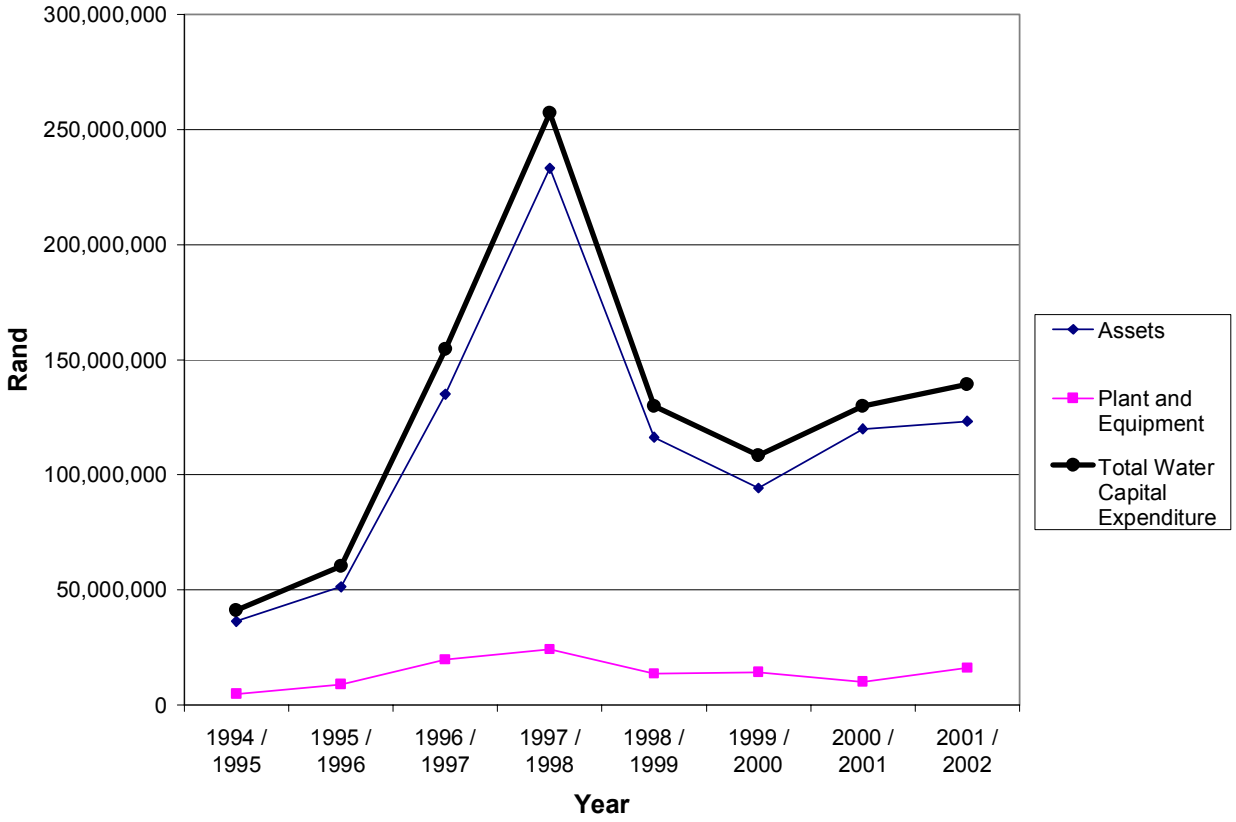

Figure 3.10 Annual capital expenditure of the EWS Water Department on plant and equipment and assets, between 1994/95 and 2002/03 (Rand).

[13] Complete data on funds directed by EWS towards capital expenditure, for all years between 1994/95 and 2002/03, are provided in Appendix VI.

Figure 3.10 indicates that there has been an increase in overall capital expenditure by the Water Department over the years 1994/95 to 2002/03. Most of this increase, however, is accounted for in the rise in spending on assets, and not on plant and equipment. Notably, there is a strong spike in capital spending in years 1996/97 and 1997/98, when values peak at almost twice the current levels. The peak in capital spending in 1997/98 coincides with the institution of the free basic water policy in South Africa. Beyond this, the levels of capital expenditure decline to reflect changes in subsidies to the agency. The decline in capital investment parallels the pattern of declining central-to-local transfers that has characterized South African public finances of the late 1990s (Fiscal and Financial Commission, 1997; Unicity Commission, 2000).

3.3.2 Wastewater Department

The pattern of capital expenditure in the Wastewater Department parallels that observed for operating expenditures in the department, with constant fluctuations in spending rather than annual increase. Figure 3.11 provides a summary of capital expenditures made by the Wastewater Department of EWS on both plant and equipment and assets for all years between 1994/95 and 2002/03[14].

[14] Complete data on funds directed by the Wastewater Department towards capital expenditure, for all years between 1994/95 and 2002/03, are provided in Appendix VI.

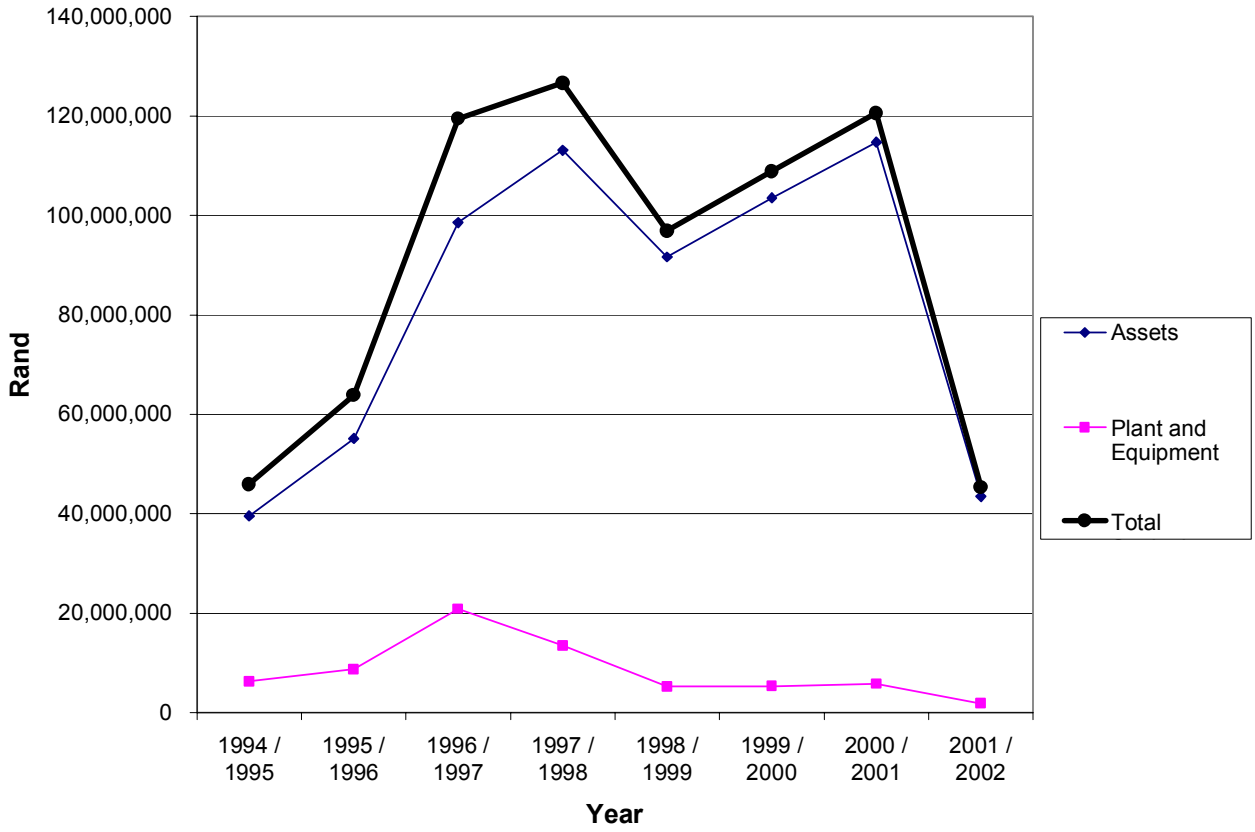

Figure 3.11 Annual capital expenditure of the EWS Wastewater Department on plant and equipment and assets, between 1994/95 and 2002/03 (in Rand).

Figure 3.11 indicates that spending rose between 1994/95 and 1996/97, fell sharply by twenty million Rand in 1997/98, and rose again in 1999/00 and 2000/01 before a precipitous decline back to 1994/95 levels in 2001/02. Capital expenditure in the Wastewater Department has followed a significantly different course than is observed in the Water Department. Furthermore, it appears that overall increases in spending, again, are largely accounted for by changes in spending on assets, as opposed to plants and equipment. Since annual subsidy values are unavailable for the Wastewater Department, it is difficult to know how changes in subsidies to the Water Department have affected capital expenditure. What is clear, though, is that capital expenditure for sanitation follows the same sporadic pattern as other financial flows for the department.

3.4 Water Service Provision – Tariffs and Cost of Supply

In order to calculate annual average tariffs and costs of supply for water in Durban, it is first necessary to know how the volume of water sold has fluctuated on a yearly basis. From these values, it will also be possible to determine if the increases in revenue from "general water sales" are due to increases in the amount of water sold, the price of water sold, or a combination of the two. The total volume of water sold in each year since 1994/95 is given in Table 3.4 and is graphically represented in Figure 3.12.

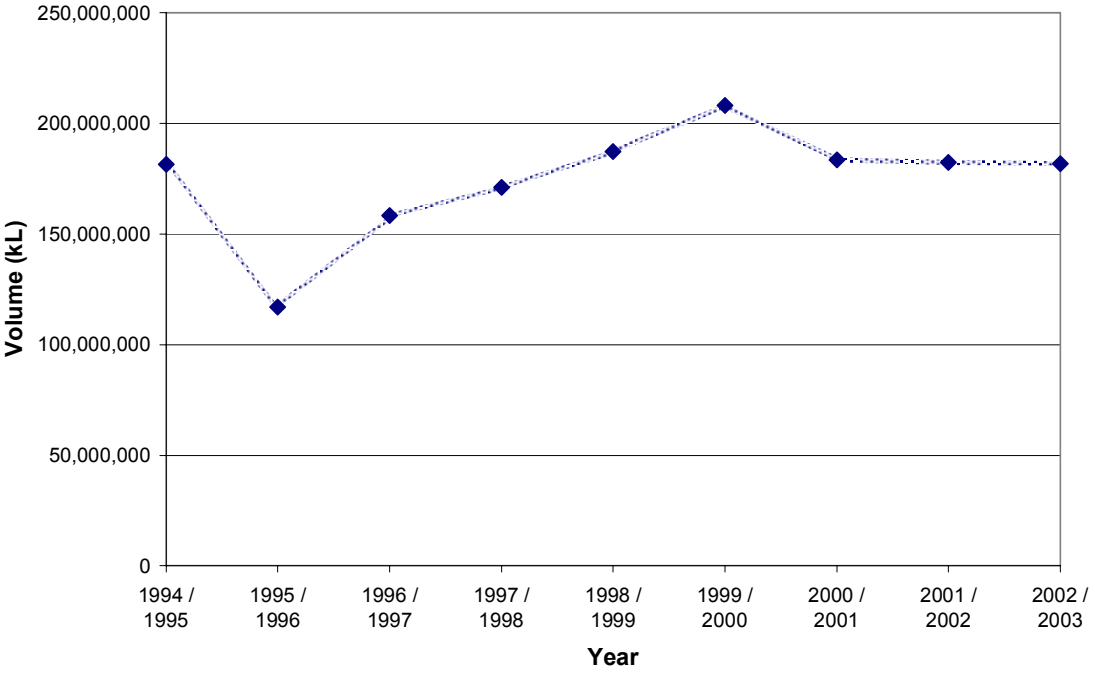

Figure 3.12 Total volume of water sold (kL) per year, between 1994/95 and 2002/03, by EWS.

Figure 3.12 indicates that there was substantial variation in the volume of water sold by EWS between 1994/95 and 1999/00. Between 1999/00 and 2002/03, however, volumes sold have been relatively constant at between 180 million kL and 205 million kL. These data also reveal that the rising annual revenues from water sales, recorded for the Water Department, are in turn primarily driven by increases in tariffs and not, increases in the volume of water sold. This deduction can be made because revenues from water sales continued to rise sharply between 1999/00 and

2002/03, while the volume of water sold remained relatively constant over this period. Thus, tariff increases are contributing heavily to the increases in operating revenue observed for the Water Department and is the source revenue most responsible for allowing EWS to match continually rising annual operating expenses.

The average cost of supply and average tariffs for water supply in Durban are critical variables for evaluating exactly what level of cost recovery has been achieved by EWS over the period 1994/95 to 2002/03. These values are also vitally important in that they allow comparison with benchmark values from other providers.

The average inflation-adjusted cost of supply for water provision, calculated as total annual operational expenses (excluding depreciation, interest, and debt service) divided by total annual volume sold, is given in Table 3.3. The average inflation-adjusted water tariff, calculated in Rand/kL, is also reported in Table 3.3.

Table 3.3 Total volume of water sold (kL) annually, between 1994/95 and 2002/03.

Year	Volume of Water Sold (kL)	Average Cost of Supply (Rand / kL)	Average Tariff (Rand/kL)
1994 / 1995	181 500 000	1.85	1.66
1995 / 1996	116 900 000	3.57	3.36
1996 / 1997	158 200 000	4.28	3.33
1997 / 1998	170 900 000	4.17	3.51
1998 / 1999	187 238 384	4.03	3.91
1999 / 2000	208 100 347	3.72	3.61
2000 / 2001	183 570 083	4.49	4.12
2001 / 2002	182 358 251	5.21	5.03
2002 / 2003	181 944 863	4.77	5.10

The average tariff[15], as shown in Table 3.3, increased from 1.66 Rand/kL to 5.10 Rand/kL over the years 1994/95 to 2002/03, with the largest increase taking place between 1994/95 and 1995/96. The relationship between average cost of supply and average tariff for water provision in Durban is examined in greater detail in Figure 3.13.

[15] The complete Water Department tariff schedule for all classes of consumption, both domestic and non-domestic, as imposed between 1995 and 2002, is given in Appendix VI.

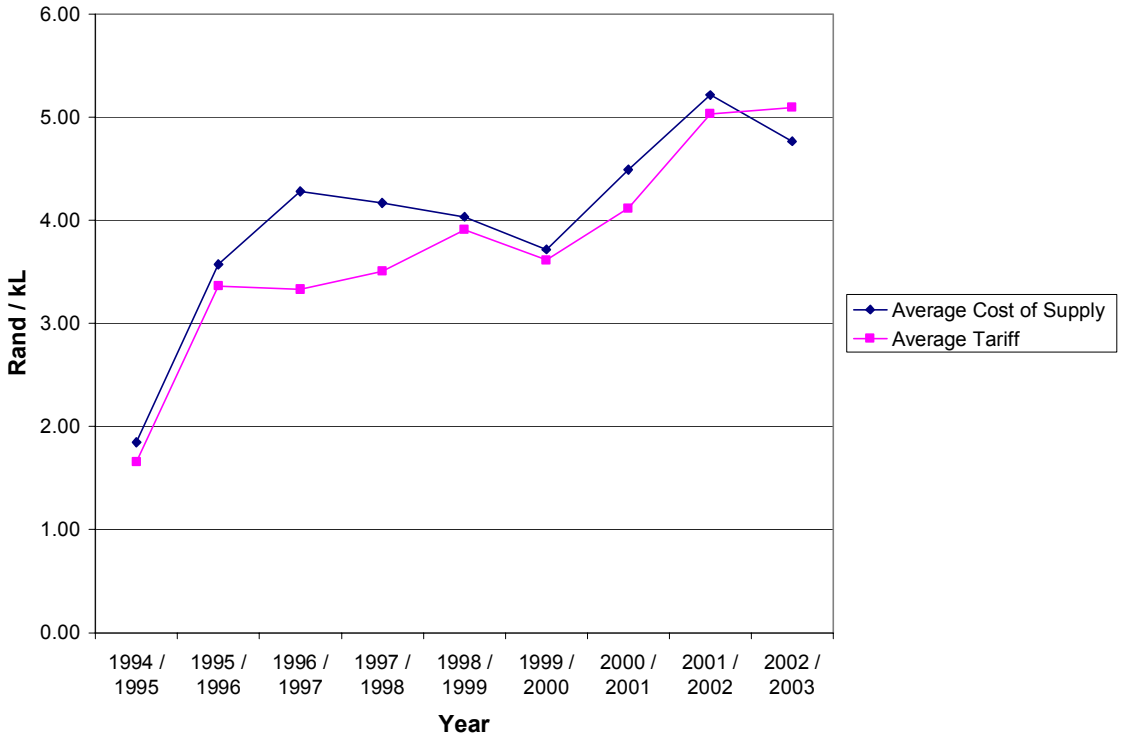

Figure 3.13 Average cost of supply (Rand/kL) and average tariff (Rand/kL) for water provision in Durban, between 1994/95 and 2002/03.

