WATER RESEARCH COMMISSION

WORKING PAPER

A review of sustainable water pricing and tariffs in South Africa

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Abstract

In South Africa, access to water and sanitation is a constitutional right. At the same time, it is meant to be treated as an economic good, priced fairly to sustain systems. However, similar to many countries, there exists a significant gap between what consumers pay for water and the revenue required to cover operations and maintenance, and investment in new infrastructure. Water revenues and water sales continue to decline in South Africa. There remains uncertainty as to how water authorities can recover costs linked to treatment and delivery and encourage conservation efforts simultaneously. This paper outlines experiences from developing countries, including South Africa and synthesis recommendations related to water pricing and tariffing.

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Introduction

In South Africa, access to water and sanitation is a constitutional right. At the same time, it is meant to be treated as an economic good, priced fairly to sustain systems. However, similar to many countries, there exists a significant gap between what consumers pay for water and the revenue required to cover operations and maintenance, and investment in new infrastructure. Water tariffs are what service providers charge users for treatment, purification, distribution of water, and collection, treatment and discharge of wastewater. It is a mechanism applied by public utilities in the recovery of costs linked to stated services. Water pricing is the assumed cost of getting water from the source to the consumer. It is an economic instrument often used for improving water use efficiency, enhancing socio-equity and securing financial sustainability of water utilities and operators (Ricato, 2012) and typically levied on industries, utilities and farmers. However, it is acknowledged that the current pricing model of water almost never considers its value and rarely covers its cost.

However, water pricing and tariffing remains a balancing act. Water revenues and water sales continue to decline in South Africa. Despite increases in the percentage of households with access to water, there has been a decline in households that pay for piped water dropping from 67,3% in 2008 to 40,09% in 2018 (StatsSA, 2019). There remains uncertainty as to how water authorities can recover costs linked to treatment and delivery and encourage conservation efforts simultaneously. With population growth, increasing urbanisation and increasing demand, municipal debt continues to rise resulting in poor credit ratings and an inability to attract investment where it is needed the most. Grant transfers and the low water tariff is seen to exacerbate the problem and weaken incentives for consumers to settle bills (Dikgang et al, 2018). This paper will outline experiences from developing countries, including South Africa and synthesis recommendations related to water pricing and tariffing.

Positions on water tariffing and pricing in developing countries

Water is a scarce resource requiring appropriate pricing to support the operationalisation of public policy. Tariffing and pricing of water is not a static exercise and requires the consideration of social, economic and environmental benefits if it is meant to sustain scarce resources in developing countries (Vilcara & Karina, 2007). Approaches to water pricing require flexibility and needs to consider how spatiotemporal changes can be built in, such that charges for water services and charges for water resources are adequately reflected (GWP, 2017).

The dilemma arises from the varying perspectives on the value of water, affordability in relation to the poor and consumer Willingness to Pay (WtP). Roger et al. (1998) developed the principles for costing water. These related to full cost, full economic cost and full supply

cost (Figure 1). These principles can be applied, but is dependent upon the availability of information linked operation and maintenance costs, capital charges, the ability to determine opportunity costs, economic and environmental externalities. This is often problematic in developing countries due to the complexity of quantifying these externalities and balancing the needs of the poor and disadvantaged.