As shown in Figure 3.13, average cost of supply and the average tariff for water follow each other quite closely as they increase between 1994/95 and 2002/03. There are three points of notable departure, however, from this relatively synchronous movement. The first is between 1995/96 and 1998/99, when the average tariff fell substantially below the average cost of supply. The second is in 2000/01, when average tariff again fall markedly below cost of supply. The third occurs in 2002/03, when the average tariff rises above the average cost of supply for the first time in the provider's history.

Cost recovery efforts can be evaluated by the numeric proximity of average tariff values to average cost of supply. The trend over the past nine years indicates that EWS has continuously priced below average cost of supply. Although average tariff has come close to average cost in several years, it is only predicted to exceed average cost for the first time in 2002/03. This is likely a strong causal factor underlying the poor working ratios and annual deficits recorded in some years. For instance, the largest deficits in the history of EWS occur during the same period in

which the largest gap is observed between average cost of supply and average tariff in Figure 3.13. The trend of underpricing water, however, appears to reverse in 2002/03. Should the predictions of EWS hold, average tariff will rise above average cost of supply for the first time. This event is predicted to coincide with the first non-deficit year after a sequence of record annual losses.

It is particularly instructive to compare the tariffs charged by EWS with those charged by other providers, particularly with benchmark values for African and American water and sanitation providers. In 2003 values, the weighted average tariff for eight African providers is 4.05 Rand per kL, while the weighted average tariff for 89 American private providers is 9.05 Rand per kL (World Bank, 2000). By comparison the 2003 tariff charged by EWS, the highest in the past nine years, is 5.10 Rand per kL. This indicates that EWS is charging higher average tariffs than other African providers. It is important to note, however, that the eight African providers used to calculate this comparative value are among the better performing of Africa's estimated 150 water and sanitation service providers. Durban tariffs then rank among the highest in Africa. The comparison also reveals that the tariff charged in 2002/03 by EWS is considerably lower than those charged by a cross-section of American providers.

3.5 Water Service Provision - Indicators of Financial and Operational Performance

The cash flows and tariffs that have been described in the proceeding sections of this chapter are central to understanding the extent to which EWS has recovered costs. To gain a more complete picture of the financial performance of the Water Department, and of its success in recovering costs, it is also important to examine several other key variables pertaining more broadly to the financial and operational performance of EWS. This section examines measures of financial and operational performance: staffing, debt service ratio, and investment. These values are reported and are compared with international benchmark values in the following sections[16].

[16] The full set of annual data used to calculate values for these indicators of financial and operational performance are found in Appendix VIII.

3.5.1 Staffing

The number of staff per connection is generally considered to be a strong indicator in service efficiency in the water and sanitation sector. As of March 31, 2003, there were 2,275 total staff working for EWS. These staff members can be categorized into three groups: 1) Water operations staff, 2) Sewerage operations staff, and 3) Finance and human resources staff. Table 3.5 presents the total number of staff for each of these categories and expresses these numbers per thousand water connections.

Table 3.4 Total number of staff and ratio of staff to water and sewer connections.

Variable		Value
All Staff	Total	2,275
	Per '000 Water Connections	6.46
	Per '000 Sewer Connections	6.98
Staff in Water Operations	Total	1,168
	Per '000 Water Connections	3.32
	Per '000 Sewer Connections	3.58
Staff in Sewerage Operations	Total	975
	Per '000 Water Connections	2.77
	Per '000 Sewer Connections	2.99
Staff in Finance and HR Operations	Total	132
	Per '000 Water Connections	0.38
	Per '000 Sewer Connections	0.41

Table 3.4 indicates that number of staff is greatest in EWS' Water Department. To gain a better understanding of how the number of staff in this department compares with those of other providers, it can be compared to key benchmark values. The average weighted number of staff for eight service providers in Africa is 8.02 workers per 1000 connections. For a cross section of 89 privately-owned suppliers in the United States, the average number of staff per 1000 connections is 2.03. Comparison of these numbers with those for Durban shows that EWS has a higher staffing efficiency than the average utility from a cross section of eight relatively high performing African water and sanitation service providers. EWS appears, however, to be far less efficient in terms of staffing than the average provider from a selection of American water and sanitation service providers.

3.5.2 Debt Service Ratio

The debt service ratio of the water and sanitation provider is an indicator of the fixed hurdle of debt repayments that the agency faces as a proportion of utility revenue.

The debt service ratio is calculated by taking the total annual debt service as a percentage of total annual operating revenues.

The debt service ratio for each year between 1994/95 and 2002/03 is given in Table 3.5. The data reveal that, over this period, the debt service ratio has increased almost four-fold, with the highest values reached in 2000/01. The levels of debt service reached by 2002/03 are worrying for EWS since they are equal to nearly fifty percent of annual operating income.

In comparison to benchmark values for debt service ratio (Table 3.6), EWS falls between benchmark values for African and American providers. However, EWS has moved increasingly toward the African value over each of the last nine years. This may reflect declining levels of subsidization for the agency from central government. Under the GEAR program levels of subsidization have declined sharply since the early 1990s (Fiscal and Financial Commission, 1997).

3.5.3 Investment

Total annual investments expressed as a percentage of total annual operating revenues are presented in Table 3.5. As a percentage of operating revenues, investment has decreased substantially since 1994/95, from 15.1% to 4.0% in 2001/02. This may, however, be attributable to the large increase in operating revenues that occurred over this same period, and may not necessarily be indicative of decreasing investments alone.

In comparison with benchmark values from a cross section of 89 American providers, EWS' performance has declined significantly over the past nine years. The benchmark value of 31% is twice the highest investment rate of EWS. It is critical to note that the EWS' highest rate of investment occurred in 1994/95 and has declined annually over the following eight years.

Table 3.5 Debt service ratio per year, between 1994 and 2003.

Year	Debt Service Ratio (%)	Investments as % of Operating Revenues (%)
94/95	13.5	15.1
95/96	20.2	12.6
96/97	23.4	8.3
97/98	46.7	7.1
98/99	32.1	6.6
99/00	37.0	5.9
00/01	58.6	5.0
01/02	49.9	4.0
02/03	-	-
Benchmark Values		
American	15.48	31.06
African	121.88	N/A

3.6 Conclusion

It is clear from the data presented in this chapter that EWS has had mixed success in its efforts to recover costs over the past nine years. One clear conclusion from the data in this chapter is that the Water Department has had considerably more success in achieving cost recovery than the Wastewater Department.

For the Water Department, annual operating revenues have come close to covering operating expenses in six of the last eight years. For the past two years, however, expenses have exceeded revenues by a considerable margin. In 2002/03, this trend is predicted to reverse itself, for the Water Department at least. In this year, the Water Department is predicted to balance expenses and revenues and achieve a working ratio of one. It will do this while taking in the lowest levels of subsidization for operating expenses recorded in recent years. In that the Water Department is moving toward the cost recovery goals it has set for itself, then, this is a victory for EWS.

In comparative terms, the Water Department of EWS ranks slightly below average African, but well below average American, benchmark values for cost recovery. However, it must be said that the African values used are based on a high performing cohort of suppliers and the American values are for private suppliers. In terms of operating and financial performance, the EWS Water Department ranks above benchmarks for average African suppliers but well below the values for American suppliers.

But the story of cost recovery is not so simple. In direct contrast to the situation predicted for the Water Department, the year 2002/03 will not be a banner financial year for the Wastewater Department of EWS. Instead, operating expenses will exceed revenues for the department by an even greater margin than in any of the previous eight years. The Wastewater Department, unlike the Water Department, is not moving towards greater cost recovery, but is instead encountering increasingly large annual operating deficits.

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"There is nothing softer and weaker than water,
And yet there is nothing better for attacking hard and strong things.
For this reason there is no substitute for it."

Lao Tzu "Tao-te Ching" Ch. 78

- CHAPTER FOUR -
Meeting the Water Supply and Sanitation Needs of Durban's Poor

4.1 Introduction

This chapter presents a summary of efforts to meet the water and sanitation needs of the poor in Durban, South Africa. The chapter addresses overall service quality improvements brought about by eThekwini Water Services (EWS), as well as aspects of service delivery that have particular bearing on low-income households. The chapter also provides an overview of data on service and coverage levels and gives a summary of the economy of water and sanitation services from the perspective of the household. To allow comparisons among population and consumer groups, data on a number of key socio-economic and demographic variables - including income, race, employment status, and housing type - are also presented and investigated for relationships with levels of service delivery.

Among the most important aspects of service delivery to be examined is the free basic water policy instituted in Durban. This policy provides 6 kL of water free per month to all households in the eThekwini Metropolitan Area (EMA) as part of an increasing block tariff structure. Also known as the "lifeline volume" or the "free basic water policy", the practice of providing 6 kL of water free per month, or 200 L free per day, to all households is widely considered to be among the most novel approaches to pro-poor service delivery currently being applied in the developing world.

In order to understand better the impact of the pro-poor strategies adopted by EWS, as much data as possible were collected over a time series that captures both pre- and post-reform periods[17]. The most well documented pro-poor reform, provision of 6 kL of water free to all households, was instituted in 1998. The time series over which most data was gathered covers fiscal years 1994/95 to 2002/03[18]. This corresponds to the full period that EWS, and its predecessor, Durban Metro Water Services (DMWS), have been in operation.

[17] Unless otherwise cited, all of the data compiled in this chapter was provided in raw form by Mr. Neil Macleod, Executive Director of EWS, from agency records.

[18] All prices referenced in this chapter are adjusted to 2003 values, at an average annual inflation rate of 7.32%. This value was calculated using annual figures compiled from the quarterly reports of the South African Reserve Bank, Department of Finance Budget Review (South Africa, 1994-2002). For complete data on annual inflation rates and on the calculation of the average value used here, please refer to Appendix II.

The specific questions that the data presented in this chapter are intended to address include (a) Does the free basic water policy sufficiently address service affordability challenges for poor households? (b) Are there other aspects of EWS' service delivery system that either facilitate or discourage poor households from obtaining improved water and sanitation service? (c) How are the benefits of EWS' reforms distributed?

The analysis undertaken in this chapter suggests that there are two strands that dominate the story of service delivery to the poor in Durban. On the one hand, coverage levels have increased since 1994 and the fall of Apartheid. These increases are likely due to the reforms of EWS and, in themselves, are a positive outcome of the technical and policy innovations pioneered by the agency. At the same time, there is a more ominous strand to the story of how Durban serves the poor. This is a story that, in contrast, focuses on service disconnections and rising tariffs. While many households have gained service, many have also seen the levels of service that they once enjoyed decline. Many households are now limited to the 6kL lifeline by a combination of increasing tariffs for higher levels of consumption and the imposition of a highly aggressive disconnection policy. This rising wave of disconnections tempers the positive story that emerges when only the number of water and sanitation connections is considered as an indicator of service delivery to the poor.

This chapter follows the following basic structure: It first provides an overview of water and sanitation coverage levels in Durban. It then identifies the major deficiencies in water and sanitation coverage in the city, with a focus on describing those groups that face a particular need for improved access to services. The chapter then presents a summary of the programs and policies that are employed in Durban to meet the water and sanitation needs of the poor. The chapter concludes with a presentation of data on the economics of water and sanitation services, from the perspective of affordability to poor households.

4.2 Identifying Groups in Particular Need

When service providers speak of "serving the poor", they often use the term "poor" to refer to a wide variety of groups, including the underserved and unserved. This

section seeks to identify who the "poor" are in Durban and highlight which segments of the population have the greatest need for improved delivery of water and sanitation services. The section presents a summary of key socio-economic variables associated with the population of the EMA and the consumer base of EWS. These variables are primarily drawn from the most recent census available, which took place in 1996, and from various reports of the eThekwini Municipality and its predecessor, the Durban Metro Unicity[19]. The major variables addressed are race, poverty, average household size and income, settlement type, employment status, and access to water and sanitation services.

As the section highlights, there are many ways of defining who is "poor" in Durban. In Durban, race and geography are intimately connected with both financial poverty, as measured by annual or monthly income, and poverty in service delivery, as measured by the standard of water and sanitation services received by residents. Furthermore, monetary measures of poverty are extremely hard to determine in Durban, where there are levels of unemployment as high as 31% and a burgeoning informal economy flourishes (Hindson and Ngqulunga, 2000). The combination of these factors means that is often more practical to speak of the "poor" in terms of the groups that are most closely associated with either financial poverty or poverty in service delivery. As the following investigation reveals, Blacks, and particularly Blacks living in informal areas, are the poorest group in Durban in financial terms, and are also by far the most poorly served group in the city.

4.2.1 Race, Poverty, and Access to Water and Sanitation Services

It is clear that Apartheid-era policies continue to have an affect on the distribution of public services in Durban. Despite the collapse of Apartheid in the early 1990s, Durban remains a segregated and divided city. This divide can be seen as one that separates the various races and income groups of the city as well as one that divides formal and informal regions of the metropolitan area.

[19] The most recent census data available for Durban are from the 1996 national census. As a result, much of the non-time series data relates to the pre-2001 Durban Metropolitan Area (DMA), as opposed to the more recently formed eThekwini Metropolitan Area (EMA). However, since the formation of the EMA only involved a population increase of 9%, in comparison with an area increase of 68%, the DMA statistics on population should stand as reasonable proxies for yet to be measured EMA values (eThekwini Municipality, 2002).

The population of Durban is broadly categorized according to four racial groupings – Blacks, Coloreds, Indians or Asians, and Whites (Figure 4.1). As indicated in Figure 4.1, the greatest proportion of the city's residents is Black, with substantial Indian and White minorities. As a legacy of the Apartheid era, these groups continue to differ in terms of most economic and social indicators and in terms of the geographical locations in the city where they predominate.

The four "racial" categorizations used in Durban are the product of somewhat arbitrary Apartheid classifications. "Whites" denotes those of indigenous European background. "Blacks" denotes those of indigenous African background. "Asians" denotes those of indigenous Asian background. The category of Asians generally refers to people primarily of Muslim and Hindu background descended from laborers from India and the East Indies, though it is also applied to some descendants of Chinese indentured laborers. In Durban, "Indian" is used in place of "Asian" since Indians make up the majority of this category and form the second largest racial group in the city. "Coloreds" denotes those of mixed race.

It is estimated that 23% of Durban's population suffers from extreme poverty, measured as per capita earning less than R300[20] per month, and that 44% suffer from poverty, measured as earning less than R410 per month per person (eThekwini Municipality, 2002). It is clear also that, in Durban, poverty and race are inter-related. Poverty in the EMA is concentrated in the Black population, with 67% classified as either suffering from poverty or extreme poverty. The figure for the Asian and Colored population is 20% each, and that for the White population is at 2% (Figure 4.1). Poverty is also concentrated amongst females with more than half of the females within the EMA classified as being poor.

[20] Prices in this thesis are reported in South African Rand. The exchange rate as of 1 May 2003 was 1 $US = 7.295 ZAR. (www.economist.com/markets/currency/)

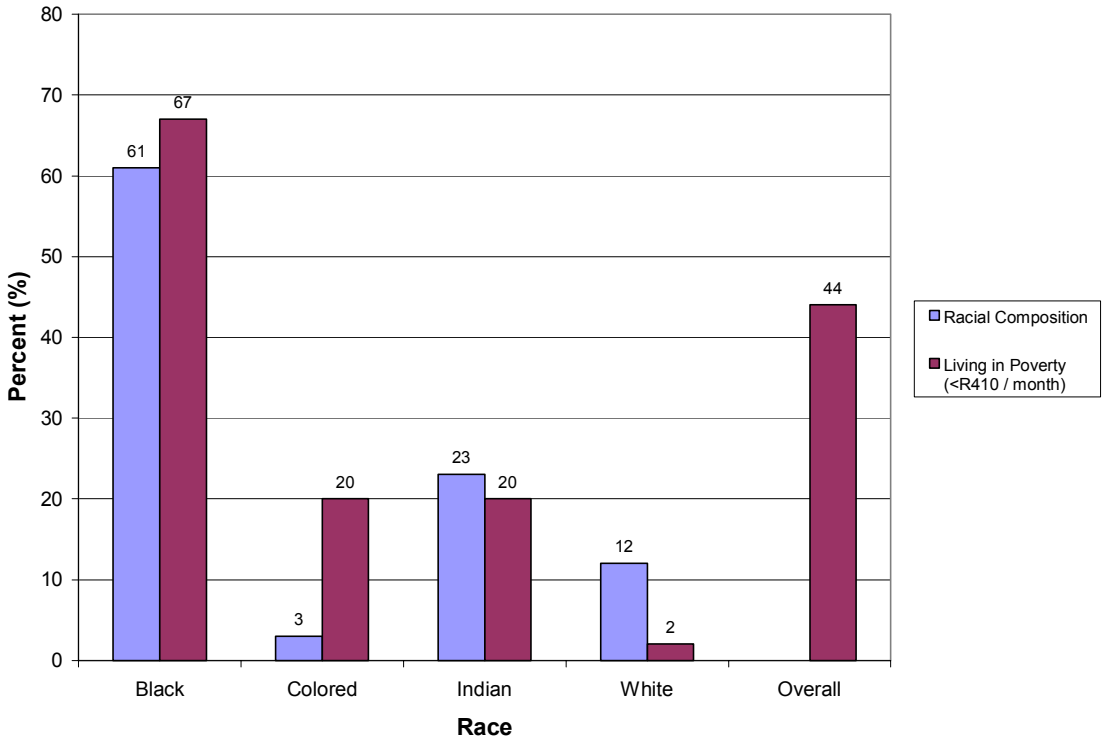

Figure 4.1 Racial composition of Durban showing percentage of each racial group living in poverty (earning less than 410 Rand per month) (Moller, 1999).

Differences in poverty levels across the races also carry over into the standard at which people of different races receive water and sanitation services. Data from Moller (1999) indicates that, in addition to the high degree of heterogeneity in Durban's population, there is also considerable variation in the need for improved services across the races. In a study of 4000 randomly selected households from Durban, Moller found significant differences in the access of different racial groups to both water and sanitation services (Table 4.1).

Table 4.1 Access, in percent, to water and sanitation services by race (Moller, 1999).

Race	Sanitation				Water		
	Flush	VIP[21]	Pit	Other	Pipe	Public Tap	Other
Black	54	11	34	1	54	34	11
Coloured	98	0	1	1	98	0	2
Indian	96	0	3	1	99	0	1
White	99	0	1	0	99	0	1

[21] VIP refers to the "ventilation improved pit" – a modernized version of the pit latrine that has a ventilation pipe to eliminate odors and flies. This is an on-site sanitation technology, i.e., it is not connected to a sewer line.

As shown in Table 4.1, there are distinct differences in the types of water and sanitation services that each racial group predominantly relies upon. For the Black population, approximately one-third of all households rely on pit latrines. At the opposite end of the spectrum, nearly 100% of the White population has access to flush toilets. With regard to water services, there is again a marked difference between services available to Blacks versus other population groups. Only half of Black households have access to piped water, compared to virtually 100% of households from other races. These data clearly indicate that the standard of water and sanitation services received by residents is closely associated with race, with Blacks receiving by far the lowest levels of service of any racial group.

4.2.2 Poverty, Household Size, and Settlement Type

The second major divide in the provision of water and sanitation services in Durban, after that between the races, is between formal and informal settlement areas (Moller, 1999). The sharp differences in service delivery to formal and informal settlements, also a legacy of the apartheid era, are critical to understanding the economic and political dynamics of contemporary water and sanitation provision in Durban.

The city's formal settlements are characterized by their integration within local government development plans (Hansson, 2001). These areas tend to be sufficiently mapped and well incorporated into the planning systems of government (Hoffman, 2001). The areas have normally been supplied with infrastructure facilities such as water supply, roads, and electricity.

Informal settlements, on the other hand, are characterized by illegal developments in the form of built houses and shacks. Typically, these settlements are the remnants of the Black homelands, which were established outside urban areas during the Apartheid era. The settlements themselves often grew on free land outside the boundary of the former White city. These areas normally suffer from an acute lack of infrastructure facilities and services and are generally not included in local government development plans. With the formation of the eThekwini Municipality, the informal areas of Durban are now squarely in the planning

jurisdiction of local government. But, despite having become integrated into the post-Apartheid city, these areas retain their informal character and remain the epicenters of poverty within the city.

Average household size is one key variable that varies between formal and informal regions of the EMA. The exact amount of variation in household size that exists between these two settlement types, however, is a matter of considerable debate. Official statistics for Durban consider that household size varies by only 0.2 individuals (Durban Metro Housing, 1999). But, on closer examination, even these figures recognize that within and across the races the size of households does vary between formal and informal settlements. That is, once race is taken into account, household size does vary substantially between formal *versus* informal areas. In official publications, the largest household sizes are recorded for Blacks in formal areas (5.2 individuals), while the smallest are recorded for Whites in informal areas (2.6 individuals) (Durban Metro Housing, 1999).

While official statistics for the region indicate that average household sizes do not vary significantly across formal and informal settlements, anecdotal and field studies indicate that these data may be far from accurate. For example, researcher Alex Loftus has indicated that, in informal areas, households regularly reach sizes of 10-12 individuals (Loftus, 2003). According to Loftus, the size of poor households is often very fluid and it is frequently very difficult for households to even assess their own size accurately. For example, poor households will often record their size as being only the parental units and any direct children, regardless of whether other relatives or friends do live with them (Loftus, 2003).

The gap between official and unofficial figures on household size is greatest for informal and poor areas and has been exacerbated by the HIV/AIDS epidemic that has swept through KwaZulu-Natal. A full 41% of new mothers in Durban are HIV seropositive (Steinberg *et. al*., 2002). Since Blacks record the lowest incomes in the EMA and predominate in informal settlements and are hardest hit by the HIV/AIDS epidemic, household sizes are expected to also be much larger for Blacks than all other groups. The discrepancy between official and unofficial records of household size must be of major concern in any assessment of equity in service delivery. This is especially true since EWS' most prominent pro-poor policy, the extension of 6 kL

of water free to all households, is fundamentally premised on an estimate of eight individuals per household.

As shown in Table 4.2, there are also distinct differences in access to water and sanitation services across settlement types. Because the majority of informal settlement residents are Black, these results bear great similarity to those found between race and water and sanitation service levels. However, the data in Table 4.2 also highlight that race alone can not serve as an efficient indicator of service quality levels received. This is because Blacks in informal areas receive substantially poorer standards of service than Blacks in formal areas. In formal areas, access to flush toilets and piped water approaches 100% for non-Blacks. For Blacks in formal areas, however, access to these levels of service is much lower, at 68%. In informal areas, only around one-third of Blacks (who make up 94% of the population of the informal settlements) have access to flush toilets and piped water.

Table 4.2 Access, in percent, to water and sanitation services by settlement type (Moller, 1999).

Settlement Types / Race	Sanitation				Water		
	Flush	VIP	Pit	Other	Pipe	Tap	Other
Informal – Black	34	13	52	1	29	54	15
Formal – Black	68	9	22	1	70	20	8
Formal – Other	97	0	2	1	98	0	1

Elaborating on the data reported in Table 4.2, it is possible to use ward-level data from the 1996 South African census to further examine the relationship between key socio-economic and demographic variables of Durban's population and the levels of water and sanitation service that citizens receive. From a full data set of 120 socio-economic and service delivery variables, identified to the ward-level for all 100 Durban wards, a subset of 15 has particular relevance to questions of equity in water and sanitation service delivery[22]. These variables are identified in the correlation matrix shown in Table 4.3. Socio-economic and demographic variables appear on the top of the table and service delivery variables appear along the left-hand side.

[22] A complete correlation matrix, showing the full range of water and sanitation service options and a greater selection of socio-economic variables, can be found in Appendix VIII.

Table 4.3 Correlation matrix relating socio-economic and demographic variables for Durban's 100 wards with standards of water and sanitation service delivery. The values reported in the table are the Pearson correlation coefficient, r, and significance value, p, on top and bottom respectively. Significant correlations, with $p < 0.015$, are indicated in bold type.

Service Delivery		Black (%)	White (%)	Employed (%)	Unemployed (%)	Income R0<R2400 (%)	Formal Dwellings (%)
Water Services (%)	Water in Dwelling	**-0.684** **0.000**	**0.680** **0.000**	**0.815** **0.000**	**-0.596** **0.000**	-0.153 0.128	**0.968** **0.000**
	Water On-site	**0.288** **0.004**	-0.131 0.192	-0.176 0.080	**0.252** **0.012**	0.035 0.731	**-0.303** **0.002**
	Public Tap	**0.706** **0.000**	**-0.356** **0.000**	-0.139 0.169	**0.638** **0.000**	**0.537** **0.000**	**-0.512** **0.000**
	Water Tanker	**0.273** **0.006**	-0.121 0.231	0.064 0.530	**0.272** **0.006**	**0.687** **0.000**	-0.180 0.074
	Well/ Borehole	**0.301** **0.002**	-0.162 0.108	**-0.343** **0.000**	0.183 0.068	**0.319** **0.000**	**-0.352** **0.000**
	Natural Source	**0.272** **0.006**	-0.162 0.108	**-0.359** **0.000**	0.162 0.108	**0.345** **0.000**	**-0.326** **0.001**
Sanitation Services (%)	Flush Toilet	**-0.664** **0.000**	**0.662** **0.000**	**0.784** **0.000**	**-0.567** **0.000**	**-0.198** **0.048**	**0.938** **0.000**
	Pit Latrine	**0.717** **0.000**	**-0.358** **0.000**	-0.209 0.038	**0.617** **0.000**	**0.584** **0.000**	**-0.565** **0.000**
	Bucket Latrine	**0.284** **0.005**	-0.117 0.259	-0.21 0.838	**0.259** **0.011**	0.121 0.242	-0.233 0.023

Source: Author's calculations using data from the 1996 South African census.

The statistical examination presented in Table 4.3 shows that, as is expected from observational and anecdotal evidence, race, income, and settlement type are all significantly correlated with the standard of water and sanitation services provided to the city's residents. The analysis provides further evidence that Black, poor, and unemployed households, and those in informal areas, receive relatively low standards of water and sanitation service. These significant correlations do not, however, indicate that these variables necessarily have a causal relationship with water and sanitation service levels. It is also important to note that the various socio-economic and demographic variables are themselves highly correlated. Race, for example, is significantly correlated with all of the other variables of employment status, annual income, and dwelling-type.

The analysis does, however, indicate that many of the variables associated with financial poverty and low standards of service delivery point to a common group. Blacks are not only the poorest citizens but are the most poorly served. Furthermore, Blacks in informal settlements are shown to be particularly poorly served. It is in the informal settlements that the highest levels of poverty and the lowest levels of service coincide.

4.3 Pro-Poor Water and Sanitation Initiatives in Durban

Durban has implemented a number of programs that aim to make water and sanitation services more readily available to the poor. The best documented of these policies is known as the free basic water policy. Under this scheme, all households in the EMA receive 6 kL of water free per month. Under any of Durban's various supply systems, consumption below this level is free from tariffs and fixed charges. The 6 kL volume itself is based on a daily *pro rata* allotment of 200 L to all households, which in turn is premised on certain assumptions regarding the daily water and sanitation needs of an average poor household. One of the most important assumptions made on the part of EWS, in the designation of the daily and monthly volumes, is that the average household size in the EMA is eight people (Niklaas and Stein, 2001). The 200 L daily volume is scheduled to provide 25 L per day per person to an eight person household.

Durban also operates a number of other delivery schemes that strive to make water and sanitation services more affordable. The city has, for example, provided alternative solutions for the provision of household services as an interim measure to the provision of full piped water connections and waterborne sanitation. For instance, EWS provides three levels of water service delivery to its customers. These may be described as full-, semi-, and low-pressure systems (Brocklehurst, 2001). Both the semi- and low-pressure systems are specifically designed with the poor in mind. The full-pressure system has also been adapted to better serve the poor.

The full-pressure system, which consists of metered connections to households, provides the highest standard of water delivery in Durban. Although it covers the majority of Durban's citizens, the full-pressure system still fails to reach a critical third of the population. As indicated, this service deficit is particularly great in Black, poor, and informal neighborhoods, where formal water network infrastructure has yet to be established.

That said, many poor and low-income households have gained access to the full-pressure system. In order to make the full-pressure system more responsive to the needs of these poorer users, EWS has implemented a number of technological innovations that aim to prevent the accumulation of large personal debts to the

utility. These innovations are the flow limiter and the flow restrictor. Both devices are used by EWS to effectively disconnect households while still allowing them to receive their 6 kL lifeline allotment of water. Once households have exceeded the debt ceiling established by EWS, service is disconnected and a flow limiter is installed. Households may then approach EWS to negotiate payment and reconnection. Alternatively, defaulting households may request the installation of a flow restrictor. The use of both devices is considered by EWS to be an inherently pro-poor approach to the problem of disconnections, since they allow households to receive their basic water allowance while still being in arrears and to better budget for water and other basic needs (McDonald, 2003).

The flow limiter and flow restrictor are technological devices that allow households that are connected to the full-pressure system and are in arrears to continue receiving their lifeline volume of water while being effectively "disconnected". The two technologies, while operating on a similar theoretical premise, achieve their ends in quite different ways. The flow limiter halts flow through the household connection so that only the daily allowance of 200 L (the *pro-rata* daily allotment of the 6 kL monthly volume) enters the household. Once the 200 L allotment has entered the household, the water is shut off. The flow restrictor, or "trickler", allows the full allotment of 6 kL to enter the household but at a reduced flow rate. Flow through the connection is effectively reduced and the monthly allotment enters slowly over the entire month.

The semi-pressure and low-pressure systems involve the distribution of water to household tanks in poor neighborhoods. These systems began operation in 1993 and have operated with considerable success in informal and poor neighborhoods (Bailey, 2002). Both systems have been refined since they were first launched and considerable experimentation with pricing took place in the early years of operation. Soon after the systems were established, for example, studies showed that it cost more to bill households receiving water via these systems than was returned in tariff revenue (Bailey, 2002). Tariffs were modified in 1996 so that households using the semi-pressure system would receive 6 kL of water free per month. This policy was so successful that the 6 kL free lifeline was eventually extended to all EWS customers. As Durban's first experiment with the provision of a lifeline volume of water, the semi-pressure system can be said to be the forerunner of the free basic water policy in Durban, and South Africa as a whole.

The semi- and low-pressure water supply systems in Durban represent two variations on a common theme. The two systems differ primarily in the placement of household water tanks and the nature of the distribution network. The semi-pressure system involves placement of the household tanks on individual rooftops, while the low-pressure system involves burial of the tanks adjacent to homes. In both cases, the tanks are filled regularly and provide a dependable source of water to poor homes.

Critically, both the semi- and low-pressure systems can be installed at much lower cost than conventional full–pressure systems. These savings are possible since the tanks rely on small diameter, low-pressure pipework, inexpensive valves and fittings, and manual labor for installation. Both systems also have the added benefit of providing local employment due to the labor-intensive nature of the installation and operation.

In the low-pressure system, water is reticulated using small diameter (< 50 mm) plastic piping, which is laid at shallow depths along roads in the area to be served. At suitable intervals a metered manifold box is installed, from which 20 households are connected. The households themselves pay for a feeder pipe from the manifold to a 200 L tank. They also dig the trench from the manifold to the dwelling. The pipework is supplied, laid and connected by EWS. In this way, each household in the system is provided with 200 L of water per day, the daily amount required to satisfy the 6 kL per month free basic water policy.

Initially, charges for water received through the semi- and low-pressure systems were overseen by local bailiffs. This method of charging, however, faced numerous challenges due to conflicts between citizens and bailiffs. Since the advent of the free basic water policy, water supplied through the low-pressure system has been free.

In the semi-pressure system, water mains are laid conventionally in the road reserve. Domestic water tanks are installed at roof level in each house, and supply from these tanks is plumbed to fixtures within the home. As the tanks take the peak load off the water reticulation system, pipes can be sized one size smaller than full pressure mains. Limited-pressure supply to the tank is continuous throughout the day, and each household is metered. The first 6 kL of water consumed per month is

not billed, but all consumption above this limit is charged. Daily consumption at each dwelling is in the order of 700 liters (Brocklehurst, 2001).

Implementation of the semi- and low-pressure systems has effectively reduced volumes of unaccounted for water (UFW) over the Durban water network. These reductions are due to the reduced pressures demanded by both systems and the introduction of improved water demand management. The overall water consumption through these delivery systems is estimated to be 50% less than through conventional systems to communities of similar profile (Naidoo, 1999).

A **semi-pressure** roof tank, on right, supplies the water needs of a household.

Low-pressure ground tanks supply the water needs of two adjacent households.

Figure 4.2 Photographs of semi- and low- pressure domestic water supply systems. [*Photo Credit: Bailey (2002)*]

A final water supply system also operates in Durban. This system consists of a network of standpoints and yard taps that is primarily concentrated in informal, rural, and peri-urban areas. Many of these taps were inherited by EWS from the provincial councils that previously administered water supply in the rural areas that were incorporated into the EMA. In some cases bailiffs control these taps and, until the implementation of the free basic water policy, enforced water charges. Since the advent of the free basic water policy in 1998, however, the network of taps is moving towards operating charge-free. Some yard-taps operate on a pre-paid basis, where the first 6 kL of water are free and all further consumption is paid for in advance.

According to EWS, the approach adopted in supplying communities with water services in Durban is one that focuses on providing options to consumers and attempts to produce local systems that match the financial resources and preferences of communities. Various service delivery options are given to consumers and public participation ensures the acceptance of most people in communities. It is undeniable that EWS has adopted innovative technologies and policies to supply water to previously unserved households in the EMA. According to EWS, community participation in the operation and maintenance of the system is a key element of the approach adopted.

4.4 Serving the Poor – Expanding Coverage and Improving Affordability

This section presents data on the economy of water and sanitation services from the perspective of poor households. The data focuses primarily on issues of service affordability in the sector. Knowing now, from the previous two sections, who lacks services and what strategies are in place to provide for them, this chapter goes on to assess to what extent the poor's needs are actually being met in terms of coverage expansion and service affordability as a result of EWS reforms.

4.4.1 Improved Access to Services

One of the most important questions that must be asked to gauge the effectiveness of EWS' pro-poor reforms, is how many and which people have actually gained access to service since they were initiated.