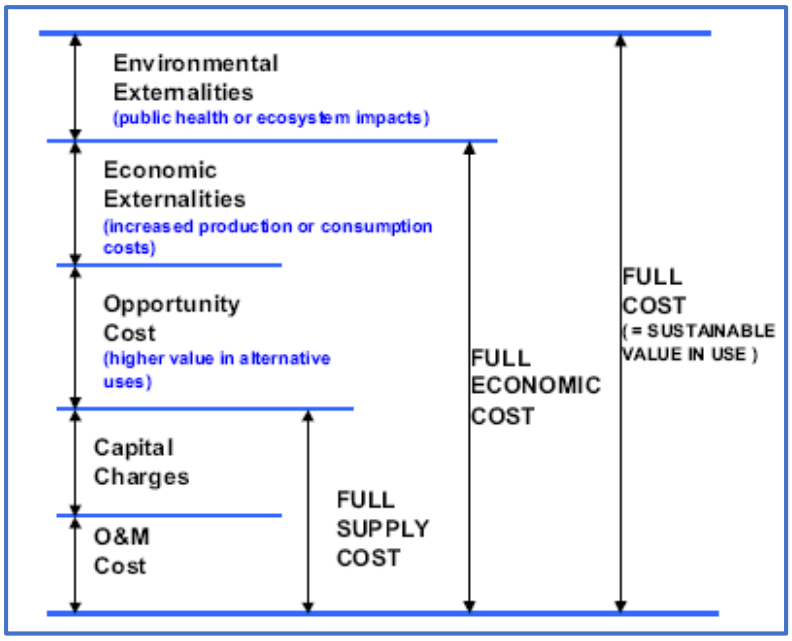

Figure 1. Rogers et al. (1998) General Principles for the Cost of Water

The full cost recovery of water should include the full provisioning and cost of supply, economic costs and environmental externalities, and should also consider present and future generation value and benefit (Rogers et al, 1997). The user pays principle varies in that users pay for the costs of their water use, including targeted subsidies where users are not able to afford costs related to the full cost recovery principle. In South Africa, the fiscus has the option of subsiding shortfalls between cost of supply and full cost recovery (PMG, 2015).

Water tariffing, as an economic mechanism, needs to meet a multitude of objectives requiring inputs from a range of stakeholders in order to determine a more flexible tariff design. These relate to fairness, equitability, revenue, measurability, supplier stability, affordability, public understanding of rate-setting, and reducing conflict with other government policies, are just a few.

Tariff setting in India prescribes minimum tariffs for municipal bodies and cities determine costs above the minimum tariff for cost recovery. The most common tariff structure used by metropolitan cities is fixed charge tariffs (Raghupati & Foster, 2002). Symbolic fees were used in Uganda prior to 1972 and were mostly influenced by social factors (Dinar & Subramanian, 1997). A new charge system came into play in 1990 introduced different

categories of consumers with residential paying flat rates based on infrastructure like the number of taps. In Lima, Peru the cross-subsidy system provides large benefits yet is challenged with incentives to conserve water. Revenues cover operation and maintenance but the tariff system is inefficient due to the scarcity of water resources and high levels of poverty. The current state of infrastructure prevents provisioning of water to all and a tariff increase is required alongside improved awareness of the population of the water pricing system. Extant literature and case studies have shown that there is no one size fits all water pricing and tariffing model and that hybrid models should be considered in developing countries.

Water tariffing and pricing in South Africa

In 2007, the South African water pricing strategy disaggregated pricing regimes into pricing tiers – raw, bulk and retail pricing categories. The objectives of social equity, financial sustainability, economic efficiency and ecological sustainability drove the strategy and development of the three-tier pricing structure. In addition to the three tiers, other charges were developed to take into consideration location factors, such as systems, catchment and sub-catchments. These include the water resource management charge (WRMC), water resource development costs, and the waste discharge charge system as examples (Hassan & Schreiner, 2011).

As the lead on norms, standards and compliance against such, the Department of Water and Sanitation (DWS) in South Africa issues guidelines for setting retail tariffs for standardised piped water service packages. Due to South Africa's three-sphere system of government (national, provincial and local), each has executive and legislative authority in their own sphere as defined by the Constitution. Guidelines provided by DWS, e.g. the recommended Block Tariff structure, consider the basic demand and are linked to an adjusted average cost. Water service tariffs are linked to the marginal cost of supply and the most recent guidelines (DWA, 2011) recommend incremental increases for households.

South African experience has shown a shift from supply-side measures to demand-side policies, and has increased tariffs to include the mandatory water resource management fee charged to consumers (Dikgang et al., 2018; Turpie et al., 2008). A recent Water Research Comission (WRC) study put forward scenarios whereby raising revenues through the increase in tariffs may not result in the outcome expected. However, if the goal is to reduce consumption and conserve water then tariff increases would be an option (Dikgang et al. 2018).