The 1999 Durban Quality of Life Survey, a randomized survey of 4000 Durban residents from all neighborhoods in the city, showed that 7.3% of respondents reported improved access to water over the previous year (Table 4.5) (Moller, 1999). The meaning of "improved access" in this survey was left to the interpretation of the respondents. The timing of this study is critical, since it comes one year after the launch of the free basic water policy. The study found that improved access over 1998 to 1999 was mainly in piped water to dwellings, with 4.2% of respondents indicating improvement in this area.

Table 4.4 Improvements in water service in 1998 to 1999 (Moller, 1999).

Service	% of citizens indicating improvement
Total Water	7.3%
Piped Water	4.2%
Public Tap	2.1%

The increases in coverage shown in Table 4.4 indicate that the greatest growth in coverage over 1997/98 to 1998/99 occurred in piped connections. In numeric terms the percentages shown in the table represent a total annual increase in coverage of 219,000 individuals, with 126,000 of these gaining access to piped water. Since income and piped water are closely related, and the wealthy have been shown to enjoy existing coverage levels near 100%, it is clear that most of the people gaining new access to water will be from poor households.

4.4.2 Water Tariffs and Charges

Charges and fees, together with tariffs, are an important determinant of whether water and sanitation services are affordable. The charges and fees that are most important in the water and sanitation sector are connection charges, for hookups to the network, and the fixed charges that are components of the overall fee structure. These charges are especially important because they represent a fixed hurdle which poor households must pass before they can access services. The following three sections look at the affordability of water and sanitation services by examining changes in wastewater connection fees, water tariff rates, and the cost of residential fixed charges for water supply.

4.4.2.1 Water Tariffs and Affordability

Tariffs for water consumption can be a major household expense, especially for those households that are poor. For those poor residents who do get connected to water and sanitation services, it is generally held that no more than 5% of household income should be spent on water and sanitation (McPhail, 1993). Anything above this limit so-called "five percent rule" is generally considered to be unaffordable.

In Durban, water tariffs for the full-, semi-, and low-pressure supply systems have all undergone extensive revision over the past six years[23]. In each case, the trend has been towards the elimination of tariffs and charges for consumption of less than 6kL per month, and towards increased tariffs and charges for higher levels of consumption. Figures 4.3, 4.4, and 4.5 show how the tariffs for different volumes of consumption in all three supply systems have changed since 1996. The values indicated in all figures have been adjusted for inflation to 2003 values.

Figure 4.3, shows the change in tariffs for water consumed under the semi-pressure (roof-tank) system. As mentioned in previous sections, this system serves households that are primarily located in informal areas. Figure 4.3 indicates that there was only one tariff for all levels of consumption under this system at the beginning of the study period. The graph also shows that tariffs for consumption of between 0 and 6 kL per month dropped to zero in 1998 as a result of the implementation of the free basic water policy. Tariffs for levels of consumption between 6 and 30 kL remained relatively constant over the period, before rising slightly in 2001 and 2002. Tariffs for consumption of over 30 kL, however, rose dramatically after 1996, reaching a peak approximately three-fold greater than initial tariff by the end of 2002. The tariff for consumption of over 30 kL of water per month rose particularly sharply after the implementation of the free basic water policy in 1998.

[23] A complete schedule of these tariff changes is listed in Appendix VII.

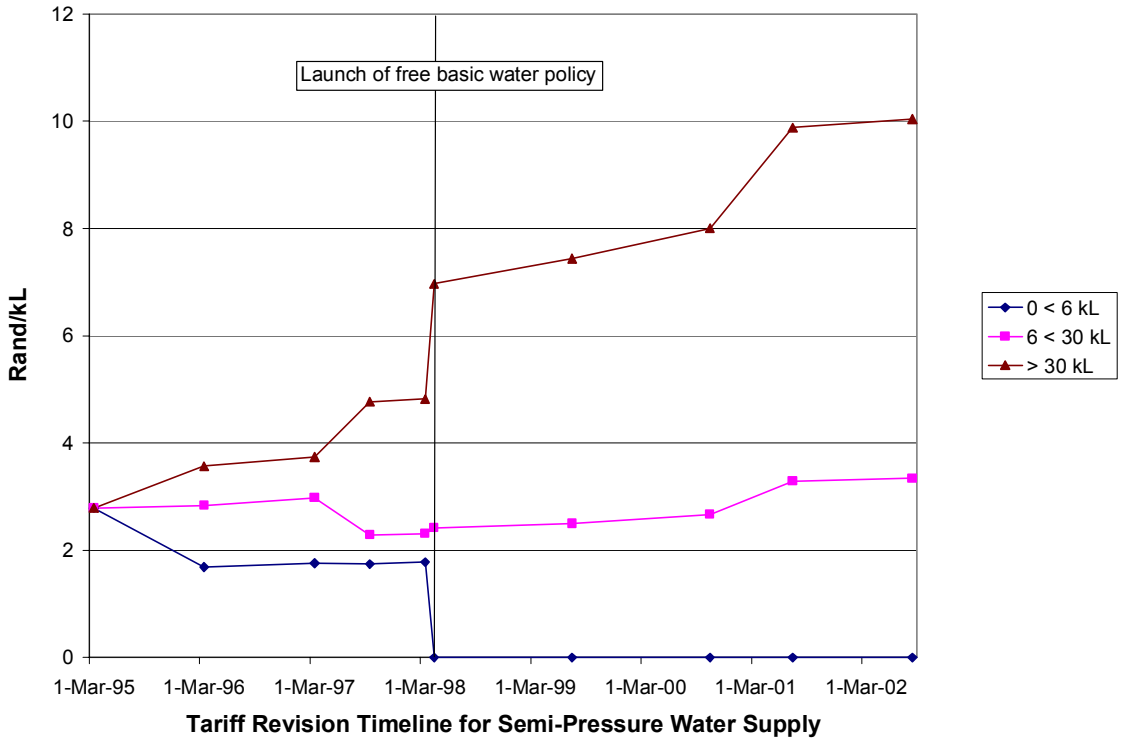

Figure 4.3 Tariff revisions for semi-pressure water supply between 1996 and 2002.

Figure 4.4 shows the change in tariffs for water consumed under the domestic, full-pressure water supply system. The graph indicates that the tariff for consumption of between 0 and 6 kL of water per month fell to zero in 1998, in accordance with the basic free water policy. The tariff for consumption of between 6 and 30 kL, however, climbed steadily over the entire study period, approximately doubling in price by the end of 2002. The tariff for consumption of more than 30 kL of water per month, like that observed for the semi-pressure system, rose sharply after 1998, tripling by 2002.

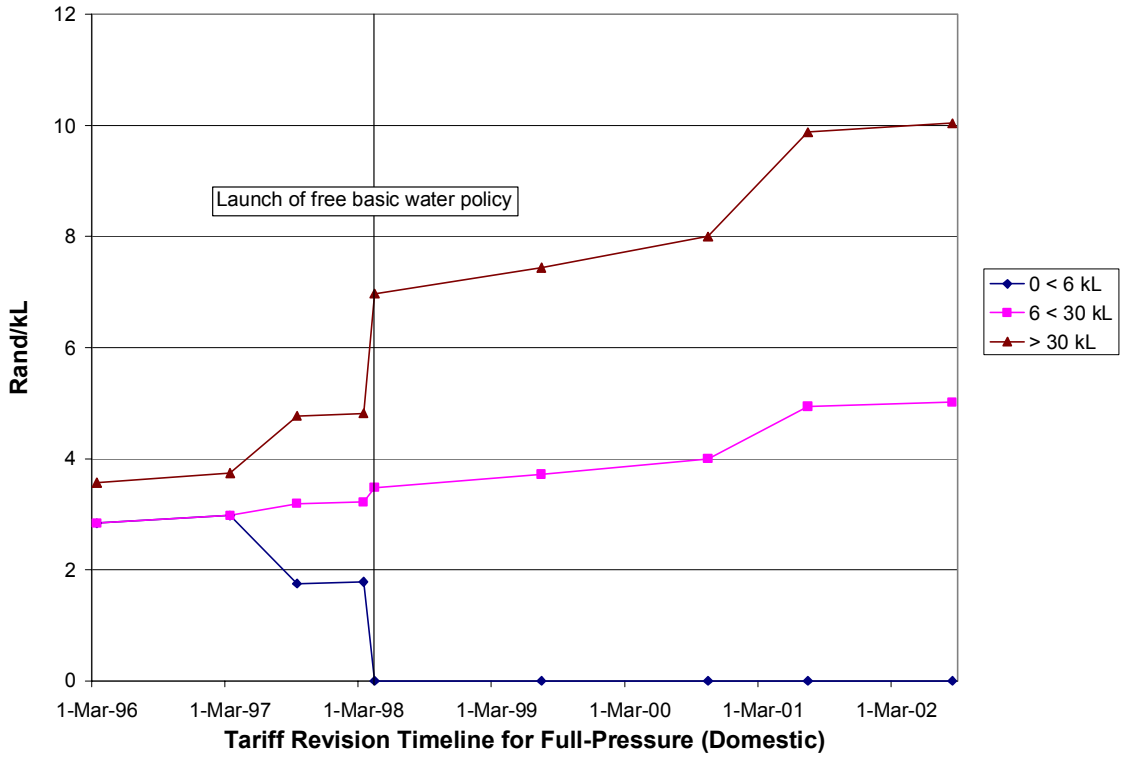

Figure 4.4 Tariff revisions for full-pressure water supply (domestic) between 1996 and 2002.

Figure 4.5 shows the tariffs for full pressure, non-domestic water consumption. The graph clearly shows that there is a single rate for all volumes of non-domestic consumption. The graph also shows that the cost of the tariff increased steadily between 1996 and 2002, rising by two-thirds over the six-year period. This increase was the same as that recorded for domestic full-pressure consumption of between 6 and 30 kL per month. The increase is not as steep as that experienced for household consumption above 30 kL under either the semi- or full-pressure supply systems.

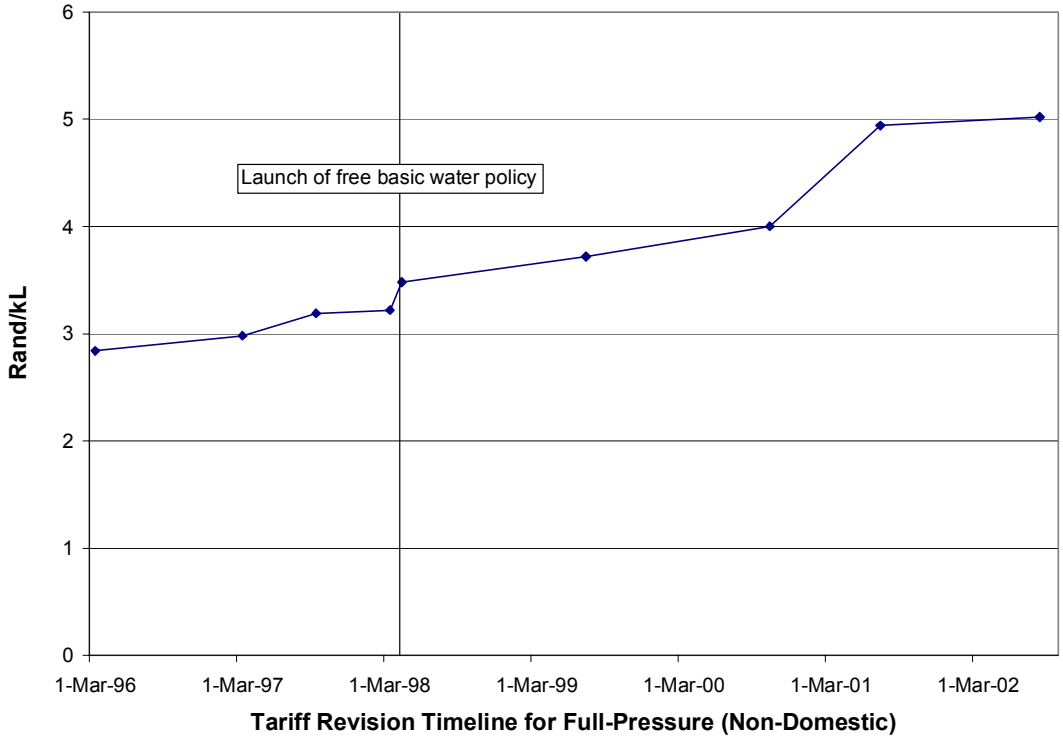

Figure 4.5 Tariff revisions for full-pressure water supply (non-domestic) between 1996 and 2002.

Figures 4.3, 4.4, and 4.5 indicate that tariffs for consumption of all household water below 6 kL per month have fallen to zero since 1998. Tariffs for consumption of higher volumes of water have, however, risen. This is especially true for levels of household consumption above 30 kL per month. Tariffs for all levels of non-domestic consumption have also risen, but less markedly than those for levels of domestic water consumption above 30 kL per month. Thus, high volume domestic consumers are paying a premium above that charged to industrial and commercial water users. Providing 6 kL of free water is also clearly a subsidy. However, by providing it to everyone, the rich benefit from it just as much as the poor. In fact, the rich could be said to benefit more, because a higher percentage of them have piped water.

A major constraint that Durban is experiencing with free basic water provision is the reduction in water demand that has occurred following the introduction of a rising block tariff. Although the costs of free basic water are still a relatively small proportion of total water supply costs they are an increasing burden on the water services account. The city has seen an increase from 8% in 1996 to 18% in 2001 of consumers who are receiving all their water free (i.e. are consuming less than 6 kL

per month) (DWAF, 2001). The tariff structure adopted has meant that most of the cross subsidies in the system are from consumers in the highest tariff block. Provided consumption by households remains below 6 kL per month, current tariff structures will benefit in-need households (DWAF, 2001). If, however, levels of consumption by poor households are higher than 6 kL, then they will end up paying a new premium for these higher levels of consumption. As mentioned, predictions of levels of water consumption are largely based on an assumption of a household size of eight people. The accuracy of these predictions is, therefore, a key to determining the extent to which the tariff structures adopted in Durban will effectively benefit the poor.

4.4.3 Wastewater Connection Charges and Affordability

In the Wastewater Department, connection fees are charged to gain access to EWS mains. The most recent changes in these fees are shown, in inflation adjusted terms, in Figure 4.6. As the graph shows, the cost of most wastewater connection fees increased after the 2002 revision of the departmental fee schedule. Complete data on wastewater connection charges are presented in Appendix XI.

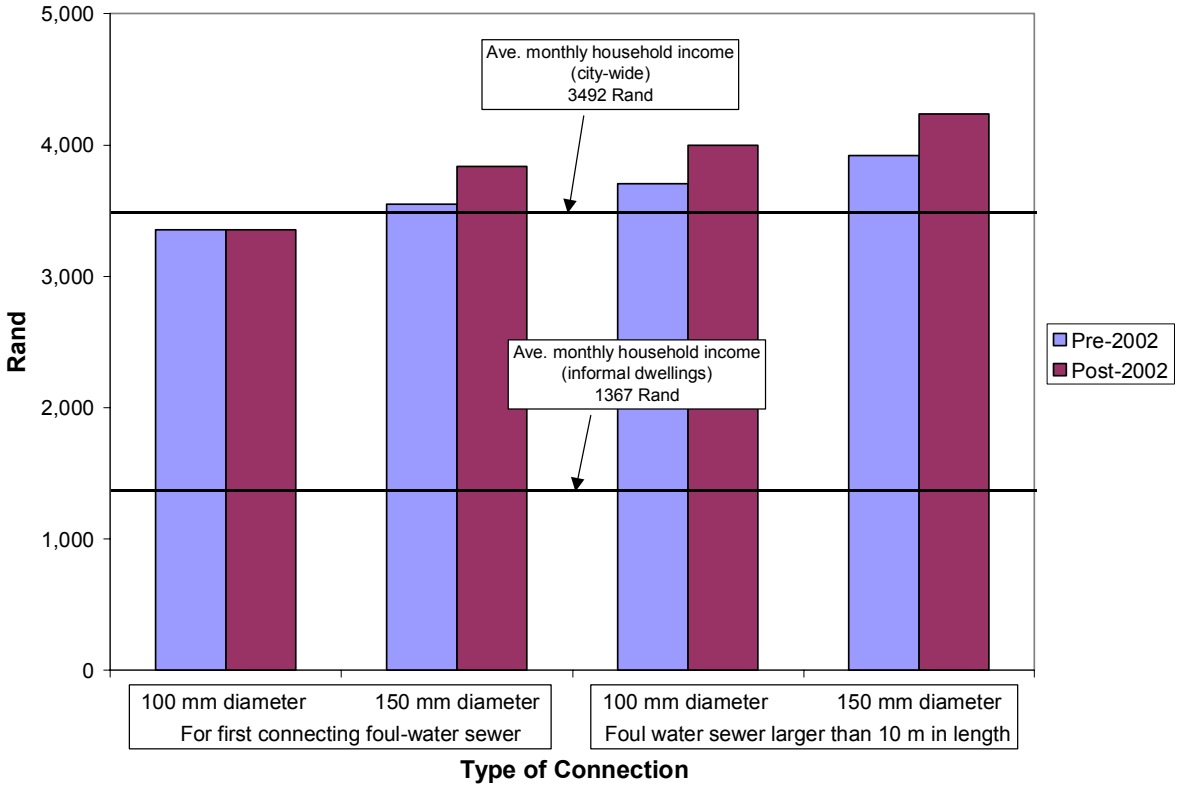

Figure 4.6 Inflation adjusted wastewater connection fees (Rand) pre- and post-2002 revision of charges.