The revised DWS Pricing Strategy (DWS, 2015) provides a framework for pricing the use of water from water resources (untreated), resources supplied from government waterworks and includes water discharge into a water resource or onto land. It seeks to improve transparency and the predictability of water users and how water can be priced to ensure

effective, equitable and sustainable growth and development as per the National Water Resources Strategy (NWRS, 2013). It aims to balance cost recovery through water use charges for effective operations and maintenance, new developments, to support redistribution, transformation, equity and the redress of racial and gender imbalances. Yet, frameworks and guidelines are proving difficult to implement as municipalities face growing constraints in balancing legal standards of delivery, the need for cost recovery, water scarcity, the accommodation of socio-political pressures, and poor water service infrastructure.

The costs related to potable water, wastewater management, access and use reflect differences in their determination. However, there is no economic case to separate levying for potable water provision and for wastewater receipt and sanitation. A case can be made for distinguishing between access and use charges due to differences in water service supply infrastructure through Stepped Tariffs. However, this may not have the desired impact due to complex factors linked to improving transfers and benefits from the rich to the poor and many significant historic factors (Hosking & Norden, 2013).

The South African context is an interesting case when it comes to water use. Scholars argue that it appears that on average higher income households use more water. Yet, households with more inhabitants show high use and the poor with water supply connections share resources and supply to unconnected families. Studies in the Eastern Cape suggest that water service tariffs were calculated by balancing tariff revenues with financial costs i.e. a cost accounting exercise with little consideration and under-recovery for depreciation and environmental costs with preferences to increase the block tariff structure in order to facilitate cross-subsidisation of the poor and manage demand whilst attending to new infrastructure.

Water supplies through municipalities are categorised into non-tariff water, water charged at average financial cost (the tariff level) and water charged to balance total revenue with total financial cost. Non-tariff water (non-revenue water) relates to all water losses where no revenue is generated due to leaks and theft, and where no national government subsidy support is provided. Water services are charged at their average financial cost of production to government, selected business firms, other municipalities and residents whose tariffs are paid out of equitable share on their behalf by National Government. The remainder of water service users are charged in a way that balances total revenue with total cost, namely, full tariff paying residents and businesses not qualifying for average cost tariffs. Revenue (and captured consumer surplus) is maximised from this group by means of price discrimination. Those who are prepared to pay more for their water are charged more for it. This tariff and water classification system is reported by the municipalities to work well, but there are two obvious economic concerns that it gives rise to: the responsiveness of supply to demand is undermined. Several municipalities reported an advantage of the system being that they could solve the problem of excess demand (cheaply) through a tariff hike rather than an

increase supply (the more expensive option); this system is accommodative to water wastage/loss (and high non-tariff water levels). The supplier (municipality) does not bear the burden of this loss, because the cost is captured from consumers (transferred consumer surplus).

Principles for water pricing

This pricing strategy is based on sound principles and aims to provide a greater degree of transparency on how raw water is priced in the country. It recognises the developmental context of the South African water sector and acknowledges that where, for social equity, environmental or affordability reasons, water management cannot be sustainably financed from specific water users, then that shortfall must be recovered transparently. The following principles underpin the revised pricing strategy:

- ***Hybrid tariff approach*** – The pricing strategy provides for a combination of nationally and water management specific charges to facilitate the development of affordable tariffs to all users: some elements of the water charge will be levied based on a national charge for a sector(s), and some based on a scheme based or catchment level charge.
- ***User pays and recovery of costs*** – The intent of the pricing strategy is to provide for the full recovery of costs associated with the management, use, conservation and development of water resources and the associated administrative and institutional costs. Users must pay for the costs of their water use in this regard, considering the need for targeted subsidies where, due to socio-economic conditions, users are not able to afford the costs resulting from full application of these principles.
- ***Polluter pays*** – Allied to the principle above, this principle sets out that polluters must pay for the costs of their water discharge or pollution.
- ***Differential charges and capping of water use charges*** – The pricing strategy allows for differential charges and the capping of water use charges to designated water use sectors to support the achievement of key national objectives, such as food security, racial and gender equity, job creation, economic development.
- ***Fiscal support*** – The Department will provide fiscal support for core national and public interest functions, undertaken by water management institutions, which cannot be recovered fully through water use charges.
- ***Ecological sustainability*** – The pricing strategy will facilitate funding to ensure the provision of water for the ecological reserve and the water sector's contribution to maintaining water ecosystems.
- ***Accountability*** – Funding will be allocated to specific water management institutions so that there is transparency and accountability for the funds that are generated through the pricing strategy
- ***Efficiency*** – The pricing strategy makes provision for an economic regulator to ensure that the water management charges are maintained at affordable levels
- ***Multi-year tariffs*** – The pricing strategy provides for multi-year tariff determination to facilitate longer term planning and greater levels of certainty for water institutions and users.

The pricing strategy makes provision for several charges. These charges can be divided into three main categories:

- Water Resources Management Charges, which cover the charges required to manage water resources within the nine water management areas determined in the NWRS-2.
- Charges relating to the development and use of waterworks, which cover the charges related to planning, capital costs, operation and maintenance, depreciation, and future infrastructure build on government water schemes and
- Waste Discharge Mitigation Charges which cover the charging for discharge of water containing waste into a water resource or onto land.

In addition, the issue of payment for catchment and natural infrastructure rehabilitation, and issues of payment during drought periods or in the face of natural disasters are dealt with. The Waste Management Levy is not dealt with in this strategy but will be determined through a Money Bill that will be tabled in Parliament.

Source: National Water Pricing Strategy (2015), DWS

Key postulations challenging the status quo

The current pricing strategy (DWS, 2007) is structured in such a way that it gives a blanket subsidy to some water use groups. As a result of these blanket subsidies, DWS is undertaking subsidy decisions that ought to be made by other government departments given that the subsidised activities of the beneficiaries are the responsibility of and fall under the oversight of those departments, particularly the Department of Agriculture, Land Reform and Rural Development (DALRD) and Department of Environment, Forestry and Fisheries.

The current pricing strategy equally does not provide sufficient protection for the poor against rising water prices resulting from infrastructure development. Nor does it provide a robust method of generating revenue for the development of infrastructure that is intended for social or economic stimulus purposes. The current pricing strategy does not make it possible for DWS to set charges that reflect the full cost of delivering water, resulting in insufficient revenue for water resource management and sustainable infrastructure asset management.

Postulation on other aspects of the pricing strategy:

- It does not take consider the full value chain in determining water costs. Municipal tariffs are guided by Norms established by DWS. The pricing strategy does not factor how tariffs are impacted.
- Affordability, Willingness to Pay (WtP) and Willingness to Charge (WtC) are elements that are not tested in both pricing and tariffing processes. Engineering economies of scale become the default driver for deriving prices and tariffs.

- A hybridisation model has different meanings in the pricing context. On one side it is an operational model and on the other it is a completely separated system.
- Where there is private sector financing of water services, the pricing strategy is very rigid to accommodate any relaxation in charges/subsidy to make transactions viable.

Pricing and tariffs moving forward

The balance of supply and demand dynamics, socio-economic and socio-political systems, and planning for water security is complex to say the least when considering the relationship between government, society and economic sectors. Tariffing and pricing cannot be implemented in isolation and should be a complementary tool whilst recognising that social parameters, cost recovery mechanisms and environmental impacts are primary. Rios et al (2018:15) states that the contribution of water pricing toward the sustainable management of water resources requires large investments and financial commitments to manage direct and indirect pressures impacting the quantity and quality of water resources. The question arises as to how much of the total cost of water management should be funded by user charges and how much by the fiscus especially if one acknowledges that certain aspects of managing water quality and quantity are by nature public benefit functions. Further research should delve into the balance between user charges and fiscal funding. The scholars argue that such decisions should be taken alongside aspects with respect to innovations in clean water technologies, increasing the capacity of customers and users on larger merit of valuing water, and putting in place mechanisms and policies to manage and mitigate conflict. It is overall imperative to set a long-term agenda.