Figure 4.6 shows that connection fees for wastewater service have increased for three of the four main connection types. Only for the smallest size of first foul-water connection did the charge remain constant. For each of the other connection types, the price rose on the order of 8%.

The wastewater connection charges shown in Figure 4.6 indicate that these fees are becoming more expensive in comparison with the monthly salaries of the poor in Durban. As previously mentioned, 44% of Durban's population earn less than 410 Rand per month (eThekwini Municipality, 2002). In addition, 67% of Black households earn less than this amount. This places the connection charges for waterborne sanitation in 2002/03 at over ten-times the monthly salary of the majority of informal area residents and higher than the salary of a significant proportion of Durbanites as a whole.

4.4.4 Residential Fixed Charges and Affordability

The residential fixed charge is the fixed component of the residential tariff. As a constant charge per month, these fees can represent a particular burden for poor households. Residential fixed charges for water supply, inflation-adjusted to 2003 values, are shown in Figure 4.7[24].

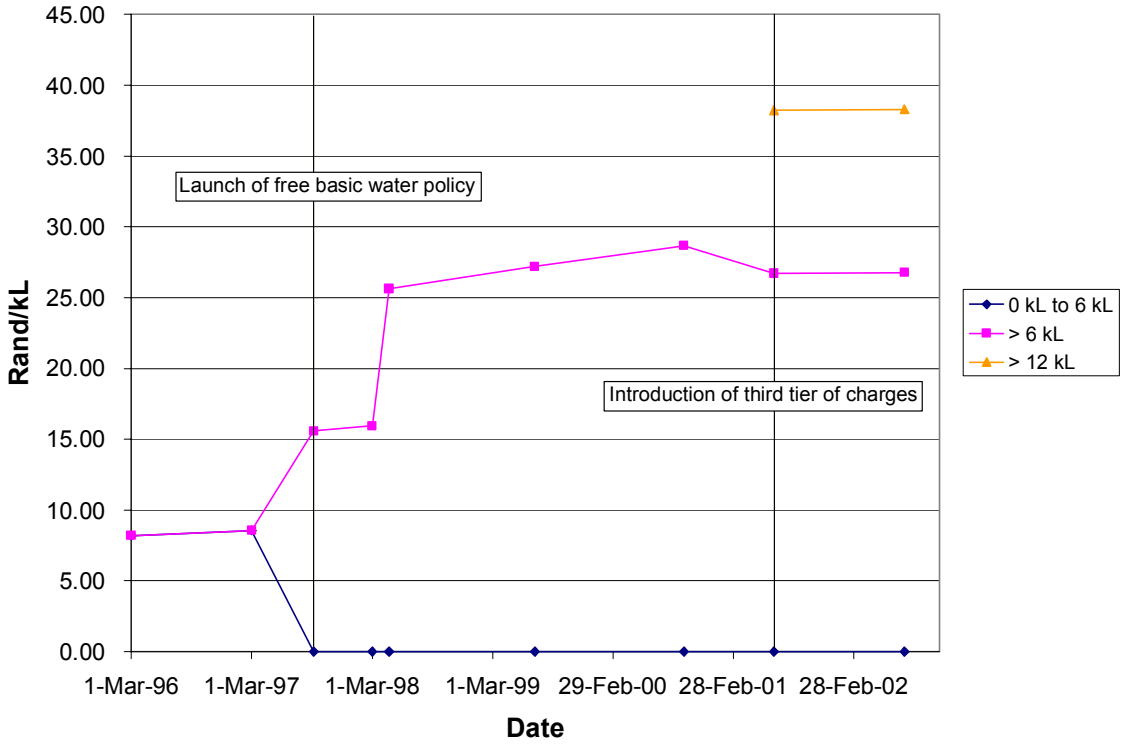

Figure 4.7 Residential fixed charges, inflation-adjusted to 2003 Rand values, from March 1996 to August 2002 (In 2003 Inflation adjusted values).

Figure 4.7 shows that, for consumption below 6 kL per month, the fixed charge has fallen to zero since late 1997. Reduction of the fixed charge, together with the removal of tariffs for similar levels of consumption in 1998, forms Durban's free basic water policy. Again, this is the most pro-poor part of the pricing strategy, assuming that poor households are more likely than non-poor to use less than 6 kL. For consumption above 6 kL, however, the fixed charge climbed sharply after this same

[24] Full data on residential fixed charges in the EMA are provided in Appendix VII.

date, reaching a price more than five times that of 1997 in two years. Since 1999, the fixed charge has remained relatively constant for consumption levels between 6 and 12 kL per month. At levels of consumption above 12 kL per month, the fixed charge has increased substantially since 2001, when a third tier of fixed charges was added to the fee schedule.

Given that 44% of the population of Durban earn less than 410 Rand per month, the fixed charges for consumption of more than 6 kL of water per month are very high. For consumption between 6-12 kL per month, the current charge of 27 Rand is equivalent to over 5% of the monthly salary of the 44% of the population who live in poverty and 67% of Blacks alone. For levels of consumption above 12 kL, the current fixed charge of 38 Rand is nearly 10% of the monthly salary of this group. Thus, the fixed charge for consumption of any volume of water above 6 kL exceed the well established "five percent rule".

4.4.5 Number of Households Disconnected for Non-Payment

The number of households disconnected for non-payment of water bills is a strong indicator of the affordability of water and sanitation services as well as of the institutional environment in which poor and defaulting customers find themselves embedded. As of 1999, Durban was said to boast a collection efficiency for water services above 95% (Naidoo, 1999). While this indicates a strong ability of consumers to pay for the water they receive, at the same time up to 1000 disconnections of defaulting customers were being made by EWS on each week day (Naidoo, 1999). According to Loftus (2003), the rate of disconnection in Durban continues to hover around 4,000-5,000 disconnections per week. This corresponds to a weekly disconnection rate of 1.3 to 1.4 percent of all connections in the EMA.

The high number of service cut-offs in Durban is part of a wave of disconnections that have swept South Africa since 1994. Following a roughly 85% decrease in central to local transfers in the mid-1990s, local authorities began increasingly to impose disconnections as a way of recouping costs through tariffs. The estimate of the total number of disconnections imposed in South Africa since 1994 is 11.7 million

(McDonald, 2003). These disconnections affect poor households predominantly, as they are the least able to pay for services and the most likely to fall into arrears.

4.4.6 Interest Collected on Overdue Debts

The amount of interest collected annually by EWS on overdue customer debts is a good indication of the degree to which poor households face increasing financial burdens in paying for water and sanitation services. As Figure 4.8 shows, the amount of interest collected on overdue debts for water services has increased almost exponentially since 1994/95. While values appear to level off somewhat in 2000/01, the increase is particularly great between 1996/97 and 1999/2000, after the institution of the free basic water policy. This interest collected by EWS represents a significant, and increasingly large, component of the agency's general revenues.

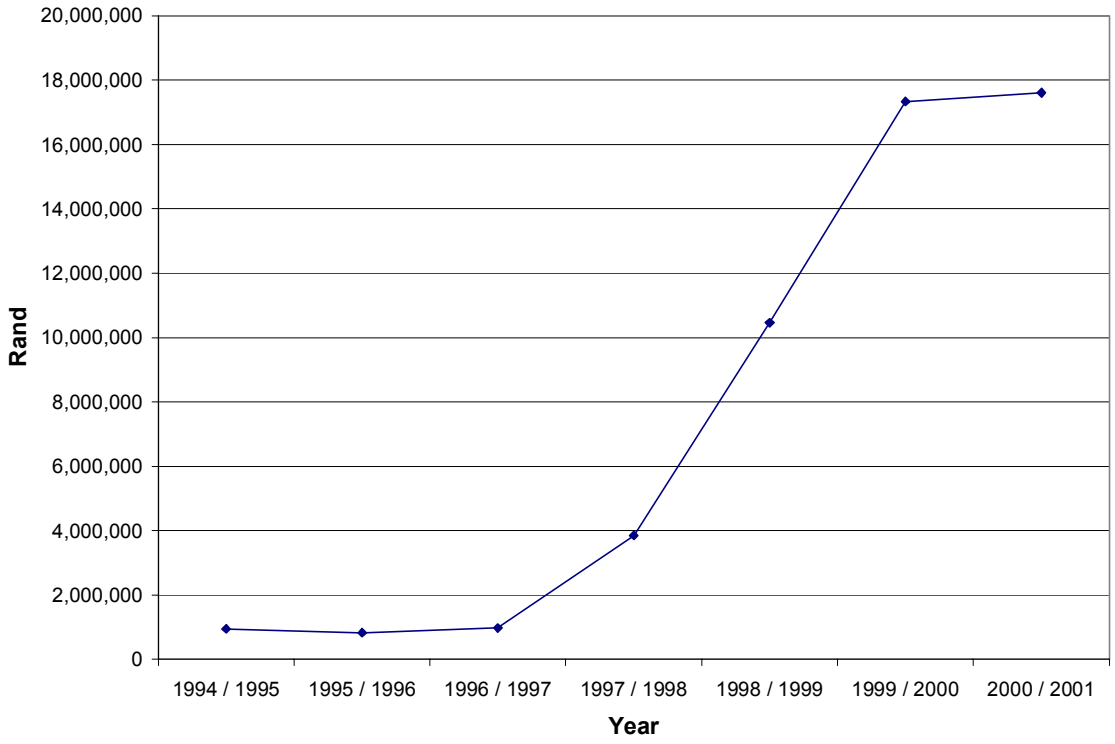

Figure 4.8 Interest from overdue accounts collected annually by EWS, 1994/95 to 2002/03 (Rand).

The fact that EWS has collected increasing amounts of interest on overdue debts since the fall of Apartheid, and particularly since the institution of the free basic water policy in 1998, is an indication of two scenarios that may be affecting poor households. The first is that the level of household debt for water and sanitation services has increased, while the collection efficiency of EWS has remained relatively constant over the period. The second is that household debts have not increased, but EWS' efficiency in collecting interest on overdue debts has improved substantially. In either case, it is clear that an increased financial burden is placed on consumers as a result. It is also clear that this burden will fall particularly heavily on poor households, who are least able to afford such increases.

4.5 Conclusion

The data and analyses presented in this chapter indicate that the story of how the poor are served in Durban with respect to water and sanitation services is highly complex. On the one hand, considerable gains in coverage have been made due to the intervention of EWS. As well, EWS has sought to employ a host of innovative policies and technologies to ensure that systems for water and sanitation provision respond better to the needs of the poor. In this sense, EWS and Durban are very much at the forefront of work to serve the poor.

At the same time, however, there is a more contentious aspect to the application of pro-poor water and sanitation policies in Durban. There are major concerns over the actual equity inherent to EWS' approach to serving the poor. Advocates of the poor argue, and the data presented here confirm, that costs for large, poor households are particularly likely to have had their access to water and sanitation services decline in the post-reform era. There are concerns that the free basic water policy has limited many households to low levels of water consumption through a combination of sharply increasing block tariffs for higher levels of consumption. As well, EWS' highly aggressive disconnection policy tempers the successes that have been achieved in terms of sheer numbers of increased connections. With 1.3 to 1.4 percent of all connections being cut-off per week, it is difficult to reconcile the disconnection practices of EWS with its other pro-poor efforts.

Ultimately, it is very difficult to assess the overall success that EWS has had in serving the poor's water and sanitation needs in Durban. The policies that the agency has adopted clearly have increased coverage levels. But these gains have just as clearly come at a great price for the poor.

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"Whiskey is for drinking … it's water that's for fighting."

Mark Twain

- CHAPTER FIVE –

Discussion

5.1 Introduction

This chapter discusses the central question of the thesis in light of the results of the investigation and analysis conducted in the previous two chapters. The first sections of the discussion come to a conclusion on the extent to which eThekwini Water Services (EWS) is covering costs and serving the poor in Durban. The following section then examines the dynamic between these two goals and discusses how, and on what terms, any successes in cost recovery and serving the poor have been achieved. The section focuses on linking the findings of the previous two chapters to the political and economic situation in Durban and to the institutional and policy environment of EWS. Finally, the chapter discusses what lessons the Durban case holds for other cities and for the attainment of international water and sanitation targets given the conventional wisdom that it is difficult to make simultaneous progress towards both cost recovery and serving the poor.

5.2 Cost Recovery

5.2.1 Cost Recovery in Water Supply

As discussed in Chapter 3, The Water Department of EWS has had a mixed history of covering recurrent costs over the past nine years. Over the period 1994/95 to 2002/03, significant operating losses were recorded in five different years. Nonetheless, expenses and revenues for operations and maintenance did balance in three years between 1994/95 and 2001/02 and are projected to be exactly equal in 2002/03. Should projections prove to be on track, EWS will have managed to achieve a zero deficit year with minimal subsidization of operating expenses in the current year. In an era of declining central government subsidies to local government in South Africa and for an agency located in a rapidly growing developing world city, this is in itself a victory for EWS. Superficially, it also seems to vindicate studies that indicate that EWS is moving towards a financially self-sufficient future.

However, on closer examination, one sees that the story of cost recovery in Durban's Water Department is much more complex than a simple balancing of operating revenues and expenses might indicate. One of the greatest complexities involves

Durban's definition of cost recovery. Cost recovery in Durban refers only to recovery of operating expenses, not capital costs. In practical terms, this is the limited definition of cost recovery that most governments in the developing world have adopted. Indeed, most local governments fail even to cover operating expenses; meeting capital costs seems far beyond the revenue generating power of many cities in the developing world, if not the developed world. However, it is also clear that, with declining central government transfers to local authorities in South Africa, providers like EWS will continually have to expand their definition of cost recovery if they are to maintain levels of capital investment. As the data for EWS indicate, levels of capital investment in water infrastructure have fallen off considerably since 1997/98, when subsidies were at their peak. Given the growing need for capital investment in water infrastructure, EWS may find that its relative success in recouping operating expenses in the short term dims in comparison to the rising challenge of financing capital investment in the long term.

The financial challenge posed by future needs for capital investment in Durban is expected to be particularly severe. Since the fall of Apartheid, Durban's population has grown rapidly. Between 1996 and 2001, the city recorded an average annual population growth rate of 0.96 and saw a substantial increase in both the size of the municipal area and its number of inhabitants (Naude and Krugell, 2002). A considerable amount of this growth resulted from repeated expansions of the city to include adjacent urban, tribal, rural, and provincial authorities. Given the pace of urbanization and the scale of rural-urban migration in Durban, EWS will not only face large capital costs for existing infrastructure, but also for expansion of the water and sewerage network. Rising environmental standards in South Africa, too, are expected to impose sharp costs in terms of capital investment in sewage treatment and waste disposal (South Africa, 1999). Thus, EWS can be expected to face sharply rising capital costs in an era of declining subsidies for capital investment. With each passing year, it will become more difficult for EWS to maintain its current low levels of capital investment and it will be of considerable interest, in years to come, to evaluate how the agency has chosen to balance the need for investment against increases in tariffs and charges to consumers.

In comparison with other water and sanitation service providers, the efforts of EWS to recover costs for water supply rank the agency well below a cross-section of

private American providers, but only slightly below values for top-tier African utilities, as measured by benchmarks for annual working ratio. This comparison places Durban close to where one would intuitively expect it to be, in terms of cost recovery – near the top of African providers, but still well below American private sector standards for cost recovery.

5.2.2 Cost Recovery in Sanitation Provision

The cost recovery picture for sanitation provision in Durban is harder to frame as a success over the period 1994/95 to 2002/03 than is the situation for the Water Department. In no year during this period did operating revenues cover operating expenses for the Wastewater Department, much less cover a portion of sanitation capital costs. In fact the Wastewater Department has taken on greater and greater operating losses in each year since 1994/95, moving from an annual working ratio of 3.53 in 1994/95 to a projected working ratio of 5.14 in 2002/03.

Before delivering too harsh a verdict on the scale of cost recovery for sanitation achieved in Durban, though, it should also be remembered that the time-series over which data has been collected is relatively short and follows an incredibly turbulent political and social period in South African history. Therefore, one should not be too quick to judge the financial trajectory of the department in years to come, no matter how dire finances may be in the short term.

Given the rapid rate of growth of Durban's population and the large shortfalls in coverage that EWS must make up for, it is clear that the agency will most likely be faced with above average capital investment needs in the near future. Fortunately, the Wastewater Department of EWS has maintained relatively high levels of capital investment, until 2002/03 at least, in comparison with the Water Department. It is possible, therefore, that these relatively high levels of continued capital investment have skewed the department's working ratios somewhat.

As well, the poor cost recovery performance of the Wastewater Department comes as no surprise for several other important reasons. Sanitation is fundamentally a less political issue than water in Durban and, as a sector, enjoys less political support from elected representatives and community leaders. In addition, sanitation tends

to have an even larger public good dimension than water in the eyes of local governments and, as a result, the sector often generates less strident demands for cost recovery.

In comparison with other providers in Africa and the United States, however, the efforts of EWS to recover costs for sanitation are poor. Top-tier providers in Africa achieve levels of cost recovery, as measured by annual working ratio, well above those achieved by the Wastewater Department of EWS in any year between 1994/95 and 2002/03. There is really no comparison between the performance of private American providers and the Wastewater Department of EWS in terms of cost recovery. Again, the Wastewater Department is moving further and further away from achieving cost recovery and is incurring greater deficits with each passing year.

5.2.3 Cost Recovery Across EWS Operations in Durban

The finances of both the water and wastewater departments of EWS need to be examined in concert to determine whether deficits in one department are being covered by gains in the other. It is common practice that cost recovery for water and sanitation together is achieved through cross subsidies from water to wastewater departments. In Durban, it might, for example, be possible for revenue balances from the Water Department to subsidize the operation of the Wastewater Department, ultimately leaving EWS in a position where effective cost recovery is achieved across the entire agency.

In the case of Durban, however, annual financial losses incurred by the Wastewater Department are far too great to be covered by any potential gains in the Water Department. In any case, the Water Department has not registered excess revenues in any year between 1994/95 and 2002/03. While the Water Department of EWS has begun to approach cost recovery in the numbers predicted for 2002/03, it has not had a record of profits with which to subsidize the growing deficits of the Wastewater Department or contribute to significant capital expenditure. In terms of both urban water and sanitation provision in Durban, cost recovery - even according to a limited definition that excludes capital costs - has not been achieved.

5.3 Serving the Poor

5.3.1 Meeting the Water Supply Needs of Durban's Poor

The following sections address the second half of the central question of the thesis, which examines the extent to which EWS is able to meet the water and sanitation needs of the poor.

In terms of water coverage, it is clear that EWS, and its predecessor Durban Metro Water Services (DMWS), have made progress in connecting the poor since the fall of Apartheid and the birth of multi-party democracy. Since 1998 especially, with the institution of the free basic water policy, water coverage levels have increased in the city. As shown in the 1999 Durban Quality of Life Study, 7% of respondents in a randomized survey of the city's inhabitants indicated that the standard of water service delivery they received had improved between 1998 and 1999 (Moller, 1999). In this study, the meaning of "improved" was left to the interpretation of respondents. So, while the exact nature of the improvements achieved over the year 1998-1999 is unknown, it is nonetheless clear that gains were made. Since access to water and sanitation services was shown to be highly correlated with income, and the non-poor already enjoy high levels of service coverage, it stands to reason that the reforms put in place by EWS have succeeded in increasing water coverage primarily for the poor (McDonald, 2003).

As described in Chapter 4, EWS has instituted a number of novel programs and policies that strive to make water both more affordable and more accessible to the poor. The development of the semi- and low–pressure distribution systems, for instance, has undoubtedly improved levels of water connectivity for the poor, especially in informal and peri-urban areas. As well, adoption of the free basic water policy has removed tariffs and connection fees for levels of water consumption below 6 kL per month. The implementation of this policy, now adopted at the national level, has most certainly served to increase the poor's access to basic volumes of water in Durban. By reducing the cost of basic allotments of water to households, and by removing water connection fees and fixed charges, consumption of less than 6 kL of water per month has become affordable for all.

At the same time, however, there is a second more complex aspect to the story of how EWS serves the water needs of the poor in Durban. This story emerges when, instead of focusing only on the numeric tally of connections in the EMA and the cost of low quantities of water, one examines the pro-poor strategies of EWS in their entirety. When one does this, it becomes apparent that institution of the free basic water policy has coincided with both a rise in the cost of water, at levels of consumption above 6 kL per month, and a sharp increase in the number of service disconnections taking place in poor neighborhoods (McDonald, 2003).

According to Naidoo (1999), EWS had reached cut-off levels of 1000 connections per day by 1999. These numbers are corroborated by Loftus, who remarked in 2003 that, "current disconnection rates range from 800-1000 per weekday, or around 4000 to 5000 per week." In research conducted with the South African Human Sciences Research Council, McDonald (2002) estimated that a nationwide surge in service cut-offs since 1994 has seen 10 million people disconnected from South African water networks.

The number of service disconnections being made each week by EWS is tremendously high, given that each must be made physically, and corresponds to 1.3 to 1.4 percent of all connections in the eThekwini Municipal Area (EMA). In fact, the sheer task of turning off so many connections seems quite daunting for a service provider. But of particular concern is the fact that disconnection practices on this scale, particularly in poor neighborhoods, would seem to contradict the spirit, if not the substance, of the regulations of the Department of Water Affairs and Forestry (DWAF) that lay down the terms of a constitutionally-derived right to water.

As described, to ensure that the stipulations of the free basic water policy are upheld in the face of rising rates of disconnection, EWS has adopted flow-limiting technologies that allow households to receive their monthly allotment of 6 kL, while still being effectively disconnected from higher levels of consumption. From EWS' perspective, the adoption of innovative flow-limiting and flow-restricting technologies guarantees that the disconnection policy is not only financially prudent, but also eminently humane. From the perspective of many poor households, however, especially those that are large, these technologies mean that it is more difficult to

fulfill their basic needs and that they are physically prevented from taking on extra debt as a means of securing water in the present.

The rising number of disconnections imposed by EWS has been accompanied by increases in the cost of water for levels of consumption above 6 kL per month. This further caps the ability of poor households to fulfill their basic needs within the strictures of the free basic water policy. For households that are large, these increased tariffs for higher levels of consumption are expected to be especially punishing. At the same time, little data exists on the actual household economy of basic water and sanitation needs, in Durban or elsewhere in South Africa. Durban represents an excellent site for further study of how the poor cope with rising tariffs and budget for water consumption in the framework of a free basic water policy. As the progenitor of South Africa's lifeline volume strategy, the city provides an ideal location for further study of the long-term consequences that such policies impose on the household finances of the poor.

It would appear that EWS has managed to achieve the best of both worlds - they have managed to keep connection numbers high while also ensuring that defaulting households are strictly limited to 6 kL of water consumption per month. This leaves the agency able to provide free service at a lifeline level to all while also engaging in strong cost recovery efforts. Whether EWS can be considered to be meeting the water and sanitation needs of the poor then depends very much on the way in which the agency's policies are evaluated and on which indicators of success are employed in the analysis. If one selects numeric gains in connectivity as the indicator of choice, then the gains that EWS has made in serving the poor seem strong indeed. If, however, one factors in the scale of disconnections and the fact that these disconnections are likely to affect poor households disproportionately, then the gains that EWS has made in serving the poor become much less clear-cut.

5.3.2 Meeting the Sanitation Needs of Durban's Poor

The efforts of EWS to provide for the sanitation needs of Durban's poor have been relatively limited compared to the well-publicized efforts undertaken by the Water

Department. Again, this may have much to do with the fact that sanitation is seen as a far less politically important issue in Durban than water supply.

Relative to the household incomes of the poor in Durban, connection fees associated with the wastewater system remain extremely high. As noted, 44% of the population earns less than 410 Rand[25] per month. Yet, the connection fee for a basic household wastewater connection is ten times this amount. As well, charges for connection to the wastewater system have risen since the mid-1990s in inflation-adjusted terms. Connections are therefore not only expensive, but have become more expensive in recent years.

The sanitation needs of the poor, especially those in informal areas, are primarily served through the extension of ventilated improved pit (VIP) toilets to poor households. These on-site facilities, while an alternative to full waterborne sewerage, are considered to be a poor second best by most Black households (McDonald, 2003). Anecdotal and statistical evidence suggests that the expansion of piped sewerage is not seen as important as the provision of high quality water supply options. As evidence of this, an estimated 68,000 households that are well served with regard to water supply remain chronically underserved with regard to sanitation services (eThekwini Municipality, 2002).

5.4 The dynamic relationship between cost recovery and serving the poor

As mentioned, a number of critical challenges have been raised concerning the realized versus theoretical equity inherent in the pro-poor approaches to water and sanitation delivery adopted by EWS. Critically, these challenges raise important questions concerning the relationship between Durban's strategies to recover costs and serve the poor.

The first of these challenges centers on the technologies used by EWS to limit consumption in defaulting households. Many advocates for the poor claim that the technologies used by EWS to limit flow to homes are not, in fact, high-tech solutions to the right to water / non-payment dilemma. Rather, these critics argue that the

flow limiter and the flow restrictor are actually imperfect, low-tech, solutions to this complex issue.

For instance, many individuals claim that both the flow limiter and flow restrictor frequently fail to deliver the daily or monthly lifeline volume of water. Often, for example, the flow restrictor, or "trickler", limits flow to the point where only 2 kL of water might enter the home in a month (Naidoo, 2003). Furthermore, the poor complain that they often feel too threatened to approach EWS for the removal of flow limiters or the installation and repair of flow restrictors, and often endure long periods of time with either no water or with severely reduced water flow to the household (Loftus, 2003). As a result, instead of providing a financial safeguard for households, the flow limiter and flow restrictor all too often serve to further compromise the already marginal access to water enjoyed by the poorest of the poor.

The second major challenge is centered on the issue of household size. The free basic water policy is premised on household sizes of eight people and a supply of 25 L of water free per individual per day (Niklaas and Stein, 2001). However, considerable anecdotal evidence indicates that the poorest households tend to have much larger household sizes than eight individuals. Often household sizes of 10-13 are encountered in the predominantly Black informal settlements (Loftus, 2003). These already large households are now becoming even larger due to the HIV/AIDS crisis that has gripped the province of KwaZulu-Natal, and much of sub-Saharan Africa. As adults die of AIDS, more and more single parent and grandparent-headed households are being encountered and families are increasingly forced to take in neighbors and near, and not so near, relatives (Steinberg *et. al*., 2002). Still, many households do not include temporary or unrelated guests in their calculations of occupancy numbers (Loftus, 2003).

One of the most important repercussions of under-reported household sizes and the growing HIV/AIDS crisis in Durban is that the average household size of the poorest households may be grossly underestimated. With 41% of all new mothers in Durban testing seropositive for HIV, the size of households in Durban will only become larger over the coming years (Steinberg *et. al*., 2002). The resulting underestimation of

[25] Prices in this thesis are reported in South African Rand. The exchange rate as of 1 May

average household size will pose an increasingly large problem for effectively forecasting the needs of poor households and for devising effective pro-poor water and sanitation strategies in Durban and other South African cities.

Any underestimation of average household size in Durban will have profound consequences for the equity of EWS' water supply and sanitation policies. The 6 kL free basic water policy will only be truly equitable if poor households are able to fulfill their needs within the 6 kL lifeline volume. If they cannot, the sharply rising tariffs imposed above the 6 kL boundary will actually punish poor users. Furthermore, even if households are able to use less than 6 kL of water per month, there is no guarantee that this will not severely compromise the health and welfare of household members.

By mandating the 6 kL monthly limit and implementing an aggressive disconnection policy, EWS has effectively downloaded the cut-off process onto households themselves. Knowing that tariffs have increased beyond the 6 kL per month lifeline volume, many households try desperately to stay within the 0-6 kL consumption band, even at great risk to themselves (McDonald, 2003).

A third challenge to the equity of Durban's water and sanitation policies rests on the willingness and ability of households to pay for services. While EWS argues that poor citizens are often unwilling to pay for services, other research suggests that this is not the case. In terms of ability to pay, certainly the 4000-5000 cut-offs (corresponding to 1.3 – 1.4 % of all connections) taking place per week in the EMA would suggest that many households are unable to pay for the services they receive.

There is an assumption on the part of EWS that the poor are unwilling, although able, to pay for water (Loftus, 2003). This assumption is built, partly, on the extensive willingness to pay literature (Rogerson, 1996). If EWS' assumptions regarding ability to pay are incorrect, however, they could pose severe risks to the health and welfare of the poor.

The most frequently cited example of the type and scale of health risk associated with an inability of the poor to pay for levels of essential water consumption is the

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2003 was 1 $US = 7.295 ZAR. (www.economist.com/markets/currency/)

outbreak of cholera that swept a semi-rural region of KwaZulu-Natal in 2000. This devastating outbreak is alleged by some to have begun when free taps were replaced with a system of pre-paid, metered taps. Left without recourse, the poor, unable to pay the extra costs associated with the new taps, are thought to have simply drank from contaminated surface water (Moloi and Dieltiens, 2002). The result was one of the most devastating cholera outbreaks in recent South African history. This incident stands as a stark reminder to EWS of the potential consequences should their assumptions about the ability of households to pay for levels of water consumption above 6 kL per month prove incorrect.

The question of whether the poor are willing to pay raises the related question of whether there is a "culture of non-payment" for water in Durban, as some EWS staff have contended (Loftus, 2003). One of the major arguments put forward at the international level to support cost recovery efforts has been that charging for water teaches people that water has a value. At the local level, EWS has maintained that, in Durban, there is a history and culture of nonpayment for water that has extended from Apartheid times, when Blacks commonly boycotted payment for public services (McDonald, 2003).

Other research, however, contradicts the presumption that a culture of nonpayment continues to thrive amongst the poor in Durban. Researchers in the city have been told by residents that the system of boycotts initiated by anti-Apartheid activists prior to 1994 was a specific tool directed at local governments of that time (Loftus, 2003). By refusing to pay local tariffs during the Apartheid era, it was hoped that they could destabilize the finances of local government, force recognition of their concerns, and ultimately bring an end to Apartheid (McDonald, 2003).

These researchers hold that the boycott policy of the Apartheid era was not reflective of a culture of non-payment for water or a lack of appreciation for the value of water on the part of the poor. In fact, they maintain that it rather reflects a strong understanding, on the part of local people, of the nature of local public finances and of the importance of water charges to the sustainability of public service delivery and of local government itself. Furthermore, they state that these boycotts were not only directed at water, but were applied to all public services, and therefore cannot

be particularly reflective of any unique lack of appreciation for the economic "value" of water.

According to both Loftus and McDonald (2003), these boycotts are now seen in hindsight by EWS as symptomatic of an extant culture of nonpayment for public services, and for water in particular. From Loftus and McDonald's research, however, it appears that these boycotts were a unique historical phenomenon that has now been replaced with a general willingness to pay for quality services, should they materialize. Boycotts were just one of the many ingenious political tools of a bygone era that have little application in post-Apartheid South Africa. Given this, they argue that EWS should be concerned that, if people aren't paying currently, there is a distinct possibility that they genuinely can't afford to pay. The degree to which this is true will be difficult to assess, of course, without comprehensive data on household finances in Durban. What the debate over Durban's "culture of non-payment" does make clear is that the extent to which the poor in Durban are willing and able to pay for improved water and sanitation services desperately needs further research.

What little research has been done on the topic of willingness and ability to pay for water in Durban indicates that the poor are willing to pay, should the quality of service first increase. As part of the Durban Quality of Life Survey, Moller (1999) found that new users of piped water (65%) were more likely than other informal settlement residents (56%) to hold the opinion that paying for services "is the right thing to do". This implies that, should service levels increase, people generally have no major problem with paying for those services. Provided the city moves first to improve the service delivery, consumers are generally willing to pay for the services they receive.

In order to combat the perceived culture of nonpayment for water, EWS has instituted a strict disconnection policy. One of the most shocking results of this policy has been the sharp increase in violence surrounding water issues in Durban, particularly in the informal settlements. This violence has taken a toll on EWS in the form of rapidly increasing costs for security. According to McDonald (2003), EWS now has 50 teams dedicated to service disconnections alone and accompanies these teams with armed guards or dogs as protection. As revealed in Chapter 3, the costs

associated with providing these teams with protection are a large, and rapidly growing, expense for EWS.

What motivates EWS, in the face of protests, increasing violence, and rising costs for security to push forward with their aggressive disconnection policy? In other words, what makes cost recovery such an attractive option for EWS that they are willing to impose such large financial, social, and political costs on themselves and residents? The answer to this question is complicated and highlights the several reasons that cost recovery has gained prominence in Durban and will, most likely, continue to do so. The answer also provides strong insights into why EWS has pushed to implement the free basic water policy and reveals the dynamic relationship that exists between the agency's policies for increased cost recovery and serving the poor. As it turns out, the motivations for pursuing both courses of action, in the manner that EWS has chosen, are intimately related.

The first major reason underlying the push for cost recovery is macroeconomic in nature. Following the fall of Apartheid, the national government launched a policy known as GEAR – "the Growth, Employment and Redistribution program" – in 1996 to combat the declining macroeconomic health of the national economy and increase investment (Michie and Padayachee, 1998). The GEAR program, combined with a shift towards an increasingly neoliberal interpretation of government intervention on the part of the African National Congress (ANC) leadership, created an environment of fiscal conservatism in national financial policies that strictly limited national to local transfers in the 1990s (Weeks, 1999). Central to local transfers fell 85% in real terms between 1991 and 1997 and an additional 55% between 1997 and 2000 (Financial and Fiscal Commission, 1997; McDonald, 2002). This macroeconomic environment in turn imposed strong financial constraints on local governments, who were confronted with dwindling financial assistance from central government. The fiscally conservative policy environment created by GEAR at the national level is central to understanding the origins of the current focus on cost recovery by local government in South Africa[26].

[26] It is worth noting that the move towards fiscally conservative budgetary and finance policies in South Africa, as implemented through GEAR, was pursued without the involvement and support of the World Bank.