A significant component of the challenge lies in the existing information gaps and the nature of demand for water service provision::

- The structure of tariffs is just as important as the level of charges in achieving equity and cost recovery.
- Improvements in billing and in the rate of collection can have the same effect as tariff increases, without attracting as much opposition.
- WSA's lack a clear view of water-related expenditure on budget lines that cut across the entire municipality, preventing the setting of cost-reflective water tariffs;
- Private companies are better equipped at levying and raising charges than their public counterparts but at the risk of equitability. It is yet unclear how this can be better facilitated and managed.
- Pricing of water alone will not have its desired effect towards better conservation efforts if it is weakened by policies elsewhere that pull in the opposite direction. This lesson was learnt from attempts to reduce water use in agriculture and reduce the waste of water and pollution in highly protected industries.

The outcomes of studies suggest a combination of strategies that are carefully crafted to consider investment choices including ownership versus management of assets, planning, maintenance and rehabilitation. The financing and use of grants are dependent upon tariff policies, tariff setting, improved billing, credit control and revenue management. All of which require a review of service delivery mechanisms in order to improve investment attractiveness.

Water Pricing and Tariffs have several dependencies and a part of a larger agenda that if ideal requires rational behaviour, perfect information and minimal transaction costs. All of which do not exist (Dinar, 2000). There are several political, economic and governance factors that lend to improved pricing and tariffing that include shared societal values, institutional capacity and willingness to charge. Multiple values create multiple tensions between social groupings where commodification or privatisation to improve measurability and efficiencies is not preferred due to distrust and trade-offs in the system. Coordination between authorities at the different governance tiers is poor and therefore does not lend to information sharing, resolution of conflicts and flexibility. Improved systems and resources are required for the administrative tasks linked to horizontal coordination in tariff design, billing and collection of revenues and customer relations. Willingness to Charge (WtC) is affected by political needs that do not serve the public, civil society pressure to keep prices low, and infrastructure decay and wasteful use need to be addressed if water pricing and tariffing are meant to perform optimally (SIWI, 2016). State support and smart subsidies have an important role to play. However, the blanket subsidy approach should be revised where water use across e.g. the scale of agriculture should be considered to build in equity. These are key factors to be considered in further developing hybrid-pricing models within the South African context.

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KEY DEFINITIONS

Block rate structure - a tariff schedule with a provision for charging a different unit cost for various increasing or decreasing blocks of demand for water.

Decreasing Block Tariff - a single tariff structure in which per-unit price of water decreases as the consumption increases.

Fixed charge - the fixed component of a two-part tariff structure.

Fixed charge tariff - a single part tariff that applies the same price, without considering the consumption.

Fixed cost - the sum of the business expenses that are not dependent on the activities of the business

Full cost - the full economic cost with the addition of the environmental externalities. These costs have to be determined based on the damages caused**.**

Full cost recovery - to recover all of the costs associated with a water system, programme or service to ensure long-term sustainability

Full economic cost - the sum of the full supply cost and the opportunity cost associated with other use of the same water resource and the economic externalities imposed on others as a result of the water consumption by a specific factor.

Full supply cost - the cost associated with the supply of water to a consumer without consideration of the externalities or the alternatives uses of water

Full value - the economic value of water plus the intrinsic value.

Increasing block tariff - a single part tariff structure in which per-unit price of water increases as the consumption increases.

Non-tariff water - all water losses and water supplied is provided at no charge or without national government subsidy support

Single part tariff - a tariff structure composed of only one charge or part.

Two-part tariff - is composed of two charges or parts: a fixed charge and a volumetric charge.

Uniform volumetric tariff – a single tariff structure that applies a constant unit price for all metered volumetric units of water consumed.

Volumetric charge - the volumetric component of the two-part tariff structure.

Volumetric tariff - a tariff structure based on the volume of water consumed by the users.

Hosking & Norden (2013); Vilcara & Karina (2009)