The fiscal conservatism that arose from the macroeconomic climate in South Africa in the 1990s was also fed by an increasing focus on urban competitiveness at the local level. Since the fall of Apartheid, cities like Durban, Johannesburg, and Cape Town have increasingly seen themselves as competing for private investment and assistance from central government. These cities now see themselves not only as competing against each other for funds, but against cities of similar caliber around the world. This new focus on urban competitiveness has led cities like Durban to increasingly look for ways to reduce the tax burden on firms, so as to attract new business and retain existing ones (McDonald, 2002). Implementing cost recovery in public service provision is seen as one very effective way of reducing the burden of cross subsidization on industry to make relocation of outside firms more attractive. In fact, the Durban Chamber of Commerce and Industry has stated that cost recovery is seen as one of the most effective way to improve local tax conditions to attract industry and, in 2002, noted that, "the cost of water is one of the major components of the total infrastructural cost, over which our members have no control" (Chamber of Commerce and Industry, 2002).

But how, given a history of boycotts against service providers, rising anger at disconnections, and the historically pro-poor approach of the ANC and other anti-Apartheid parties, has EWS actually been able to maintain its cost recovery policies. This question necessarily brings one to examine the dynamic relationship between Durban's policies to recover costs and serve the poor.

Given the political climate of post-Apartheid South Africa, it would have been very difficult for a local government department to implement a pure cost recovery strategy in water and sanitation provision. While this may have been attractive to bureaucrats, given the macroeconomic climate and the decline in central-local transfers, it would have been unlikely to pass the hurdle of being accepted by elected local politicians. Despite the transition towards financial conservatism at the national level of the ANC, local branches of the party remained very much rooted in the activist traditions of the Apartheid struggle. In the days after Apartheid, and even now, it would have been literally unimaginable for local elected officials to accept such a hard nosed and apparently anti-poor policy stance. In fact, the reluctance of local politicians to the setting of cost-recovering tariffs is one of the major reasons that privatization is so often advocated as a tool for building the political will to allow

cost recovery. In South Africa, as in other nations, politicians have preferred to make extravagant promises about what can be given to the poor and are generally reluctant to bite the electoral hand that feeds them.

The wedding of Durban's cost recovery strategy to a well-publicized campaign to serve the poor then should come as no surprise. On its own, a plan for increased cost recovery in water and sanitation would likely have been rejected by the public and by publicly-elected officials alike. As has been shown, EWS knew by 1996, from studying the small semi-pressure supply system, that the revenues gained from charging customers for levels of consumption below 6 kL per month were less than the cost of actually billing these consumers (Bailey, 2002). This realization also happened to coincide with increasing discussion in the central government on whether "basic services" should be provided free to the public. While many local governments were aghast at the idea of having to provide free water and other services, EWS realized that they already had strong indications that such a scheme would be not only practicable, but cost-effective. EWS also recognized that instituting a policy where small volumes of water were given away to the poor would allow them to win over the public and elected officials and provide a way for both groups to buy into the idea that heightened cost recovery would be fair.

The move to drop charges within the semi-pressure water supply system in 1996 was supported by studies that showed charging for small volumes of water actually cost agencies more than they gained in revenue (Bailey, 2002). This work was further supported by studies in Zimbabwe and elsewhere which showed a similar relationship between profitability and low levels of service consumption (Bond, 1999). By giving away low volumes of water, EWS could effectively implement a pro-poor policy at no net cost to itself. EWS had already done exactly this within the semi-pressure distribution system as of 1996 and moved shortly thereafter to extend the lifeline volume to all consumers.

But why should all consumers be granted the lifeline volume under the free basic water policy? EWS in its pragmatism clearly knew that extending the lifeline volume to only the poor would meet with resistance from both wealthy households and industrial and commercial consumers. Studies showed, for instance, that the majority of wealthy households – who consume the greatest volumes of water and

therefore provide the bulk of domestic tariff revenues to EWS – were not willing to subsidize water consumption by the poor. To overcome this resistance, EWS had the insight of giving all households 6 kL of water free per month in the context of a rising block tariff structure, where households that used more than 6 kL would then pay increasing rates for consumption. The extension of the lifeline tariff bought political support from wealthy residents and succeeded in making the cost recovery strategy devised by the agency palatable to both rich and poor alike.

It has been said that the 6 kL free water policy provides EWS with the moral high ground that it needs to effectively implement its strict cost recovery strategy (Bailey, 2002). A cynic might argue that the free basic water policy is just a ruse to improve the effectiveness and efficiency of cost recovery efforts. But this is not likely the case. In fact, activists in the field feel that the intentions of DWAF and EWS officials are honorable and that they are truly committed to the expansion of water and sanitation coverage for the poor (McDonald, 2003). And EWS has brought about both water and sanitation coverage increases for the poor in Durban. But, critics say that EWS has also become divorced from the ground and often fails to see the negative consequences of the strict cost recovery policies they are implementing. Ultimately, EWS has capitalized on the cost recovery opportunities afforded by the carefully delimited free basic water policy, but will have to address the sharp penalties that they now impose on poor households, especially those that are large.

5.5 Lessons and Conclusions

Conventional wisdom in the water and sanitation sector holds that it is difficult to make simultaneous progress towards both cost recovery and serving the poor. Certainly few providers have made comprehensive in-roads in both areas, particularly in the developing world, and Durban is often referenced as a unique case where headway in both areas has been achieved. The analysis undertaken in this thesis indicates that Durban has indeed made progress in serving the poor and covering costs. As the thesis has also highlighted, doing so has not been easy. Neither have the gains in both areas been clear-cut or uncontested.

The Durban case highlights the dynamic trade-offs that exist between policies to recover costs and serve the poor. The case also shows the difficulty involved in evaluating efforts to achieve cost recovery and serve the poor, when both may be used as guises to actually pursue the opposite. As evidenced in Durban, what may appear to be a superficially pro-poor policy, such as the extension of a lifeline volume of 6 kL of water free to all, may in fact be a cost cutting measure on the part of local government. Conversely, efforts to disconnect people from the water network may be presented as a strategy to reduce the debt load on poor families. Ultimately, the politics of both cost recovery and serving the poor are murky. Policies in both areas are premised on a need to win over local residents and the representatives they elect and it is often difficult to assess where serving the poor ends and recovery of costs begin. Separating the rhetoric associated with both cost recovery and pro-poor policies from actual outcomes is essential if a true understanding of the ramifications of these policies on the poor, in particular, is to be gained.

The applicability of the exact cost recovery and pro-poor strategies adopted by EWS in other cities in the developing world may be limited. But the approach to combining the two ends to improve the political-acceptability of cost recovery strategies could be much appreciated by local governments in other cities in the developing world, and beyond. The Durban case contains powerful lessons for other governments in how to structure cost recovery efforts in ways that not only make them a highly desirable and practicable means of improving urban competitiveness and addressing unfavorable macroeconomic conditions, but also make them more palatable to both politicians and members of the public.

At the same time, the Durban case holds equally powerful lessons for advocates of serving the poor. The complex inter-relationship between cost recovery efforts and seemingly pro-poor strategies make organizing against cost recovery and tariff increases a challenging proposition. The Durban case should be carefully studied by advocates for the poor, opponents of tariff increases, and the anti-privatization lobby to better familiarize themselves with the changing language of service delivery and the complexities of the political rhetoric that now surrounds these issues.

Whether the gains that Durban has made can be achieved by other cities, particularly in Africa, is questionable. Conditions in Durban are unique. The city is one of the wealthiest on the continent. As well, the water and sanitation infrastructure that does exist was in relatively sound condition and virtually the entire network was metered at the start of the reform period. Furthermore the local government is more energetic than most and has tremendous human capital, on a scale that few other city governments enjoy. This human capital has been essential for managing the inherent and immensely complex tensions that exist between the agency's policies for improving cost recovery and serving the poor. Keeping the two separate, both in application and in the minds of the public and politicians, requires a highly trained and talented bureaucracy that is in tune with the political winds of change and the practical realities of policy implementation.

There are other aspects of the Durban case that may not lend themselves to replicability. For example, the gains that Durban has achieved have required a degree of cross subsidization from the wealthy, which in many other cities in Africa would be unavailable on a similar scale. Many developing country cities lack the core of wealthy households that Durban is able to rely upon to carry the increased burden of extending connectivity to the poor and supplying them with the lifeline volume. As well, implementation of the free basic water policy, according to the Durban model, requires a highly professional agency that is relatively free from corruption and is extremely stable. The Durban model is premised on the strict application of rules and on the fulfillment of basic service promises. Should revenue collection from the rich decline, for instance, the system would fail to operate effectively. Should the poor have no hope of receiving improved services, they would pay even less frequently than they do for volumes of consumption above 6 kL per month. Should disconnections not be made, defaulters would not curb consumption above 6 kL per month. Thus, a relatively high degree of efficiency is central to the operation of the Durban model. Without a highly efficient agency, the Durban model will be unlikely to succeed.

The Durban case does, however, bear powerful insights into how local water and sanitation service providers in the developing world can better manage their complex role as intermediaries between national and local level political actors. Situated between national and local branches of the ANC, EWS was faced with the difficult

task of implementing nationally dictated policies for cost recovery that were bound to be unpopular with locally elected politicians. As shown in this thesis, the financial constraints imposed by increasingly restrictive national fiscal policies were among the most important factors driving the local push for cost recovery in Durban. And yet, in order to move towards cost recovery, EWS had to negotiate local political hurdles often established by decentralized functionaries of the ANC. EWS, like many large-city service providers, found itself at the complex intersection of national and local politics and was forced to devise systems that allowed it to manage the tensions that arose from the meeting of these very different political interest groups.

The complex dynamic that EWS established between its policies for serving the poor and recovering costs can, to some extent, be seen as a means of coping with its position as an intermediary between two radically different levels of political actors. The way in which a locally palatable policy option, the extension of the lifeline volume, was paired with implementation of a less appealing (at the local level, at least) cost recovery scheme holds strong lessons for other local governments who must try to sell nationally-driven policies to locally-elected officials and their constituents.

The Durban case also bears lessons for the fulfillment of international water and sanitation targets, which are increasingly premised on the achievement of both full cost recovery and meeting the needs of the poor. Again, the chief lesson is that great creativity and innovation are needed to skirt the political hurdles that often prevent the application of pure cost recovery strategies. The Durban case also indicates that by combining strategies for both cost recovery and service to the poor, there is hope that the two aims can be achieved simultaneously. But the case also indicates that the headway made, as in Durban, is likely to be contested.

5.6 References

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- APPENDICES -

N.B. All monetary values reported in Appendices I through XII are in raw form and are not adjusted for inflation. All monetary values reported in the graphs and tables appearing in the body of the thesis, however, are adjusted for inflation using the values reported in Appendix II.

- APPENDIX I -

Acronyms

Table A1.1. List of Acronyms

Abbreviation	Definition
DMA	Durban Metropolitan Area
DMWS	Durban Metro Water Services
DWAF	Department of Water Affairs and Forestry
EMA	EThekwini Municipal Area
EWS	EThekwini Water Services
GEAR	Growth, Employment, and Redistribution Program
kL	Kilo-Liter
R	Rand
RSA	Republic of South Africa
UFW	Unaccounted For Water

- APPENDIX II -

Annual Inflation Rate Data

Table A2.1. Annual inflation data, 1994-2002, and Average Inflation Rate for the same period*

Year	Inflation Rate (%)
1994	8.90
1995	7.90
1996	7.40
1997	8.60
1998	6.90
1999	5.20
2000	5.30
2001	5.80
2002	9.90
AVERAGE VALUE	7.32

* Figures taken from the quarterly reports of the South African Reserve Bank, Department of Finance Budget Review

Note: In all cases where the full time series 1994/95 to 2002/03 is referenced, inflation adjustments are made using the average annual value reported above. Because the full range of annual inflation rates is only between 5.2% and 9.9%, the use of this average allows rapid and efficient calculation with a minimum of error. For shorter periods each individual annual rate is applied to calculate inflation-adjusted values.

- APPENDIX III -

Water Department Revenue and Expense Profiles for eThekwini Water Services

Water Department Operating Revenue and Expense Profiles

Table A3.1. Profile of operating revenues for the EWS Water Department, showing amount and source of monies received, 1994/95-2002/03, in Rand.

Year	Water Sales General	Water Sales 2nd Class Water	Interest on Investments	Rebate Private Leaks	Subsidies	Other Income	Total
94/95	169,116,155	1,602,414	34,214,140	0	0	22,083,926	227,016,635
95/96	237,823,478	1,943,228	37,233,010	0	4,529,174	14,468,836	295,997,726
96/97	342,683,291	2,011,559	40,200,290	0	85,679,433	12,782,127	483,356,700
97/98	418,033,546	2,664,066	40,461,970	0	98,440,566	719,216	560,319,364
98/99	549,063,439	2,607,147	43,392,898	-15,226,755	88,684,562	-6,899,918	661,621,373
99/00	605,512,621	2,909,999	43,733,057	0	66,706,367	13,945,213	732,807,257
00/01	653,195,199	2,737,990	41,498,741	-17,869,391	58,438,296	6,058,500	744,059,335
01/02	852,559,316	2,274,854	38,234,017	-6,910,596	45,549,985	-60,614,685	871,092,891
02/03	924,484,900	2,554,000	40,328,160	-8,000,000	45,549,980	35,904,180	1,040,821,220

Table A3.2. Profile of operating expenses for the EWS Water Department, showing all costs incurred, 1994/95-2002/03, in Rand.

Year	Salaries	Gen. Expenses	Repairs & Maintenance	Capital Charges	Contributions	Less Recoveries	Charged Outs	Total
94/95	21,194,096	194,463,255	24,408,402	36,578,652	16,827,300	-41,898,370	-24,555,505	227,017,830
95/96	29,880,332	265,067,720	30,506,735	41,765,672	6,338,220	-50,765,029	-26,795,924	295,997,726
96/97	49,268,150	445,634,740	35,158,276	58,752,424	14,239,704	-60,560,558	-41,740,054	500,752,682
97/98	51,735,381	499,818,531	71,529,655	77,230,767	13,241,630	-99,336,022	-41,804,156	572,415,786
98/99	53,162,788	549,970,357	107,032,038	111,661,570	14,832,872	-113,726,967	-61,311,284	661,621,374
99/00	55,330,452	639,597,002	126,110,925	122,201,030	17,759,618	-132,686,685	-82,878,831	745,433,511
00/01	103,654,121	632,118,842	49,256,085	141,360,741	21,916,773	-112,605,162	-982,471	834,818,929
01/02	110,478,664	716,983,794	45,283,527	153,504,812	23,476,889	-96,156,416	-1,632,072	951,939,198
02/03	115,771,150	775,786,880	48,650,670	174,527,710	24,954,630	-98,879,820	0	1,040,811,220

- APPENDIX IV -

Breakdown of General Expenses Categories for EWS Water Department

Table A4.1. Breakdown of the 115 "General Expense" Categories for the Water Department of EWS into 45 key constituent sub-categories.

Advertising
Alterations to Offices
Bulk Purchases
Capital Charges
Chemicals
Cleaning
Computer Software
Conferences
Consultant Fees
Consumables
Contractors
Electricity
Fuel
Furniture
Hire of Equipment
Insurance
Laboratory Expenses
Laundry
Legal Expenses
Licences and Permits
Marketing
Medical Exams
Meter Reading Costs
Pest Control
Postage
Printing
Radio Communications
Refuse Removal
Rent
Safety Equipment
Security
Small Plant and Tools
Sundries
Telephone
Training and Seminars
Transport
Unemployment Insurance
Water
Office Accommodation
Technical Services Costs
Administration Costs
Executive Costs
Finance Department Costs
HR Costs
Material Management

- APPENDIX V -

Wastewater Department Revenue and Expense Profiles for eThekwini Water Services

Wastewater Department Operating Revenue and Expense Profiles

Table A5.1. EWS sanitation revenue profile, showing amount and source of monies received, 1994/95-2002/03.

Year	Total Revenues (Rand)
94/95	21,462,586
95/96	22,976,171
96/97	30,635,094
97/98	112,429,642
98/99	41,591,582
99/00	45,045,650
00/01	44,282,167
01/02	56,914,431
02/03	58,435,500

Table A5.2. EWS sanitation expense profile, showing amount and source of monies received, in Rand, for 1994/95-2002/03.

Year	Salaries	Gen. Expenses	Repairs & Maintenance	Capital Charges	Contributions	Less Recoveries	Charged Outs	Total
94/95	32,060,820	76,986,254	23,621,787	24,470,139	0	-52,087,130	-29,318,916	75,732,954
95/96	38,419,560	151,613,335	27,534,562	29,627,342	0	-57,307,118	-98,695,028	91,192,653
96/97	38,596,822	95,090,949	36,347,794	35,842,077	0	-65,049,575	-34,634,380	106,193,687
97/98	65,241,625	160,683,106	73,965,542	69,803,333	0	-84,917,541	-81,995,818	202,780,247
98/99	72,005,338	142,062,169	87,757,320	72,938,871	109,000	-160,672,503	-69,553,280	144,646,915
99/00	83,791,203	205,101,565	99,495,653	76,073,370	4,880	-179,225,626	-124,943,792	160,297,253
00/01	97,537,644	93,368,950	51,445,772	83,643,214	0	-156,633,772	-4,646,170	164,715,638
01/02	103,009,455	107,529,986	66,767,732	85,938,080	0	-84,841,626	-4,878,500	273,525,127
02/03	113,159,300	120,000,900	73,797,900	87,394,700	0	-89,099,900	-5,171,200	300,081,700

- APPENDIX VI -

Capital Expenditure Profile for eThekwini Water Services

Water Department Capital Expenditure

Table A6.1. EWS Water Department capital expenditure profile, showing funds directed to capital spending, 1994/95-2002/03, in Rand.

Year	Assets (Rand)	Plant and Equipment (Rand)	Total Capital Expenditure (Rand)
94/95	36,197,897	4,709,895	40,907,792
95/96	51,196,127	8,976,358	60,172,484
96/97	134,964,599	19,564,525	154,529,124
97/98	233,150,050	24,147,788	257,297,838
98/99	116,301,499	13,600,751	129,902,251
99/00	94,235,820	14,263,195	108,499,016
00/01	119,859,855	9,975,420	129,835,275
01/02	123,261,584	16,081,420	139,343,004
02/03	-	-	-

Wastewater Department Capital Expenditure

Table A6.2. EWS Wastewater Department capital expenditure profile, showing funds directed to capital spending, 1994/95-2002/03, in Rand.

Year	Assets (Rand)	Plant and Equipment (Rand)	Total Capital Expenditure (Rand)
94/95	39,580,374	6,324,301	45,904,675
95/96	55,142,126	8,745,268	63,887,394
96/97	98,585,307	20,875,482	119,460,788
97/98	113,144,846	13,503,487	126,648,332
98/99	91,646,957	5,270,232	96,917,189
99/00	103,533,171	5,327,844	108,861,015
00/01	114,751,606	5,825,091	120,576,697
01/02	43,450,051	1,877,208	45,327,259
02/03	-	-	-

- APPENDIX VII -

Complete Water Tariff Schedule

Table A7.1. Complete current water tariff schedule of EWS (As of 2 May 2003).

User Group	Charge Type	Volume Water Sold [Volume (kL) or Meter Size (mm)]	Effective Date									
			1/3/1995	1/3/1996	1/3/1997	5/9/1997	1/3/1998	22/4/98	7/7/1999	1/10/2000	1/7/2001	1/8/2002
Domestic Semi-Pressure	Per kL	0-6 kL	1.606	1.05	1.18	1.17	1.29	0	0	0	0	0
		6-30 kL	1.606	1.77	1.99	1.53	1.68	1.76	1.94	2.18	2.83	3.04
		> 30 kL	1.606	2.22	2.5	3.19	3.5	5.06	5.78	6.54	8.5	9.14

			Effective Date								
			1/3/1996	1/3/1997	5/9/1997	1/3/1998	22/4/98	7/7/1999	1/10/2000	1/7/2001	1/8/2002
Domestic Full-Pressure	Per kL	0-6 kL	1.77	1.99	1.17	1.29	0	0	0	0	0
		6-30 kL	1.77	1.99	2.13	2.34	2.53	2.89	3.27	4.25	4.57
		> 30 kL	2.22	2.5	3.19	3.5	5.06	5.78	6.54	8.5	9.14
	Fixed Charge (Pre 07/012001)	0-6 kL	5	5.6	0	0	0	0	0		
		> 6 kL	5	5.6	10.2	11.2	18	20.5	23.2		
	Fixed Charge (Post 07/01/2001)	0-6 kL								0	0
		6-12 kL								23.2	24.94
		> or = 12 kL								33.2	35.69

			Effective Date								
			1/3/1996	1/3/1997	5/9/1997	1/3/1998	22/4/98	7/7/1999	1/10/2000	1/7/2001	1/8/2002
Non-Domestic Full-Pressure	Per kL	All Volumes	1.77	1.99	2.13	2.34	2.53	2.89	3.27	4.25	4.57
	Fixed Charge	< or = 20 mm	5	5.6	10.2	11.2	18	20.5	23.2	33.2	35.69
		> 20 but < or = 25 mm	8	9	15.92	17.5	28.1	32	36.25	51.9	55.79
		> 25 but < or = 40 mm	20	22.5	40.8	44.8	72	82	92.8	132.8	142.76
		> 40 but < or = 50 mm	31	34.9	63.53	69.8	112.5	128	145	207.5	223.06
		> 50 but < or = 75 mm	70	78.8	143.16	157.2	253.1	288	326.25	466.9	501.92
		> 75 but < or = 100 mm	125	140.6	255	280.1	450	513	580	830	892.25
		> 100 but < or = 150 mm	281	316.1	572.63	629	1012.5	1150	1305	1867.5	2007.56
		> 150 mm	500	562.5	1020	1120.3	1800	2050	2320	3320	3569

- APPENDIX VIII -

Indicators of EWS Financial and Operational and Performance

Table A8.1. Annual Debt Service and Investments (Rand)

Year	Annual Debt Service (Rand)	Investments (Rand)
94/95	30 660 848	232 740 574
95/96	59 910 195	233 478 699
96/97	113 115 975	308 837 958
97/98	261 797 838	303 201 191
98/99	212 118 694	309 083 096
99/00	270 988 196	309 585 864
00/01	436 294 955	310 070 901
01/02	434 514 752	3 764 165
02/03	-	-

- APPENDIX IX -

Water Supply and Production

Table A9.1. Total water production (kL) by EWS per year.

Year	Total Water Production (kL)
94/95	201,800,000
95/96	131,500,000
96/97	271,900,000
97/98	284,800,000
98/99	279,681,684
99/00	276,607,942
00/01	266,526,700
01/02	261,185,036
02/03	249,239,538

Table A9.2. Total Kiloliters bought by EWS, total kiloliters sold, Unaccounted for Water (kL), and Unaccounted for Water (%).

Year	Total Water Bought (kL)	Total Water Sold (kL)	UFW (kL)	UFW (%)
94/95	201,800,000	181,500,000	20,300,000	10.1
95/96	131,500,000	116,900,000	14,600,000	11.1
96/97	271,900,000	158,200,000	113,700,000	41.8
97/98	284,800,000	170,900,000	113,900,000	40.0
98/99	279,681,684	187,238,384	92,443,300	33.1
99/00	276,607,942	208,100,347	68,507,595	24.8
00/01	266,526,700	183,570,083	82,956,617	31.1
01/02	261,185,036	182,358,251	78,826,785	30.2
02/03	249,239,538	181,944,863	67,294,675	27.0

- APPENDIX X –

Correlation Matrix of Ward-Level Socioeconomic and Demographic Parameters with Water and Sanitation Service Delivery Variables for Durban

Table A10.1. Correlation matrix of ward-level socio-economic and demographic parameters (%) versus water and sanitation service delivery variables for Durban (%). Author's calculations using data from the 1996 South African Census. Key - - (AI R1< R2400 = Annual household income 1< 2400 Rand; MI R1<R2400 = Annual individual income 1 < 2400 Rand; Flush = Flush toilets; Water Dwell = Water supplied in dwelling; Onsite = Water supplied on site, not in house; Tanker = Water supplied by tanker truck; Bore-hole = Water drawn from borehole or well; Natural = Water from Natural Sources; ANC = Vote for African National Congress; DA = Vote for Democratic Alliance)

		AFRICAN	INDIAN	WHITE	EMPLOYED	UN-EMPLOYED	AI R1<R2400	MI R1<R2400	FLUSH	PIT-LATRINE	BUCKET LATRINE	WATER DWELL	ONSITE	PUBLIC-TAP	TANKER	BORE-HOLE	NATURAL	WATER-OTHER	ANC	DA
AFRICAN	Pearson Correlation	1	-.581(**)	-.475(**)	-.411(**)	.884(**)	.408(**)	.536(**)	-.664(**)	.717(**)	.284(**)	-.684(**)	.288(**)	.706(**)	.273(**)	.301(**)	.272(**)	.110	.758(**)	-.711(**)
	Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.000	.005	.000	.004	.000	.006	.002	.006	.277	.000	.000
INDIAN	Pearson Correlation	-.581(**)	1	-.136	.495(**)	-.321(**)	-.059	-.165	.423(**)	-.298(**)	-.229(*)	.464(**)	-.273(**)	-.273(**)	-.025	-.181	-.139	-.012	-.426(**)	.278(**)
	Sig. (2-tailed)	.000	.	.178	.000	.001	.558	.100	.000	.003	.025	.000	.006	.006	.802	.072	.167	.905	.000	.005
WHITE	Pearson Correlation	-.475(**)	-.136	1	.549(**)	-.574(**)	-.091	-.237(*)	.662(**)	-.358(**)	-.117	.680(**)	-.131	-.356(**)	-.121	-.162	-.162	-.158	-.470(**)	.868(**)
	Sig. (2-tailed)	.000	.178	.	.000	.000	.366	.018	.000	.000	.259	.000	.192	.000	.231	.108	.108	.117	.000	.000
EMPLOYED	Pearson Correlation	-.411(**)	.495(**)	.549(**)	1	-.236(*)	.208(*)	.044	.784(**)	-.209(*)	-.021	.815(**)	-.176	-.139	.064	-.343(**)	-.359(**)	-.060	-.428(**)	.695(**)
	Sig. (2-tailed)	.000	.000	.000	.	.018	.038	.663	.000	.038	.838	.000	.080	.169	.530	.000	.000	.557	.000	.000
UNEMPLOYED	Pearson Correlation	.884(**)	-.321(**)	-.574(**)	-.236(*)	1	.412(**)	.515(**)	-.567(**)	.617(**)	.259(*)	-.596(**)	.252(*)	.638(**)	.272(**)	.183	.162	.112	.631(**)	-.689(**)
	Sig. (2-tailed)	.000	.001	.000	.018	.	.000	.000	.000	.000	.011	.000	.012	.000	.006	.068	.108	.267	.000	.000
AI_R1_2400	Pearson Correlation	.408(**)	-.059	-.091	.208(*)	.412(**)	1	.816(**)	-.198(*)	.584(**)	.121	-.153	.035	.537(**)	.687(**)	.319(**)	.345(**)	.016	.296(**)	-.178
	Sig. (2-tailed)	.000	.558	.366	.038	.000	.	.000	.048	.000	.242	.128	.731	.000	.000	.001	.000	.875	.003	.077
MI_R1_2400	Pearson Correlation	.536(**)	-.165	-.237(*)	.044	.515(**)	.816(**)	1	-.328(**)	.750(**)	.245(*)	-.320(**)	.212(*)	.722(**)	.776(**)	.279(**)	.172	.066	.439(**)	-.335(**)
	Sig. (2-tailed)	.000	.100	.018	.663	.000	.000	.	.001	.000	.017	.001	.034	.000	.000	.005	.087	.512	.000	.001
HOUSEHOLDS	Pearson Correlation	-.053	.210(*)	.451(**)	.773(**)	-.038	.435(**)	.429(**)	.559(**)	.240(*)	.149	.578(**)	.065	.292(**)	.227(*)	-.142	-.167	.010	-.108	.457(**)
	Sig. (2-tailed)	.601	.036	.000	.000	.705	.000	.000	.000	.017	.150	.000	.518	.003	.023	.160	.097	.923	.286	.000
FLUSH	Pearson Correlation	-.664(**)	.423(**)	.662(**)	.784(**)	-.567(**)	-.198(*)	-.328(**)	1	-.661(**)	-.108	.967(**)	-.125	-.580(**)	-.223(*)	-.448(**)	-.424(**)	-.115	-.640(**)	.778(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.048	.001	.	.000	.297	.000	.216	.000	.026	.000	.000	.253	.000	.000
PITLATRINE	Pearson Correlation	.717(**)	-.298(**)	-.358(**)	-.209(*)	.617(**)	.584(**)	.750(**)	-.661(**)	1	.213(*)	-.594(**)	.157	.951(**)	.465(**)	.365(**)	.286(**)	.108	.625(**)	-.481(**)
	Sig. (2-tailed)	.000	.003	.000	.038	.000	.000	.000	.000	.	.040	.000	.121	.000	.000	.000	.004	.285	.000	.000
BUCKETLATR	Pearson Correlation	.284(**)	-.229(*)	-.117	-.021	.259(*)	.121	.245(*)	-.108	.213(*)	1	-.216(*)	.611(**)	.220(*)	.009	-.016	-.060	.008	.302(**)	-.172
	Sig. (2-tailed)	.005	.025	.259	.838	.011	.242	.017	.297	.040	.	.035	.000	.032	.931	.878	.561	.942	.003	.095
WATERDWELL	Pearson Correlation	-.684(**)	.464(**)	.680(**)	.815(**)	-.596(**)	-.153	-.320(**)	.967(**)	-.594(**)	-.216(*)	1	-.322(**)	-.525(**)	-.196	-.418(**)	-.397(**)	-.104	-.676(**)	.813(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.128	.001	.000	.000	.035	.	.001	.000	.050	.000	.000	.304	.000	.000
ONSITE	Pearson Correlation	.288(**)	-.273(**)	-.131	-.176	.252(*)	.035	.212(*)	-.125	.157	.611(**)	-.322(**)	1	.082	-.057	-.020	.007	.055	.396(**)	-.250(*)
	Sig. (2-tailed)	.004	.006	.192	.080	.012	.731	.034	.216	.121	.000	.001	.	.415	.574	.845	.944	.590	.000	.012
PUBLICTAP	Pearson Correlation	.706(**)	-.273(**)	-.356(**)	-.139	.638(**)	.537(**)	.722(**)	-.580(**)	.951(**)	.220(*)	-.525(**)	.082	1	.405(**)	.209(*)	.115	.078	.593(**)	-.468(**)
	Sig. (2-tailed)	.000	.006	.000	.169	.000	.000	.000	.000	.000	.032	.000	.415	.	.000	.037	.254	.438	.000	.000
TANKER	Pearson Correlation	.273(**)	-.025	-.121	.064	.272(**)	.687(**)	.776(**)	-.223(*)	.465(**)	.009	-.196	-.057	.405(**)	1	.291(**)	.162	-.050	.196	-.146
	Sig. (2-tailed)	.006	.802	.231	.530	.006	.000	.000	.026	.000	.931	.050	.574	.000	.	.003	.108	.620	.051	.147
BOREHOLE	Pearson Correlation	.301(**)	-.181	-.162	-.343(**)	.183	.319(**)	.279(**)	-.448(**)	.365(**)	-.016	-.418(**)	-.020	.209(*)	.291(**)	1	.814(**)	-.056	.285(**)	-.244(*)
	Sig. (2-tailed)	.002	.072	.108	.000	.068	.001	.005	.000	.000	.878	.000	.845	.037	.003	.	.000	.577	.004	.014
NATURAL	Pearson Correlation	.272(**)	-.139	-.162	-.359(**)	.162	.345(**)	.172	-.424(**)	.286(**)	-.060	-.397(**)	.007	.115	.162	.814(**)	1	-.007	.237(*)	-.225(*)
	Sig. (2-tailed)	.006	.167	.108	.000	.108	.000	.087	.000	.004	.561	.000	.944	.254	.108	.000	.	.948	.018	.024
WATEROTHER	Pearson Correlation	.110	-.012	-.158	-.060	.112	.016	.066	-.115	.108	.008	-.104	.055	.078	-.050	-.056	-.007	1	.157	-.179
	Sig. (2-tailed)	.277	.905	.117	.557	.267	.875	.512	.253	.285	.942	.304	.590	.438	.620	.577	.948	.	.118	.075
ANC	Pearson Correlation	.758(**)	-.426(**)	-.470(**)	-.428(**)	.631(**)	.296(**)	.439(**)	-.640(**)	.625(**)	.302(**)	-.676(**)	.396(**)	.593(**)	.196	.285(**)	.237(*)	.157	1	-.642(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.003	.000	.000	.000	.003	.000	.000	.000	.051	.004	.018	.118	.	.000
DA	Pearson Correlation	-.711(**)	.278(**)	.868(**)	.695(**)	-.689(**)	-.178	-.335(**)	.778(**)	-.481(**)	-.172	.813(**)	-.250(*)	-.468(**)	-.146	-.244(*)	-.225(*)	-.179	-.642(**)	1
	Sig. (2-tailed)	.000	.005	.000	.000	.000	.077	.001	.000	.000	.095	.000	.012	.000	.147	.014	.024	.075	.000	.

** Correlation is significant at the 0.01 level (2-tailed) / * Correlation is significant at the 0.05 level (2-tailed)

- APPENDIX XI –

Wastewater Connection Fees

Table A11.1. Wastewater Department connection fees (Rand) (EWS, 2003).

Type of Connection		Pre-2002	Post-2002	% change
For first connecting foul-water sewer	100 mm diam	R3,353.50	R3,353.50	8%
	150 mm diam	R3,550.50	R3,835.00	8%
Foul water sewer ≤ 10 m in length	100 mm diam	R3,704.00	R4,000.00	8%
	150 mm diam	R3,920.50	R4,235.00	8%
Connecting foul-water sewers having diameter greater than 150 mm nominal diameter		Full Cost	Full Cost	0%

- APPENDIX XII -

List of Interviews

Table A12.1. Interviews held during course of thesis research.

Date	Time	Name	Position	Notes
23 April 2003	10-11 am	Alex Loftus	Researcher, Oxford University	Telephone Interview
28 April 2003	4-5 pm	David McDonald	Professor, Queen's University	Telephone Interview